GL011634

COMPLETION REPORT

GEOTHERMAL PRODUCTION WELL P-88-2

Sulphurdale, Utah

For

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

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

GL01634

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(LADY LORRETTA)

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7350 E. Evans, Suite B
Scottsdale, Arizona 85260

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

July 1989

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PLATE (in pocket)

COMPLETION REPORT FOR

P-88-2
Sulphurdale, Utah

I. ABSTRACT

A geothermal production well designated P-88-2 and informally named "Lady Lorretta" was drilled and tested on Fee land controlled by Mother Earth Industries, Inc. between the dates of January 2 and January 25, 1989. The well is 3018 ft. south and 986 ft. east of the northwest corner of Section 7, T26S, R6W, SLB&M.

P-88-2 penetrated about 77 feet of Quaternary alluvium typical of "sulphur pit materials" and then transected about 723 feet of variably colored, altered and metalized ash-flow tuffs of the Three Creeks formation (Tbt). Between 135 and 230'KB, a red-brown to black hydrothermal breccia was encountered and between 750 and 800'KB the Tbt was green, strongly argillized and pyritic.

The Coconino sandstone/quartzite was penetrated at about 800'KB. The first steam entry was recorded at 815'KB and major steam-bearing fractures were logged at 825 and 830'KB. The well was bottomed in the Coconino Fm., at 951'KB, 22 days after the start of drilling.

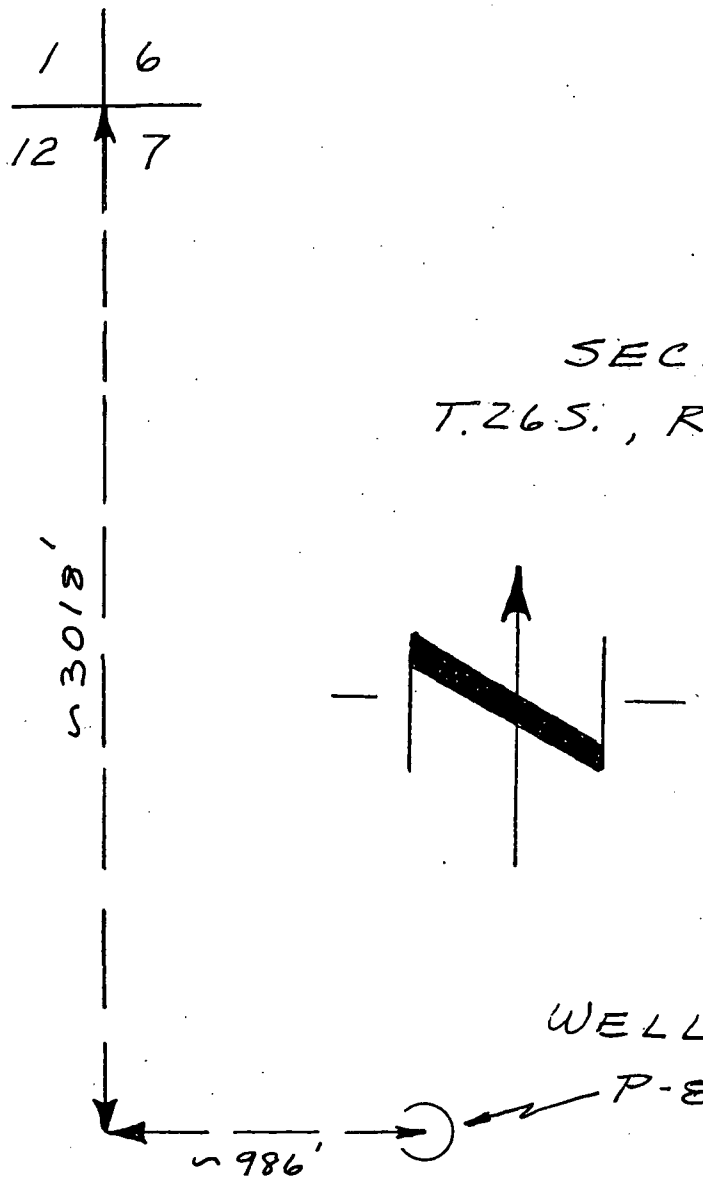
The prime contractor for the well was Sierra Drilling Inc.; surveys were done by Sunrise Engineering, Inc. of Fillmore, Utah; Safety Services were provided by Bell Safety of Evanston, Wyoming; wellsite geological supervision was by Geothermal Management Company, Inc. of Evergreen, Colorado; and petrographic 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 geothermal production well P-88-2 located near Sulphurdale, in Beaver County, Utah within the Cove Fort-Sulphurdale KGRA.

Specifically, the well is on MEI controlled fee land approximately 3018 feet south and 986 feet east of the northwest corner of Section 7, T26S, R6W, SLB&M. It is about 410 feet southwest of P-88-1A, 800 feet southwest of well 34-7A (Olga), 560 feet southwest of exploratory well S-87-4, 65 feet south of exploration well S-88-3, and 540 feet northeast of exploration well S-89-4.

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.



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LOCATION MAP P-88-2
SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 7-14-89
Scale: 1" = 600'
Dwng. No: ME1P882-1

Figure 1

III. WELL DRILLING AND CONSTRUCTION HISTORY

In order to increase the amount of steam recoverable from the Sulphurdale geothermal field, production well P-88-2 was drilled as follows:

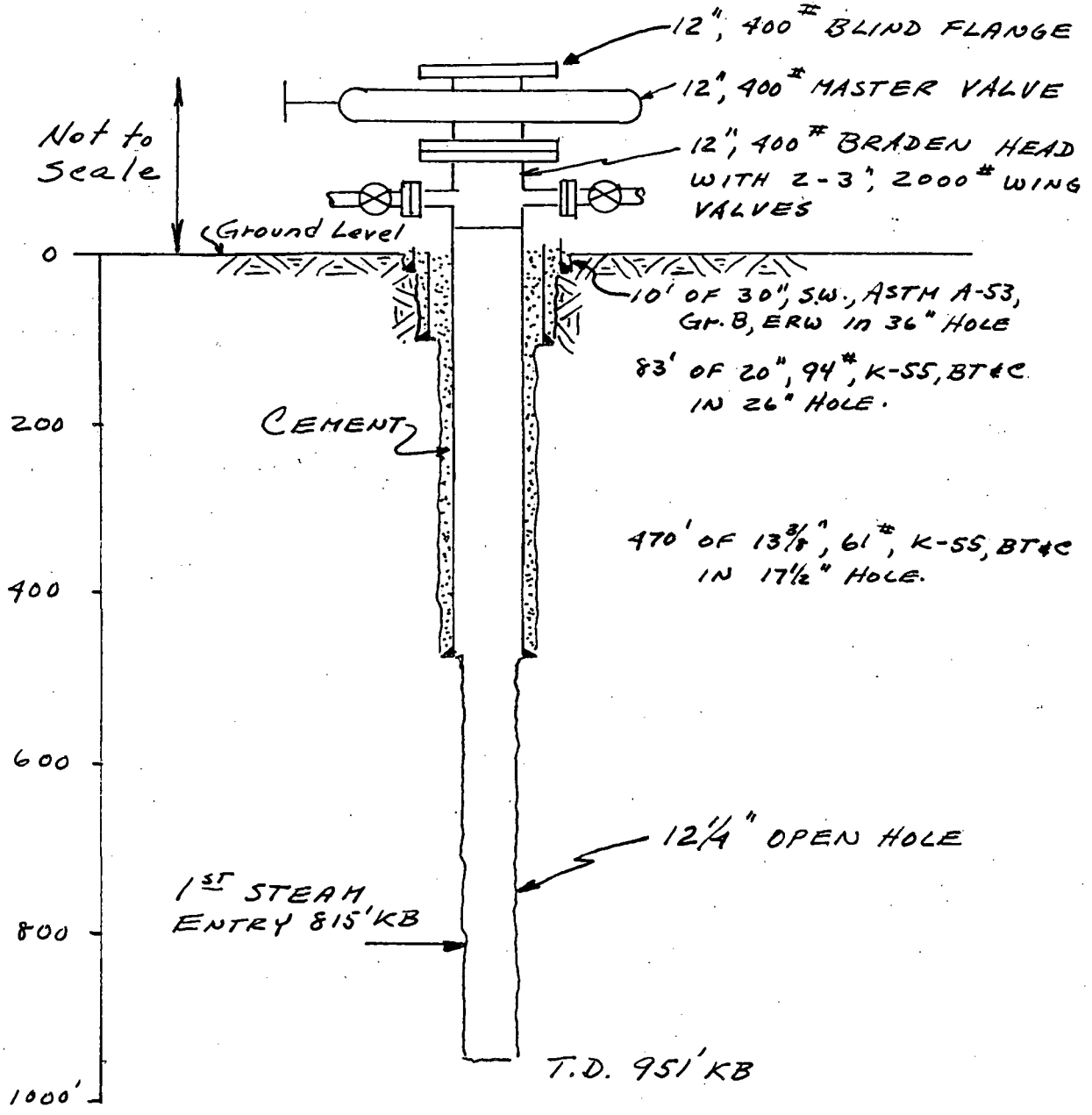
On January 3, 1989, 10 feet of 30" SW, ASTM A53, Grade B, ERW conductor casing was set by backhoe and cemented in place. Following a lengthy rig-up, the well was spudded on January 8, and by 0630 on January 9, a 26" hole had been drilled to 100'KB. The contract drilling engineer decided to set surface casing at this depth and on January 9, 83' of 20", 94#, K-55, BT&C was landed and cemented useing a 2" tremie outside the casing.

Following nipple-up of the BOPE and repeated thawing of frozen air and mud lines, an attempt was made, on January 11, to drill ahead with a 17.5" bit. When drilling mud returned to the surface via the mousehole, it became apparant that the outside cement job had failed and operations were shut down by Mother Earth Industries, Inc.

On January 16, operations resumed with new crews. B.J. Titan successfully squeezed cement into the 20" casing and the mousehole and between January 18 and January 20 the well was drilled from 100' to 470'KB.

At 470'KB, 13.375", 61#, K-55, BT&C production casing was run and cemented without incident. On January 22, after pressure testing the BOPE, drilling resumed and on January 23, steam was encountered at 815'KB. Drilling continued into the production zone and the well was bottomed at 951'KB on January 24. A brief cleanout/flow test was run on January 25.

A drilling history, describing daily events between January 2 and January 25, 1989, drilling activity sheets, 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 13.375" casing. Appendix B, attached, is MEI's basic drilling procedure developed for production scale wells.



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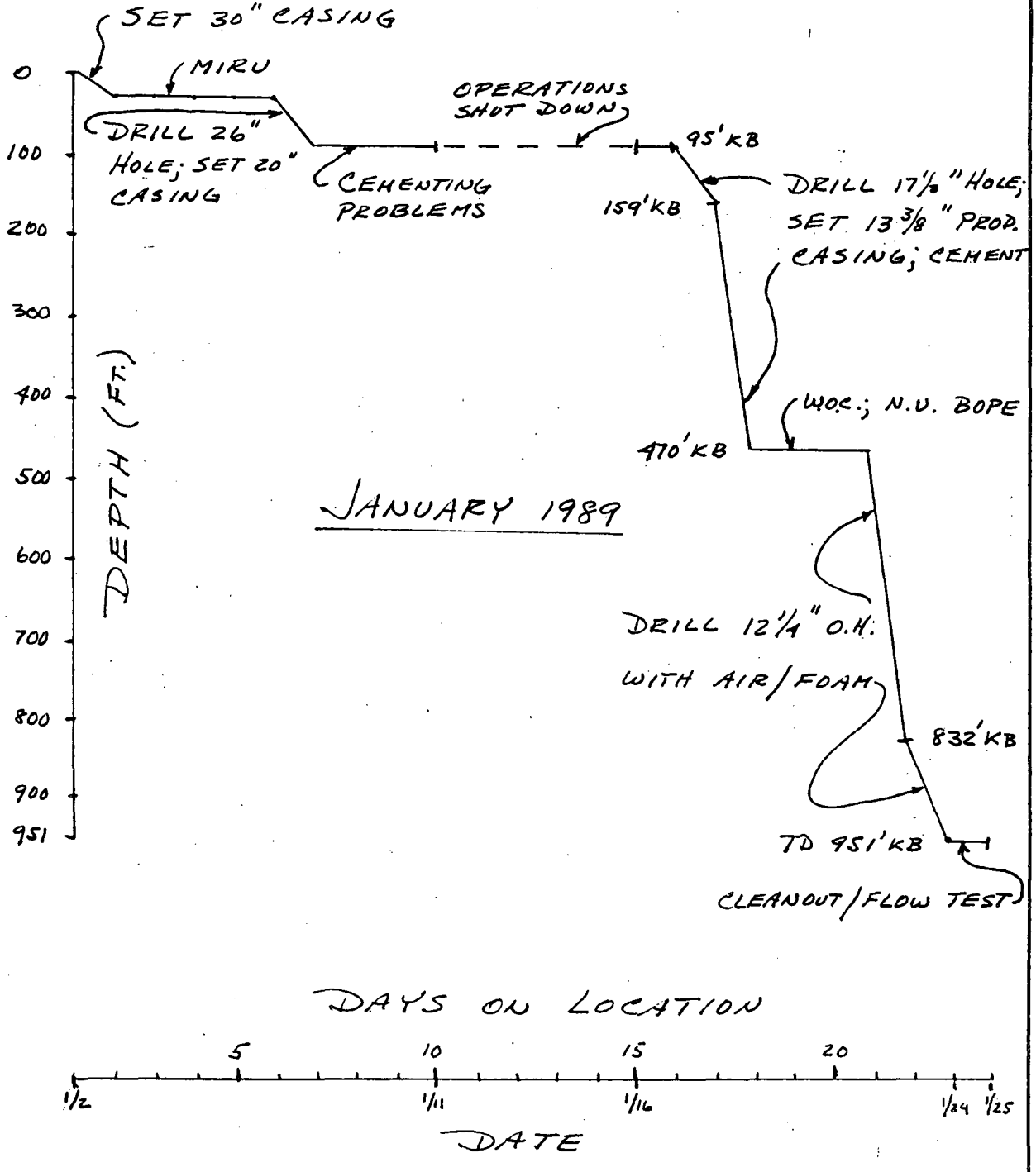
WELL PROFILE P-88-2

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 7-14-89
Scale: 1" = 200'
Dwng. No: ME1P882-2

Figure 2



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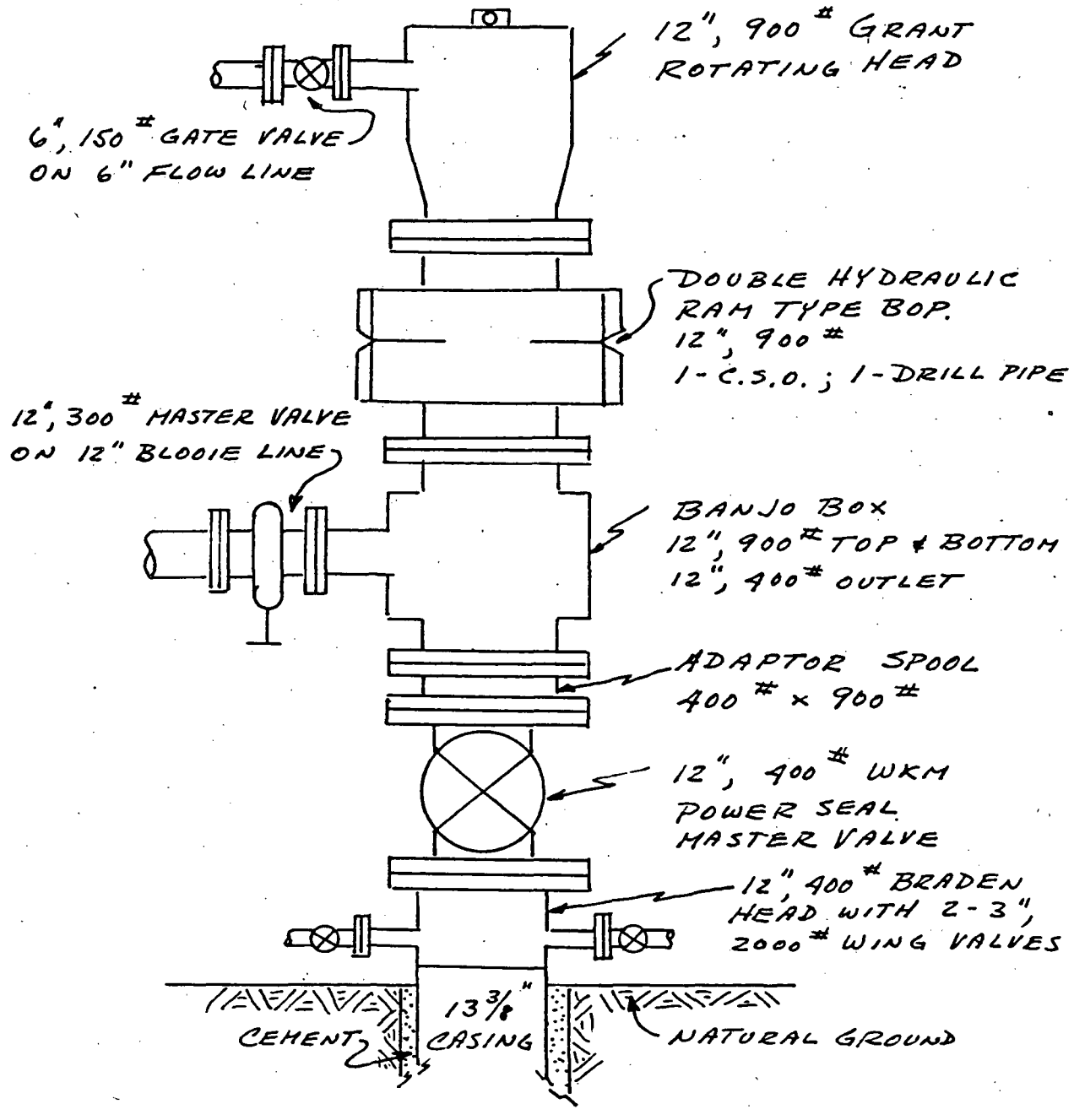
DRILLING CURVE P-88-2

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 7-14-89
Scale: 1" = 200' VERT.
Dwng. No: HEIP882-3

Figure 3



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13 3/8" B.O.P.E. STACK P-88-2

SULPHURDALE, UTAH

By: GWH | Ckd: GWH
Date: 7/14/89
Scale: NONE
Dwng. No: ME/P88Z-4

Figure 4

IV. GEOLOGY

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

The rocks penetrated in P-88-2 comprise hydrothermal breccias and ash-flow tuffs (Ttb), hydrothermally altered to varying extents, that have been designated as the Three Creeks Tuff Member of the Bullion Canyon Volcanics (one of the oldest of the local volcanic units). The Three Creeks Tuff has three distinct zones: an upper and a lower zone of red to grey densely welded tuff and a middle zone of poorly welded white tuff. Only the lower zone of the Three Creeks Tuff has been mapped in the Cove Fort area of interest.

This lowermost zone of the Three Creeks Tuff has been further subdivided into two cooling units. The upper unit is characterized by euhedral plates of biotite up to several millimeters wide and euhedral (beta morphology) quartz crystals while the rocks of the lower cooling unit are mineralogically the same but much finer grained. The lower unit (tentatively correllated with the Wales Canyon Formation) was not found in P-88-2.

P-88-2 penetrated "Sulphur Pit" type altered alluvial materials to 77'KB and then stayed in coarse grained, light to medium to dark grey, to green-grey, to red-brown, variably altered and pyritized Tbt to 800'KB. A hydrothermal breccia was logged between 135 and 230'KB and a section from 435 to 630'KB was noted to be highly pyritic.

The well entered the Coconino sandstone/quartzite at 800'KB with the first steam entry at 815'KB. Continued drilling of the white, vitreous, silicified Coconino resulted in increased steam flows, especially from major fractures between 825 and 830'KB. The hole was terminated in the production zone at 951'KB due to technical, wear-related problems.

Attached, as Appendix C, is a petrographic description of drill cuttings from 0 to 630'KB, together with some interpretive comments. Unfortunately the cuttings from 630 to 951 were lost after they were binocularly field-logged.

V. PERMITS

Because well P-88-2 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 P-88-2 was pressure tested in accordance with State regulations, the test was witnessed and approved by UDWR representitive John Solum.

VI. SUMMARY COST ESTIMATE

P-88-2 costs , summarized in Appendix E, averaged $266.86 per foot for two primary reasons:

1) The weather was unusually severe causing delays due to repeated freeze-ups and burial of equipment beneath snow and

2) There arose a disagreement regarding drilling proceedures between the well owner and the contracted drilling engineer that resulted in an eventual costly, time consuming change of personnel and vendors.

VII. CLEANOUT/FLOW TEST DATA

Test conducted by Jay C. Hauth of MEI.

1-25-89

1030	Close flowline valve.
1031	Start to open master valve, slight blind ram leak. WHP 46 psig.
1034	Open flowline valve, well unloads black fluid, mud and gravel.
1035	Still unloading.
1037	Still black.
1038	Completely open master valve.
1039	Occasional black slugs.
1041	WHP=9 psig, flowline pressure=3-4 psig at point ~6 feet d/s from well.
1043	Blind rams no longer leaking. Wind North and light, ambiant air temperature = 5F. Olga pressure down 0.5 psig.
1200	Crews released.
1215	WHP=8 psi +/- 1 psi.
1219	S-88-3 WHP=48.8 psig, well stable, no cannonballs. Flow not transparent at flowline nozzle. Flare angle=10 degrees.
1222	Flowline pressure = 2-3 psig.
1300	S-88-1 = 47 psig.
1301	Linda = 41.5 psig.
1303	Olga = 40.5 psig.
1405	Linda = 41.5 psig.
1407	Olga = 40.5 psig
1410	S-88-1 = 47 psig
1419	P-88-2 WHP = 8 psig.
1420	Start shut-in with flowline valve.
1422	WHP = 20 psig, complete flowline closure, begin master valve closure.
1424	WHP = 42 psig.
1425	WHP = 43 psig.
1426	S-88-3 = 48.4 psig.
1427	P-88-2 = 45 psig.
1430	P-88-2 = 45 psig.
1431	S-88-3 = 48.5 psig.
1448	P-88-2 = 46 psig.
1449	S-88-3 = 49 psig.

APPENDIX A

P-88-2 DRILLING HISTORY

1-2-89		
0730	- 1800	Miscellaneous cleanup; material stocking.
1-3-89		
0730	- 1800	MIRU; Set 10' of 30" SW, ASTM A53, Grade B, ERW conductor casing.
1-4-89		
0730	- 1800	MIRU
1-5-89		
0730	- 1800	MIRU, Safety classes for entire crew.
1-6-89		
0730	- 1800	MIRU
1-7-89		
0730	- 1800	MIRU
1-8-89		
0000	- 0400	MIRU
0400	- 0600	Spud hole with 26" Smith RB bit and drill to 30'KB. KB=GL plus 17'.
0600	- 0800	MU new mud.
0800	- 0900	DA to 47'KB.
0900	- 1200	Build and condition mud.
1200	- 1545	Service rig and change subs.
1545	- 2300	DA 47'-100'KB. Into bedrock at about 77'KB.
2300	- 2330	Circulate mud.
2330	- 2400	RIH to check for fill.
1-9-89		
0000	- 0415	Circulate and condition hole.
0415	- 0630	POOH, ice problems.
0630	- 1400	Run 83' of 20", 94#, K-55, BT&C surface casing.
1400	- 1430	Cement, via a 2" tremie pipe on the outside of the casing, 12 yds Class G cement plus 2% $CaCl_2$. CIP at 1430.
1430	- 2400	WOC; install weather protection on rig.
1-10-89		
0000	- 0300	WOC; service rig.
0300	- 0530	Cut off 30" and 20" casings.
0530	- 1200	Weld on Braden head, test to 3000 psi for 30 minutes.
1200	- 2000	NU 20" Hydril.
2000	- 2400	Continue rig-up in bitter weather.

1-11-89

0000 - 0600	Service rig, redrill mousehole, clean out cellar.
0600 - 1000	Rig up choke and kill lines.
1000 - 1200	MU 17.5" BHA.
1200 - 1400	Try to pressure test BOPE to 500 psi. No luck.
1400 - 2200	Discover cement leaking up mousehole.
2200 - 2400	POOH, RD as per MEI instructions.

1-12 through 15-89 No operations.

1-16 to 1-25-89 See "P88-2 Activity Log" that follows in a different format.

Presented below is a brief documentation of the situation at P-88-2 on January 10 and 11, 1989.

Mr. Wayne A. Portanova
Mother Earth Industries, Inc.
7350 East Evans, Suite B
Scottsdale, Az 85260

January 12, 1989

Dear Wayne:

This "Trip Report" letter is written upon my return to Evergreen on January 12, 1989 following the temporary shut down of operations on MEI well P-88-2 effective January 11, 1989. The purpose of the letter is to document my activities and my impressions of the overall situation that prevailed while I was on site.

When I arrived at Sulphurdale on Jan.10, at about 1500 hours, the well was at 100 feet, with 97 feet of 20" casing cemented in place. The day crew was tightening the bolts on the 20" annular BOP. For the next 2 hours they continued to nipple up the BOP and the pitcher nipple/flow line. In the early evening, they began changing a valve on one of the mud pumps and this they continued to do in a driving snowstorm for several hours. Gary Sherman predicted that they would be drilling out the casing shoe by midnight after hooking up a kill line and pressure testing the 20 " annular BOP.

At 0630 on Jan. 11, the day crew was begining to make up their bottom hole assembly after cleaning out the mousehole and a cellar-full of mud all night while repeatedly thawing air lines. Jay and Gary vigorously jumped into the work scene and tried to speed operations. Their skill and experience did help noticeably, but they too were constantly

frustrated by frozen equipment, "green hands" standing around, and the need to modify or replace various pieces of hardware. By 1300 hours, when we talked to you, the BOP had still not been pressure tested though the BHA had been made up and mud was circulating. (The following paragraphs should help you understand why the pressure test was not accomplished).

On Jan. 10, I examined the drill cuttings from 17'- 100', using the MEI Binocular Microscope. The materials penetrated from 17' to approximately 60' were similiar to those recorded in the log of S-88-3. That is, a mixture of colluvial gravels of several lithologic types and cryptocrystalline silica in several habits including some that appear to be typical of hot spring deposits. From about 60' to 100', the cuttings were predominently grey with a yellow cast. The grey is largely due to an abundance of pyrite and only secondarily to the presence of tuffaceous materials. The cuttings were 50-70% quartz, 20-25% decomposed feldspar, and about 5% pyrite. No textures or structures were visible in the fragments, and little cementation was visible. All of this means that the 20" casing was placed in rock that has been significantly altered by geothermal gasses and/or fluids.

I was told by Gary that they were able to drill 10' of "bedrock" in 35 minutes, or about 17 feet per hour. With a 26" bit, this is quite rapid, but not really "snowdrift drilling". In the light of these statistics, I agreed that 40 feet of penetration into this rock with the 20" casing would probably be adequate and safe. My thinking took into account the fact that the 13.375" casing will be installed and cemented for more than 500' in competent rock well above the point at which we anticipate intersection of the steam resource.

The reason that the crews were not able to do a pressure test on the BOP was that mud was observed filling the cellar while the mud was being pumped out of the mud tanks to test the BOP. After hours of hand -bailing the mud out of the sump (there were not available any working pumps) mud was seen to be flowing out of the <u>mousehole</u> into the cellar. This means that the cement job on the 20" (done from the outside of the casing, with a tremie, for some reason) was not adequate. Probably, a repair can be achieved by putting a packer into the 20" and pressure-grouting the leaks that now access the surface via the mousehole.

In summary: 1) The rig, though oversized for the job at hand, can be run in such a way as to drill your wells in a fairly cost effective manner if experienced cold weather, geothermal crews are brought in, 2) Both Jay and Gary have tried very hard to give you reasonable "bang for your buck" but they have both been fighting the weather and the lack of truely experienced hands, and 3) The 20"casing should have been cemented in the conventional "inside-out" way in light of the altered nature of the bedrock encountered. Without a geologist on site, there was no way in which the quality of the rock could be assessed rapidly and a decision made to change the cementing method.

I'm sure that you have made a wise decision by hiring experienced crews to run your rig. Hopefully, costs per foot will decrease and, more important, "green-hand related emergencies" should be avoided. I look forward to returning to P-88-2 soon and to completing the first of what I anticipate will be many sucessful wells this year.

Sincerely,

G.W. Huttrer
Geothermal Management Company, Inc.

P882let.rep

P88-2 Activity log		Last edited 1/21/89	
Date	Time (2400)	Depth, RKB	Activity
1/16/89	0800	95	Hold safety meeeting w/Veco crews, Grimshaw and toolpusher
1/16/89			inspect rig for safety hazards
1/16/89	0900		start complete rig service, thaw out water lines,
1/16/89			hook up steam lines, hook up air dryer on compressor, adjust
1/16/89			cathead, put #1 pump together, thaw out water tank
1/16/89	1330		RU BJ Titan for squeeze:
1/16/89	1530		CIP, RD cementers, clean all unnecessary equip from rig,
1/16/89			rig floor, and clean location while WOC.
1/16/89	2000		Crew released for day, WOC
1/17/89	0800		Complete rig service, start up rig compressor, start engines
1/17/89			ND flowline and pitcher nipple
1/17/89			prep for rot head install
1/17/89			Safety meeting with crew
1/17/89			All hands on location attend H2S certification training by Bell Safety
1/17/89	2200		Hook up water lines and diesel lines to air comp for rot. head
1/18/89	0000		Install pipe to standpipe for air compressors
1/18/89	0300		Find elec. short in rig lighting sys
1/18/89	0400		measure, makeup bit and monel DC
1/18/89	0700		Install rot head packoff, compressors will not start
1/18/89	0800		Elec Acc arr., electrician on loc.
1/18/89	0945		#1 compressor started
1/18/89	1000		Hook up acc. and remote panel on floor, work on comps, mix foam
1/18/89	1045		Thawing acc, moving air starter from booster to unit #37 comp
1/18/89	1135		Unload hole w/air
1/18/89	1145		Inj foam 10 bbl/hr, start drilling out cement
1/18/89	1145		compressor stage pressures 20, 60, and 75 psi
1/18/89	1200		Lost air compressor, valve on Dresser fuel closed, killed motor
1/18/89	1215		Still warming acc, setup mist pump, still moving air starter to #37
1/18/89	1230		comp up again, Drilling out cmt from 77 to 95
1/18/89	1235		Compressor running, circ OK drlg ahead
1/18/89	1240	95	Hit shoe
1/18/89	1400	95	Shut down to start #2 comp, mix foam, comp. starter doesn't work,
1/18/89			drlg ahead @ 5 ft/hr
1/18/89	1430		Drill into 2" Tremie pipe, unit #37 still down
1/18/89	1500	95	2" Tremie pipe under bit in hole, milling
1/18/89	1530		Drilling on junk iron
1/18/89	1545	98	Drlg @ 98
1/18/89	1630	105	Iron milled up OK. Drlg ahead
1/18/89	1800	128	only 1 comoressor up
1/18/89	1830		circ w/air, clear hole
1/18/89	1915		2nd compressor started (unit #37)
1/18/89	1950	128	fill hole w/water, watch for fallback: none observed
1/18/89	2019	128	Unload hole, drlg ahead @128, 2 compressors operating
1/18/89	2200	159	Drlg approx 20 ft/hr, circ hole
1/18/89	2230	159	survey N73W 1/4 degree
1/18/89	2300		LD 1-6 1/2 DC, PU 2-9" (30')DC's
1/19/89	0230	159	Drilling ahead @ 159

P88-2 Activity log		Last edited 1/21/89	
Date	Time (2400)	Depth, RKB	Activity
1/19/89	0715	282	drlg 30 ft/hr due to wt incr. from 8 to 20K WOB
1/19/89	0730	282	Penentration slowed, shows hard or frac. formation 282-298
1/19/89	1000	300	Drlg ahead @ 300 ft.
1/19/89	1115	312	Clean hole, make conn and survey N86E not corr 1/2 deg dev.
1/19/89	1145	312	drlg ahead, 10-12K bit wt. 50-60 rpm, air 250 psi @5-6BBl/hr
1/19/89	1238	316	H2S detectors tripping approx 4 times in 5 min., Bell hand on loc.
1/19/89	1238		V. slow drlg 312-322
1/19/89	1300		Bell hand indicates detectors tripping due to vibration-corrected
1/19/89	1430	342	Make conn 342. Air hands dumping air to lower press
1/19/89	1450	347	Repair spinning chain, drlg @ 15 ft/hr (hard zone 282-322 ft)
1/19/89	1530	349	Increase mist to 8-10 Bbl/Hr., penetration incr to 20'/hr
1/19/89	1610	372	Conn 372, drilled smooth 15-20 ft/hr.
1/19/89	1635	377	drlg ahead 20 ft/hr
1/19/89	1800	402	make conn 402, had to set rotating dog in place, drlg 20 ft/hr
1/19/89	1900	410	Incr mist to 12-13 bbl/hr, no returns, incr mist to 20-25 bbl/hr
1/19/89	1915	415	not full returns, suspect water influx between 402 and 415
1/19/89	2000		Repair air line #1 pump clutch, put 13 3/8 csg on rack.
1/19/89	2030	430	waiting on air booster, poor returns due to lack of air.
1/19/89	2055	432	make conn 432, 20 bbl/hr inj rate
1/19/89	2100	432	drlg ahead @ 432, hole making out Tout 90 F
1/19/89	2140	452	Tout 84 F, more water, drlg @ 30 ft/hr
1/19/89	2200	462	Drilled at 30 ft/hr, conn 462, poor returns, booster not started
1/19/89	2230		booster won't start, est 20 BBl unloaded, meas. 100 F Tout
1/19/89	2237		Drlg ahead @ 462
1/19/89	2330	470	Sample taken; decision made to case @ 470
1/20/89	0100	470	Survey
1/20/89	0130		Wipe hole to DC's, hole clean, no fill on bottom
1/20/89			Set off H2S alarm @ rotating hd and flowline, 10 ppm to over
1/20/89			100 ppm, 4000 ppm measured in cellar.
1/20/89	0200		Mix mud w/Zn material to kill H2S
1/20/89	0600		pump @ 42 SPM 60 min, no returns: 8' fill on bottom
1/20/89			mix LCM, fill hole
1/20/89	1000		Fill hole w/mud : 131 sx gel, somne LCM, revamp flowline
1/20/89			with welder to circ back to pits
1/20/89	1200		Circ and cleanout fill from 455-470, circ hole clean
1/20/89	1250	470	Incr pump to 500 psi @ 92 SPM, good returns and no noticeable
1/20/89			loss of circulation. In need of hamburgers w/fries. Lost 300 psi
1/20/89			mud pump press, assume jet plugged
1/20/89	1330	470	Pull up to 20" csg shoe (95 RKB), run back in to find 6 ft fill
1/20/89	1400		Cleanout fill and circ/cond. hole. Raise vis to 60 sec.
1/20/89	1500		Pull up to 425 and wait 20 min to see if hole is still in good shape,
1/20/89			RIH, no fill. POOH, break bit
1/20/89	1630		RU floor to run 13 3/8 csg. Do not have correct slips/spider
1/20/89	1815		mods to 13 3/8 slips.
1/20/89	1930		start to run 13 3/8" csg: run 470 ft 13 3/8 K55 BT&C (11 jts
1/20/89			plus 18 ft pup)
1/21/89	0135	470	Complete MU last jt 13 3/8, RIH clean 4" off bottom

P88-2 Activity log		Last edited 1/21/89	
Date	Time (2400)	Depth, RKB	Activity
1/21/89	0224		MU stab-in tool, start RIH w/DP
1/21/89	0340		Stab into float collar, start RU BJ Titan (cementers) on floor
1/21/89	0350		Complete BJ connections on floor, start fill csg w/mud
1/21/89	0400		Complete fill csg w/mud, secure csg and BJ lines.
1/21/89	0406		BJ start pumping, pump 10 bbl water pre-flush,
1/21/89			315 sx lead slurry, 98 sx tail slurry
1/21/89	0440		CIP, returns last 5-10 min., empty cmt tanks
1/21/89	0500		RD BJ, POOH, brk off stab-in tool
1/21/89	0530		center 13 3/8 csg inside 20" WOC
1/21/89	1000		WOC, clean excess tools off rig floor
1/21/89	1300		ND diverter sys, make rough cut on 13 3/8, remove Hydril and
1/21/89			spools, make final cut
1/21/89	1700		weld on csg head (2 welders on loc: 1 inside, 1 out to maintain heat)
1/21/89	1900		Test csg head welds to 2500 psi, let cool
1/21/89	2000		Start NU 13 3/8 BOP stack
1/22/89	0700		Working on 12" Pwr-Seal flowline valve
1/22/89	0800		John Solum on location
1/22/89	1000		Northwest Air crew on location, start rigup
1/22/89	1515		RIH w/String, tag cmt at 409
1/22/89	1620		BOP tst @ 1000 psi, 8% bleedoff, still completing compressor rigup
1/22/89	1840		Drlg on float shoe @ 410, air good, Tout 93 F
1/22/89	1920		Drilled through float
1/22/89	2020		in cmt @ 430
1/22/89	2040	436	
1/22/89	2115	466	
1/22/89	2135	471	drlg rock, Tout 84 F
1/22/89	2145		Rig transmission problem, shutdown to repair
1/23/89	0150		resume drlg
1/23/89	0220	490	Sample, Tout 75 F
1/23/89	0245	496	drlg ahead @ 20 ft/hr
1/23/89	0335	510	Tout 75 F
1/23/89	0345	520	Drlg ahead 60 ft/hr!
1/23/89	0415	530	Drlg ahead 40 ft/hr!
1/23/89	0440	540	Drlg ahead 16 ft/hr
1/23/89	0505	550	Drlg ahead 26 ft/hr, Tout 81F
1/23/89	0900	600	Drlg ahead 12 ft/hr, Tout 83F, 600-606 drlg break (formation got
1/23/89	0920	620	>60 ft/hr
1/23/89	0955	640	Tout 87 F, lost foam circ briefly
1/23/89	1220	682	Survey #4, due S 1/2 deg.
1/23/89	1240	690	~40 ft/hr
1/23/89	1345	715	rot hd rubber shot, Tout 99F
1/23/89	1410	715	resume drlg w/new rubber
1/23/89	1530	742	
1/23/89	1610	770	
1/23/89	1620	772	
1/23/89			drlg break 768-785, big one 777
1/23/89	1700	790	

P88-2 Activity log		Last edited 1/21/89	
Date	Time (2400)	Depth, RKB	Activity
1/23/89	1730	800	
1/23/89			fractures 804-805, slow, hard drlg 802-807
1/23/89	1905	816	fracture @ 814-815, first steam
1/23/89			foam killed, likely from H2S
1/23/89			Major steam entry 825-828
1/23/89			soft drlg 828-832
1/24/89	0200	932	Flow tee washed out, disc to mod prod. flow tee
1/24/89	0630		
1/24/89	1130	932	complete welding mods on flow tee.
1/24/89	1620		RIH w/ 12 1/4 bit, no collars
1/24/89	1825	932	bit on bottom, fractures @ 933 and 935, drlg ahead @ 11-12 ft/Hr
1/24/89			fractures @ 939 and 941, 34 minutes for 5 ft
1/24/89			fractures @ 946 and 947, 62 min for 5 ft
1/24/89	2200		lost rot hd rubber, stm on floor, saver sub jt washing
1/24/89	2225		replacing rubber
1/25/89	0000	951	WAP decision to POOH
1/25/89	1030	951	Start open flow testing "Loretta"
1/25/89	1430		SI Loretta

[redacted]ermaSource Inc.
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MORNING DRILLING REPORT

LEASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
[redacted] P88-2	1-2-89	1			

[redacted]EST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.

FORMATION TYPE AND TOPS	PRESENT OPERATION
[redacted]	DAILY COST 8694.00 / TOTAL COST

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

[redacted]	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT M/E	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 / PUMP 2 LIN	SPM	LIN	SPM
[redacted]																						

AIR PROPERTIES

[redacted]of Comp. Running	Pressure: (Compressor)	#(Logger)	#	Cubic Feet per Min.
[redacted] G.P.M. (	Gal. Soap to	BBL. Water)	Temp. In	Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

[redacted]PLE ME	WT.	FUN'L VIS.	PV/YP	GELS	pH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST
[redacted]															

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

[redacted]

DIRECTIONAL SURVEYS

MEASURED INSTRUM'T [redacted]EPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'
[redacted]													
[redacted]													
[redacted]													

[redacted]OURS

OPERATIONS IN SEQUENCE

7:30 AM CLEAN SNOW FROM Rig
AND WORK ON STEAM LINES
CREW WENT TO BEAVER FOR TEST
UNLOAD 16 joint OF 13 3/8 CASING FROM
PADRE TUBULAR CREEK IN NATIONAL
OILWELL STOP AT 5:30 P M

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)
☐ NEW BHA

TOOL * DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM $_W$

STEAM FLOW TEST

"PLATE

PSIG AT °F.

LBS. PER HOUR

Comments/Notes:

REPORTED BY Stan Mirman

END

[redacted]rmaSource Inc.
[redacted]1235 • Santa Rosa, CA 95402

MORNING DRILLING REPORT

LEASE AND WELL NUMBER	DATE	DAYS DRILLED	HOLE SIZE	DEPTH
P88-2	1-3-89	2		

[redacted]EST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.

[redacted] FORMATION TYPE AND TOPS	PRESENT OPERATION
	DAILY COST 2300.00 / TOTAL COST 10994.00

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

BIT [redacted]	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT M/LB	ROT. RPM	COND. (6th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 / PUMP 2 LIN	SPM	LIN	SPM
[redacted]																						
[redacted]																						

AIR PROPERTIES

No. of Comp. Running	Pressure: (Compressor)	#(Logger)	#	Cubic Feet per Min.
[redacted] G.P.M.	Gal. Soap to	BBL. Water)	Temp. In	Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

SAMPLE [redacted]ME	WT.	FUN'L. VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

DIRECTIONAL SURVEYS

MEASURED INSTRUMT DEPTH	DRIFT ANGLE	DIREC. TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUMT DEPTH	DRIFT ANGLE	DIREC. TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'
[redacted]													
[redacted]													

HOURS	OPERATIONS IN SEQUENCE	BOTTOM HOLE ASSEMBLY (BHA)
	7:30 WERK on STEAM Line RAISE DERICK	☐ NO CHANGE (SEE PRIOR REPORT)
[redacted]	And Safety meeting with ALL the men	☐ NEW BHA
	And Steve Finch Point weld on 30" Conductor	TOOL * DESCRIPT. / OD x ID x LENGTH (in.) (in.) (feet)
[redacted]	And mud Tanks Run some AIR Line and Fuel Line	
	UNLOAD Acme Tool And check it in	
	UNLOAD TILLETT Truck unload GEL + Cede Bob	
[redacted]		
		DRILL STRING WEIGHT
		ROTATING ,000 #
		UP ,000 #
		DOWN ,000 #
		GASES
		CO_2 PPM
		METH. PPM
		H_2S PPM
		WET TEST PPM $_W$
[redacted]	Comments/Notes:	STEAM FLOW TEST "PLATE
		PSIG AT °F.
		LBS. PER HOUR
		REPORTED BY Ray Sherman

END

ThermaSource Inc.
P.O. Box 1236 • Santa Rosa, CA 95402

MORNING DRILLING REPORT

LEASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
P-88-2	1-4 89	3			

DEEPEST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.

FORMATION TYPE AND TOPS	PRESENT OPERATION
	DAILY COST 4310.00 / TOTAL COST 15304.00

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT MLB	ROT. RPM	COND. (BTR) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 LIN	SPM	PUMP 2 LIN	SPM

AIR PROPERTIES

# of Comp. Running	Pressure: (Compressor)	#(Logger)	• Cubic Feet per Min.
G.P.M. (	Gal. Soap to	BBL. Water)	Temp. In / Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

SAMPLE TIME	WT.	FUNL VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

DIRECTIONAL SURVEYS

MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'

OPERATIONS IN SEQUENCE

HOURS

7:30 start Rig up ~~And~~ Rig Floor And Rig
up Guide line And lay steam line To
water Pond had Safety meeting with men
Rig up some steam Heater spot van for
mud and load mud in van Run Elec line
weld on 2" collar for steam And mud Tank
weld on 2" collar on conductor Pipe
~~[illegible]~~ 1200 gal of Fuel

1330
1:30 P.M. Shawn Tappan was work 24" pipe
wrench and wrench slip and hit him over
Right eye had to 5 ~~[illegible]~~ Stichs.
do Return To work. 1530

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)

☐ NEW BHA

TOOL • DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

Comments/Notes:

STEAM FLOW TEST "PLATE

PSIG AT °F.

LBS. PER HOUR

REPORTED BY Guy Sherman

END

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MORNING DRILLING REPORT

LEASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
P-88-2	1-5-89	4			

[redacted]EPEST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.

FORMATION TYPE AND TOPS

PRESENT OPERATION

DAILY COST 4290 / TOTAL COST 19594.00

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

[redacted]	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT MLB	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 / PUMP 2 LIN	SPM	LIN	SPM

AIR PROPERTIES

[redacted] of Comp. Running | Pressure: (Compressor) #(Logger) | Cubic Feet per Min.

[redacted] G.P.M. (Gal Soap to BBL. Water) | Temp. In | Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

S[redacted]PLE [redacted]ME	WT.	FUN'L VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

DIRECTIONAL SURVEYS

MEASURED INSTRUM'T [redacted]EPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'

HOURS

OPERATIONS IN SEQUENCE

7:30 Clean snow 5 men at
Bell safety class one crew work on Stiem
Line and ~~[illegible]~~ Air Line work with Electrician
5 men in Bell safety class one crew
work on Riging up Floor welder work
on mud Tanks and Build 26 Ring 17½
and 12¼ Gauge Repack swivel install
Rat Hole and Adjust cathead work
on Mud Pump and set in mixing Pump
set in heater stop at 1800 hr.

Comments/Notes:

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)

☐ NEW BHA

TOOL • DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

STEAM FLOW TEST

"PLATE

PSIG AT °F.

LBS. PER HOUR

REPORTED BY Gary Sherman

END

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MORNING DRILLING REPORT

EASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
P-88-2	1-6-89	5			

PEST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.
			M E I Rig 1

MATION TYPE AND TOPS

PRESENT OPERATION: Rig up

DAILY COST: 9809 / TOTAL COST: 29403.00

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	DEPTH OUT	FEET	HOURS	FEET PER HOUR	BIT WT MLB	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 LIN	PUMP 1 SPM	PUMP 2 LIN	PUMP 2 SPM

AIR PROPERTIES

of Comp. Running | Pressure. (Compressor) | # (Logger) | Feet per Min.

G.P.M. (| Gal. Soap to | BBL. Water) | Temp. | Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND CO

PLE ME	WT.	FUNL VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN			TOTAL MUD COST

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

DIRECTIONAL SURVEYS

MEASURED INSTRUMT EPTH	DRIFT ANGLE	DIREC-TION	COORDINATES	VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUMT DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES	VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'

HOURS

OPERATIONS IN SEQUENCE

7:30 Rig up Flow Line and screw
Bell safety class all men + Prov Cif
operator certify work on bolt and mud
Pump's weld in mix pump install
wind walls Rescue Pamco closing unit
and sub + Flow Tee and spidle sale
26" Bit + 12¼ Bit Rig up water line
and start to fill mud Tanks
Fine holes in number 1 Tank Pull
water in 2 Tank Put 14 of water
weld on Tank Stop at 18:00 hr

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)

☐ NEW BHA

TOOL DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

Comments/Notes: 1-7-89 7:30 Start Pick up Kelly and Bit weld on mud Tank.

STEAM FLOW TEST

"PLATE

PSIG AT °F.

LBS. PER HOUR

REPORTED BY [signature]

END

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MORNING DRILLING REPORT

E AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
P-88-2	1-7-89	6			

DEEPEST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.
			MEI Rig 6

MATION TYPE AND TOPS	PRESENT OPERATION	
	DAILY COST 4723.00	TOTAL COST 34,176.06

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

BIT NO.	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT M/S	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 / PUMP 2 LIN	SPM	LIN	SPM

AIR PROPERTIES

No. of Comp. Running	Pressure: (Compressor)	# (Logger)	Cubic Feet per Min.

Mist	G.P.M. (	Gal. Soap to	BBL. Water	Temp. In	Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

SAMPLE TIME	WT.	FUN'L VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

DIRECTIONAL SURVEYS

MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUMT DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGL SEV 0/1

HOURS — **OPERATIONS IN SEQUENCE**

7:30 Weld on Mud Tank Rig up
Board Fill one water and Fill mud
Tank Start Pump motor & check
out Motor work on water Line
~~Rig up~~ Make up Kelly and Pick
up some one crews home AT 15:00 hr
Mix mud in STILL Flow line work
on Steam heater by sub Boss ~~and~~
water To mud Tank & Floor

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPOR'
☐ NEW BHA

TOOL * DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)

DRILL STRING WEIGHT	
ROTATING	,000 #
UP	,000 #
DOWN	,000 #
GASES	
CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

Comments/Notes:

Rig Dn, Build volume and work on
mud Pump Drill To 3.5 ft Spud in
AT 4:00 PM. Kelly KB 12.6

STEAM FLOW TEST

PSIG AT

LBS. PE

REPORTED BY Dany Thurman

END

[redacted]maSource Inc.
[redacted] Box 1236 • Santa Rosa, CA 95402

MORNING DRILLING REPORT

LEASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
P 88-2	1-8-89	7	80	26	100

[redacted] LAST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.
			MEI

FORMATION TYPE AND TOPS	PRESENT OPERATION
[redacted] Gray Tuff	POH To Check For Fill
	DAILY COST / TOTAL COST

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

[redacted]	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT MLB	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 LIN	SPM	PUMP 2 LIN	SPM
[redacted]	26	Smith	R8	18	18	18	20					9/12	60-70				100		6		7½	
[redacted]																						

AIR PROPERTIES

[redacted] of Comp. Running	Pressure: (Compressor)	# (Logger)	#	Cubic Feet per Min.
[redacted]	G.P.M. (Gal. Soap to BBL. Water)		Temp. In	Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

[redacted] SAMPLE TIME	WT.	FUN'L VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM.	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST
	8.8	45												5920.00	5920

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

[redacted]

DIRECTIONAL SURVEYS

MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'
[redacted]													
[redacted]													

OPERATIONS IN SEQUENCE

HOURS	
[redacted] 12:00 12:30	Rig up
12:30 2:00	Pick up sub
2:00 4:00	work on pump #2 Though Hydlins
[redacted] 4:00 5:00	Spud in
5:00 6:00	Drilled To 30
6:00 8:00	Ran out Flowed Build Vor andwater
[redacted] 8:00 9:00	Drlg To 47
9:00 12:00	condition mud and Fill water Tank
12:00 12:45	Ser Rig
[redacted] 12:45 3:45	Pick up Drill and change sub
3:45 11:00	Drilling Formation change 60 To 100 FT
[redacted] 11:00 11:30	Circ
11:30 12:00	Check For Fill

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)

☐ NEW BHA

TOOL • DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)
	BIT
2	9" DC
2	XO sub

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

Comments/Notes: ~~Blow~~ Oh100 Rig up To Run Casing.

STEAM FLOW TEST "PLATE

PSIG AT °F.

LBS. PER HOUR

REPORTED BY Gary [signature]

END

[redacted]rmaSource Inc.
[redacted] 4236 • Santa Rosa, CA 95402

MORNING DRILLING REPORT

[redacted]EASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
0-88-2	1-9-89		~~40~~ None	20"	100

[redacted]PEST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.
95F 20 97			MEI Rig

FORMATION TYPE AND TOPS	PRESENT OPERATION	
	WOC	
[redacted]	DAILY COST 9800	/ TOTAL COST 52,594.00

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

BIT [redacted]	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT MLB	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 LIN	SPM	PUMP 2 LIN	SPM
[redacted]	24	Smith	BB	18	20	20	20	100	100	4.5	12	10	30 60				100	—	6		2¼	
[redacted]																						

AIR PROPERTIES

N[redacted] of Comp. Running	Pressure (Compressor)	# (Logger)	# Cubic Feet per Min.
[redacted] G.P.M. (Gal. Soap to BBL. Water)		Temp. In	Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

SA[redacted]PLE [redacted]ME	WT.	FUN'L VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST
[redacted]0		74													

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

[redacted]

DIRECTIONAL SURVEYS

MEASURED INSTRUMENT DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUMENT DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'
[redacted]													
[redacted]													

OPERATIONS IN SEQUENCE

HOURS	
[redacted]	Circ
[redacted]	Survey
1¼	P.O.H. 3 break out Bit + sub
[redacted]	
[redacted]	Rig up and Run 99.39 20" Casing K55
	94# with Float shoe at 97 FT Cement with
[redacted]	12 yd of Class G Cement 8 sk per yd And 5 ...
	with 2% CAL in Place at 2:30 good
	Return 40 FT of 2" pipe in Ant
[redacted]	Cement
[redacted]	WOC
[redacted]	

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)

☐ NEW BHA

TOOL • DESCRIPT:	OD x ID x LENGTH (In.) (In.) (Feet)
None	

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

[redacted] Comments/Notes:

4:10 A.M. ~~weld on head~~ cuting off
[redacted] 20" + 30" casing
[redacted]

STEAM FLOW TEST

"PLATE

PSIG AT °F.

LBS. PER HOUR

REPORTED BY [signature]

[redacted]

ThermaSource Inc.
Box 1236 • Santa Rosa, CA 95402

MORNING DRILLING REPORT

LEASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
P-88-2	1-10-89	9	None	20"	100

DEEPEST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.
20" 97'			MEI Rig 1

FORMATION TYPE AND TOPS	PRESENT OPERATION
	DAILY COST 10705 / TOTAL COST 62,999.70

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

BIT NO.	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	DEPTH OUT	FEET	HOURS	FEET PER HOUR	BIT WT MLB	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 LIN	SPM	PUMP 2 LIN	SPM

AIR PROPERTIES

No. of Comp. Running	Pressure: (Compressor) # (Logger) #	Cubic Feet per Min.
M G.P.M. (Gal. Soap to BBL. Water)	Temp. In	Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

SAMPLE TIME	WT.	FUN'L VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

DIRECTIONAL SURVEYS

MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'

OPERATIONS IN SEQUENCE

HOURS	OPERATIONS IN SEQUENCE
3	W.O.C. - Serv Rig
2	cut off 30" Casing And 20"
1½	clean out CELLAR - weld on Head And Test
	To 3000 psi For 30 min.
8	Nippled up 20" Hydrill
2	Change out 3" And 2" mud valve on #1 Pump
	instill Flow Line
	instill Kelly Hose Rig up To Drill Mouse
	Hole

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)
☐ NEW BHA

TOOL • DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

STEAM FLOW TEST

"PLATE
PSIG AT °F.
LBS. PER HOUR

Comments/Notes: Ser Rig Though out Air Line Re Drill mouse And instill Break down Mouse Hole Ass. @ 6:00 AM instill ~~Fill~~ Fill up Line And Rig up ~~Accu~~ Closing unit

REPORTED BY [signature]

ThermaSource Inc.
P.O. Box 1236 • Santa Rosa, CA 95402

MORNING DRILLING REPORT

LEASE AND WELL NUMBER	DATE	DAYS	DRILLED	HOLE SIZE	DEPTH
P-88-2	7-11-89	10	None	20"	900

DEEPEST CASING - O.D., SHOE DEPTH	LINERS - O.D., TOP AND SHOE DEPTHS	REPAIR DOWN TIME	CONTRACTOR AND RIG NO.
20" 97'			MEI Rig 1

FORMATION TYPE AND TOPS	
	PRESENT OPERATION Shot down
	DAILY COST 3208 / TOTAL COST 65,207

BIT, WEIGHT, SPEED AND HYDRAULICS RECORD

NO.	SIZE	MFG.	TYPE	NOZZLES (32nds) 1	2	3	DEPTH IN	OUT	FEET	HOURS	FEET PER HOUR	BIT WT MLB	ROT. RPM	COND. (8th) T	B	G	STAND PIPE PRESS	SERIAL NUMBER	PUMP 1 LIN	SPM	PUMP 2 LIN	SPM

AIR PROPERTIES

No. of Comp. Running	Pressure: (Compressor)	#(Logger)	# Cubic Feet per Min.
G.P.M. (Gal. Soap to BBL. Water)		Temp. In	Temp. Out

MUD PROPERTIES, MATERIALS ADDED, AND COSTS

SAMPLE TIME	WT.	FUN'L VIS.	PV/YP	GELS	PH	FILTRATE CC/30 min.	CAKE 32nds	% SAND	% SOLIDS	% OIL	CHLORIDES PPM	TEMP IN	TEMP OUT	DAILY MUD COST	TOTAL MUD COST

MUD MATERIALS AND QUANTITIES ADDED IN LAST 24 HOURS

DIRECTIONAL SURVEYS

MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT DEPTH (VKB)	DOGLEG SEV. 0/100'	MEASURED INSTRUM'T DEPTH	DRIFT ANGLE	DIREC-TION	COORDINATES		VERT. DEPTH (VKB)	DOGLEG SEV. 0/100'

OPERATIONS IN SEQUENCE

HOURS

12:00 6:00 Set Rig Throught air line
Drilled mouse hole Brake down mouse
hole Ass clean out cellar
6:00 10:00 Rig up kill line and Rig up
Close unit
10:00 12:00 Pick up 17½ down Ass
12:00 2:00 Try to Test
2:00 6:00 clean out cellar Find
That we do not have a good
cement job mud coming up mouse
hole Lay down Kelly and drain
mud line and part That will
Freeze Two men walk of at
12:00 3 men plus myself
work till 10:00

Comments/Notes:

BOTTOM HOLE ASSEMBLY (BHA)

☐ NO CHANGE (SEE PRIOR REPORT)
☐ NEW BHA

TOOL • DESCRIPT.	OD x ID x LENGTH (in.) (in.) (feet)

DRILL STRING WEIGHT

ROTATING	,000 #
UP	,000 #
DOWN	,000 #

GASES

CO_2	PPM
METH.	PPM
H_2S	PPM
WET TEST	PPM W

STEAM FLOW TEST "PLATE

PSIG AT °F.

LBS. PER HOUR

REPORTED BY Gary Sherman

MEI DRILLING ACTIVITY LOG WELL #: [P.88-2] DATE: [1-8-89]

TIME	DEPTH	NAME	COMMENTS
12:00	0	12:30	Rig Serv
12:30	0	Break	Pick up subs
02:00	0	"	work on pump #2 Though Hyd lines
04:00	0	"	spud in
05:00	27'	Drlg	Drlg
06:00			Build Vol.
08:00	47'		Drlg.
09:00	12:00		Condition mud
12:00			

VERN

MEI DRILLING ACTIVITY LOG WELL #: [P88-2] DATE: [1-8-89]

TIME	DEPTH	NAME	COMMENTS
Noon 12:00	12:45	Vern [illegible]	Checked oil on Engines
12:45	1:05		Air-Iced up lines
1:05	3:45		Made up Caller # 1
3:45	4:05		Started Drilling — 47' in depth
4:05	4:20		Strata change 60 feet Gray Tuff
			(not to hard to drill)
4:20	5:04		Gray Tuff turned a little lighter - Getting
			harder to drill
5:04	7:35		Make up Caller
7:35	9:46		Started to drill (Caller # 2) Still in
			Gray Tuff - Getting a little hardeto drill
			Started Drilling — Cut drilling to 10' per hr.
9:46	10:02		Air lines ICED UP - Engines wouldn't
			rap up - Need a sepperater (Air from water)
10:02	10:58		Went back to drilling
10:58	12:00		Drilled to 100 ft — Circulated

MEI DRILLING ACTIVITY LOG WELL #: [P 88-2] DATE: [1-9-88]

TIME	DEPTH	NAME	COMMENTS
00:00			Circulate Hole & Condition mud
03:00			start to Trip out Hole / Drained MUD line And Kelly Hose
03:30			Air line's froze to Control panel Lost all Air To Rig / Put Heat on Air lines to Though System / out of De-Icer.
04:15		Brent Larry	start to trip out Hole / Top Collar joint will not Break / put cat line on it / Did not Help / Had to Heat the joint with Larry the welder / Finely Broke.
05:30			Finished to trip out of Hole
06:30			out of Hole / Rig up And-Run 2" Tremie pipe to Cement with.
08:00			Rig up to Run Casing 20" picked up Slips / tongs / spiders / Elevators / Had to Change Are tongs and Hang them / Same with Elevators
10:00			Pick up 1st joint of 20" with Shoe And Ran in Hole
10:30			pick up 2nd joint / wont make up / Bottom joint

MEI DRILLING ACTIVITY LOG WELL #: [LP 88-2] DATE: [1-9-88]

TIME	DEPTH	NAME	COMMENTS
10:30			Keeps moveing around Hard to Start Thread's / used Hyd winch And got it to start.
11:30		Brent Jansen	Pick up 3rd Joint, Clean thread's / Tour over
2			

Vera Grimshaw

MEI DRILLING ACTIVITY LOG WELL #: [Peq-2] DATE: [1-9-88]

TIME	DEPTH	NAME	COMMENTS
12:00	13:30		Installing 20" casing
13:30	14:00		Nepplinq up ~~to~~ with 2" grout line
14:00	14:30		Cemented hole. Good return
14:30	19:30		Cleaned out Shaker & Tank, flow line, Return line, Grout line and Seller. Was over 2 yrds. in it. Cut ~~out~~ hole in 30" Conductor to drain cement out. Cement had set up.
~~7:30~~	~~12:00~~		
1930 7:30	2400 12:00	W.O.C.	Put ~~set~~ plastic around rig - Hooked up another heater. Hope it will help out with our Icing up. Put tarps over generater house. Serviced engines. W.O.C.

MEI DRILLING ACTIVITY LOG WELL #: [P-88-2] DATE: [1-10-89

TIME	DEPTH	NAME	COMMENTS
12:00		Brent	Wait on Cement to Dry Hand's
			where getting Bolt's clean and Brading
			Head out of snow and Cleaned up.
3:00		Larsen	Larry's portable welding got here and
			cut off 30" Caseing Had to split it. and
			cut off 20". (then we Laid it Down)
5:30			Crew Laid Down the split pieses +
			Crew Hocked on to well Head +
			Cleaned mud off it and Stabed on
			Caseing welding @ Ground Leval
			Load out Eqpt. on floor ta Case and
			Cement With / Laid Down 20" Landing
			Joint, - Load out spider's, slips, Elevator's, tong's,
8:45			start to Rig up floor to Drill -
			ADD tong waights - Hooked up torq gauge
			for tong's / BOP line's to floor + Run Air line /
			still welding on Head @ 10:00 A.M. Hook
			Pick up SUB for pick up Slings -

MEI DRILLING ACTIVITY LOG WELL # [P.88-2] DATE: [1-10-88]

TIME	DEPTH	NAME	COMMENTS
9:45		Bruff	well Head is an presser testing @ 11:20 AM
		J	Pick up Slings to Nipple up BOP
		Jason	Put Bit on floor to Drill Mouse Hole
12:00			Crew Change

Vern Grimshaw

P88-2

#1

MEI DRILLING ACTIVITY LOG WELL #: [1 ~~10-88~~] DATE: [1-10-89]

TIME	DEPTH	NAME	COMMENTS
12:00			Removed beaver slide + Steps
13:00			Picked up spool after cleaning it and the well head, then set the spool on. Put bolts in and hand tightened them.
1330			Picked up annuler and ~~set~~ it (after we cleaned it up. Put bolts ~~it~~ in to hand tight
14:30			Picked up 20" Casing with flang, set it on. The welder took measurments for ~~return~~ mud return line. Took back off and layed it down for welder. He welded on a 3'x 8" casing for return.
~~3:30~~			
15:30			Men are tightening bolts on spool + annuler. Will take some time. (New hand came on at 4:00) 13:11 Anderson
16:30			Set pincher nepple on annuler. Tightened nuts down. Crew still working on spool + Annuler bolts.
17:00			Set beaver ramp + Stairs, still tightening bolts
18:00			Pounded on Bolts again, spool + Annuler

Used my dictionary

MEI DRILLING ACTIVITY LOG WELL #: [P-88-2] DATE: [1-10-89]

TIME	DEPTH	NAME	COMMENTS
20:00			Changed 3" Valve on duplex pump # 2
			was hard getting off. Had to beat on it
			and heat it up. Changed 2" valves going to
			mud tanks, they were hard to get off too.
21:30			Set mud return line with forklift & sand
			line. 8" return line off pincher nepple was to
			long, had to cut 6" off. Cuppled up good.
			One man Serviced engines
22:00			Put blocks on kelly - hooked up hose.
			Looked all over for a change over sub 4½ Ex H.
			to 6½ I.F. Don't know what to do. Need to
			clean out mouse hole. Can't without that sub.
			Jay came down. Put three ~~sb~~ subs together to
			make her work. Other crew came on

MEI DRILLING ACTIVITY LOG WELL #: [P. 88-2] DATE: [1-11-89]

TIME	DEPTH	NAME	cove fort – COMMENTS
00:00	100	Brent	Rig Serv. (5 min Saftey meeting)
00:30		Jensen	Air line's to Rig froze up – put more Alcohol in Compresser – Took propain torch's And thoughed the lines – – Air Back.
01:15			Drilled mouse Hole – Ajusted Cathead / Drilled up Hard. (Set mouse Hole) @ 300 AM Sucked mud tank's Dry, And filled the Celler with Drilling mud, Had to set Kelly Buss. on mouse Hole for it to go Down –
03:00			Put 1½" + two 1" Line's (H_2O) in MUD Tank's to Build Voul / ~~water~~ water Tank – pump was froze from K To Suit Case – Vis queen Blow off. Thoughed out got it goin To MUD pit's / water tank was Low So I Started water pump at pond & Filling it
03:30			(Drained MUD System) Hydrolic pump was frezzing And would not Let Kelly Hose Down (un thoughed) Broke Down mouse Hole Assembley
04:40			Bucket out Celler Try to un plug Drain

Vern Grimshaw

MEI DRILLING ACTIVITY LOG WELL #:[P88-2] DATE:[1-11-88]

TIME	DEPTH	NAME	COMMENTS
12:00			Morning crew had just ~~cupped~~ Hooked up to a drill collar. (#2) we came on and finnished doing it, made it up, putting ~~four~~ two collars on plusss tools ~~underneath~~.
12:30			Having problems with accumulater. can't get enough psi to close it.
5:00			Its working better. Have it closed but can't build any pressure in hole.
5:30			Have lost a lot a mub out of pit. Found out it was going into the celler. Celler is full of mud.
6:00			Have no pump that well work. Started bucketting it out. Russ went to get his pump. But it wont work eather.
8:00			Have celler cleaned out. ~~Run~~ Run another pressure test. Mud came out of mouse hole. Bad cement job
8:00 - 10:00	2260		Drained all pumps and lines. Unhooked kelly and layed it Down. Stacked Collers. Brock off swevel set on floor. Tied off Blocks to mast and shut down.

GEOTHERMAL MANAGEMENT CO., Inc.

P.O. Box 2980 Evergreen, Co. 80439 27972 Meadow D

Mr. Wayne A. Fortanova
Mother Earth Industries, Inc.
7350 East Evans, Suite B
Scottsdale, Az 85260

January 12, 1989

Dear Wayne:

This "Trip Report" letter is written upon my return to Evergreen on January 12, 1989 following the temporary shut down of operations on MEI well P-88-2 effective January 11, 1989. The purpose of the letter is to document my activities and my impressions of the overall situation that prevailed while I was on site.

When I arrived at Sulphurdale on Jan.10, at about 1500 hours, the well was at 100 feet, with 97 feet of 20" casing cemented in place. The day crew was tightening the bolts on the 20" annular BOP. For the next 2 hours they continued to nipple up the BOP and the pitcher nipple/flow line. In the early evening, they began changing a valve on one of the mud pumps and this they continued to do in a driving snowstorm for several hours. Gary Sherman predicted that they would be drilling out the casing shoe by midnight after hooking up a kill line and pressure testing the 20 " annular BOP.

At 0630 on Jan. 11, the day crew was begining to make up their bottom hole assembly after cleaning out the mousehole and a cellar-full of mud all night while repeatedly thawing air lines. Jay and Gary vigorously jumped into the work scene and tried to speed operations. Their skill and experience did help noticeably, but they too were constantly frustrated by frozen equipment, "green hands" standing around, and the need to modify or replace various pieces of hardware. By 1300 hours, when we talked to you, the BOP had still not been pressure tested though the SHA had been made up and mud was circulating. (The following paragraphs should help you understand why the pressure test was not accomplished).

On Jan. 10, I examined the drill cuttings from 17'- 100', using the MEI Binocular Microscope. The materials penetrated from 17' to approximately 60' were similiar to those recorded in the log of S-88-3. That is, a mixture of colluvial gravels of several lithologic types and cryptocrystalline silica in several habits including some that appear to be typical of hot spring deposits. From about 60' to 100', the cuttings were predominently grey with a yellow cast. The grey is largely due to an abundance of pyrite and only secondarily to the presence of tuffaceous materials. The cuttings were 50-70% quartz, 20-25% decomposed feldspar; and about 5% pyrite. No textures or structures were visible in the fragments, and little cementation was visible. All of this means that the 20"

Gerald W. Huttrer, President FAX (303)674-1971 Telephone (303) 670-3

casing was placed in rock that has been significantly altered by geothermal gasses and/or fluids.

I was told by Gary that they were able to drill 10' of "bedrock" in 35 minutes, or about 17 feet per hour. With a 26" bit, this is quite rapid, but not really "snowdrift drilling". In the light of these statistics, I agreed that 40 feet of penetration into this rock with the 20" casing would probably be adequate and safe. My thinking took into account the fact that the 13.375" casing will be installed and cemented for more than 500' in competent rock well above the point at which we anticipate intersection of the steam resource.

The reason that the crews were not able to do a pressure test on the BOP was that mud was observed filling the cellar while the mud was being pumped out of the mud tanks to test the BOP. After hours of hand -bailing the mud out of the sump (there were not available any working pumps) mud was seen to be flowing out of the mousehole into the cellar. This means that the cement job on the 20" (done from the outside of the casing, with a tremie, for some reason) was not adequate. Probably, a repair can be achieved by putting a packer into the 20" and pressure-grouting the leaks that now access the surface via the mousehole.

In summary: 1) The rig, though oversized for the job at hand, can be run in such a way as to drill your wells in a fairly cost effective manner if experienced cold weather, geothermal crews are brought in, 2) Both Jay and Gary have tried very hard to give you reasonable "bang for your buck" but they have both been fighting the weather and the lack of truely experienced hands, and 3) The 20"casing should have been cemented in the conventional "inside-out" way in light of the altered nature of the bedrock encountered. Without a geologist on site, there was no way in which the quality of the rock could be assessed rapidly and a decision made to change the cementing method.

I'm sure that you have made a wise decision by hiring experienced crews to run your rig. Hopefully, costs per foot will decrease and, more important, "green-hand related emergencies" should be avoided. I look forward to returning to P-88-2 soon and to completing the first of what I anticipate will be many sucessful wells this year.

Sincerely,

G.W. Hutterer

P882let.rep

January 16, 1989

File: 1989 Drilling

Re: Status Report, Production well P88-2 (offset to S88-3)

The subject well status is as follows:

KB measurement= 17'6" AGL
TD: 97' (all depths RKB) 20" 94# K-55 BT&C in a 26" hole cemented with Class G 8-sx mix cement.

Veco Drilling Co. both crews on location, will be performing cement squeeze; BJ Titan cementers on location. Anticipate complete squeeze by 1600 hrs plus 12Hr WOC. Both crews to work today cementing, familiarization with rig, shutdown tonight, one crew to report 0800 hrs 1/17/89 for 24 hr operation.

Bell Safety rep will be on location in morning; G. Huttrer late pm 1/17. Mobilizing air compressor crew tonight. Reviewed cost info with Jay Grimshaw, provided him with cost and operations reporting documentation and info. Will provide Exec with complete cost update report 1/17 am.

MEI DRILLING ACTIVITY LOG WELL #: [P-88-2] DATE: [1-17-89]

TIME	DEPTH	NAME	COMMENTS
8:00		Ira Cox	Complete Rig Service start up Air Compressor
			Start Engines
			Nipple Down Flowline, Pitcher Nipple
			prepare to install Rotating head
			For Air Drilling.
			Held Safety meeting with crew
			Attend H_2S training School

END

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

TIME	DEPTH	NAME	COMMENTS
10 00 AM		BJ	Held H_2S + Safety Training School
12 30			INSTALL Rotating Head, weld Flow Line + Nipple up
16 00			Move Accumulator + Rig up same
17 5 30			Repair Deadman Anchor Bolts, Adjust CAT Head, Repair Tong Torque Guage
18 6 30			Pick up mousehole, Kelly + Swivel, Hook up Kelly Hose
15 30 03:30 — 18:00 06:00		JH6	Move in Air Compressors, Booster, Mist pump & Dog House
22 30 08 30			Help Hook up Compressors, Booster, mist pump

END

MEI DRILLING ACTIVITY LOG WELL #:[P89-2] DATE:[1-19-89]

TIME	DEPTH	NAME	COMMENTS
2200			
2230	159'	Ira Cox	circulate hole Clean @ 159'
2230			
2300			wire line Survey
2300			
2400			Lay Down 1-6½" Dc - P/u 2-9" DC's
2400			Drilling 17½" hole F/159' T/ with 8-10,000 # b.T wt.
			catching Samples @ Flow line Each 10' of hole
0730	282'		Penatration Slowed @ 282' shows Hard or Fractured
1000	300'		Formation, frac from 282 -298'
1600	300	K'H	Drilling @ 10'-12' P.R.N.R Hard or Fractured Formation
			T/ 312
11:45	312		Clean Hole & make connection & Survey N88E not over ½° Dev.
11:45			Resume Drilling F/312' 10'-12,000 weight 50-60 RPm
			250 Psi @ 5-6 BBLs Per MR
12:38	316 ✓ 318	DCG	H2S Detectors going off @ Intervals that Crews Assume
		—	presence of gas - getting Bell Nipple Location

1/18/89

JCK

MEI DRILLING ACTIVITY LOG WELL #: [P88-2] DATE: [1-19-89]

TIME	DEPTH	NAME	COMMENTS
1130 ~~1430~~	312	RW	Resume Drilling 5' per HR F/320', penetration increased to 15' FT per HR 10-12,000 WOB, 70-75 RPM 250 PSI
1430 ~~1500~~	342	JHG	Air People are Dumping Air To Lower Pressure, were injecting more foam to compensate, we need the booster Mike Conn. @342'
1450	347		Repair Spinning Chain
1530	349		Increase mist T/ 8-10 BBL per HR penetration increased to 20' per HR
1610	372		Connection @ 372 Drilled Smooth @ 15-20' per HR.
1635	377		Drilling @ ~20'/hr.
1800	402		" " " "
1815	402		Connection - Had trouble getting Rotating Dog not in place
19:00	410		Increase mist T/ 12-13 BBl per HR, Not getting any cuttings Back out of Hole Increase mist T/ 20-25 BBl HR.
19:15	415		Not getting Full Returns @ Flowline, Losing Air At compressors Due To Higher Pressure, could not catch cuttings sample @ 410' Very little cuttings Return Suspected water influx Between 402' & 415'

MEI DRILLING ACTIVITY LOG WELL #:[P882] DATE:[9/89]

TIME	DEPTH	NAME	COMMENTS
2000		EJ	Repair Air Line #1 pump clutch, cut 13 3/8" csg on rack
2030	430'	JHG	STILL WAITING ON BOOSTER, VERY POOR RETURNS, LOTS OF AIR. JHG.
2055	432	RH	MAKE CONNECTION @ 432' / 20 BARRELS PER HR INJECTION RATE
2200	460	RH	Drlg 30' per NR

MEI DRILLING ACTIVITY LOG WELL #:[P-88-2] DATE:[1-19-89 TO 1-20-89]

TIME	DEPTH	NAME	COMMENTS
2200	463	Era Cox	Try To get Booster pump Running poor Returns
2230	470 TD		Drilling 17½" hole T/ 470' csg. point
2300	"		circulate Clean Hole F/ wiper trip
0100			wire line Survey @ 470
0130			wipe hole T/ DC's hole Clean no Fill on Bottom
			set off H_2S Alarm @ Rotating head and Flow line
			10 ppm To over 100 p.p.m 4000 P.P.M in cellar
0200			At 0215 hrs Jay wait to talk to Wayne P.
0200			mix Lost circulation materials Gel to kill H_2S
0600			pump @ 42 SPM. 60 min. no Returns - 8' Fill on Bottom
0600			mix L.C.M. Fill hole
1000			Fill Hole with LCM 131 STKS Revamp Flow line
			with welder To cir Back To P.Ts
1200			CIR + Clean out Fill From 455' - To 470' cir Hole Clean
1250	470'		Increase pump Pr to 500 psi @ 92 SPM Have good
			Returns at no noticable Loss of Circulation - in
			need of Hamberger's w/Tries Lost 300 psi Assume Jet W/plugged
1330			Pull Pipe up To 20" Csg Shoe @ 78' GL & Run Back in To find 6' Fill

MEI DRILLING ACTIVITY LOG WELL#:[P88-2] DATE:[1/20/89]

TIME	DEPTH	NAME	COMMENTS
1400		RH	Clean out Fill & circ & cond Hole Raise Viscosity to 60 sec.
1500			Pull up To 425 & wait 20 min to see if Hole is still
			in good shape, RIH; no fill Pull out of Hole
			Break Bit
1630		RH	Rig up Floor To Run 13 3/8" csg. Did not Have Right
			Slips & spider for 13 3/8" csg.
1815		H.	Still trying to build spider/slip tool.
1930		RH	Run 13 3/8" csg.
		1/21	Run 11 jts & 18' pup.
			↓
			1/21/89

MEI DRILLING ACTIVITY LOG WELL #: [P88-2] DATE: [1/21/89]

TIME	DEPTH	NAME	COMMENTS
0135	472	JCH	Complete MU last jt 13 3/8, RIH ~~4'~~ clean off bottom
0224		JCH	MU Stab-in tool, start RIH (cale float @ ~ ~~430~~ 414
0340		JCH	Stab into float, start RU BJ lines
0350			Complete BJ conns, start fill csg w/ mud.
~~1000~~			
0400			Complete fill csg, secure csg.
0406			BJ Start pump cmt. 10 BBLS H2O Pre Fl
0440	472	H	Empty cement tanks - 5-10 min of returns. CIP! 315 sx slurry 98 sx Tail
0500		I.C.	Rig Down B.J. Pull out of hole Brk off Stab in tool
0530			center 13 3/8 csg inside 20" W.O.C.
10.00		RA	WOC clean Excess Tool off Rig Floor
1300			Nipple down Diverter System make Rough cut
			Remove Hydril + Spools, make Final cut.
1700			Weld on Csg Head + Test To 2500 Psi
1900			Let weld cool
2000		RH	Nipple up Blowout Preventer

MEI DRILLING ACTIVITY LOG WELL #:[P88-2] DATE:[1-22-89]

TIME	DEPTH	NAME	COMMENTS
2200	470	I.C.	Nipple up B.O.P.'s & Test Blind Rams To 750 PSI ok.
1200			Lay dn 9" Drill collars & Pick up 6 1/4" Drill collars
			Make up Bit Trg Float @ 409'
			Bit FHMP AG4 22 jts
1530			Test Casing & Pipe Rams To 1000 PSI.
1620			Hook up Flow line & Rig up AIR compressors
1815			Drill on float @ 409' Drill cement & shoe @
2045			Connection @ 436' Hard cement
2135		*	out of shoe, into new rock @ 471', To = 84°F
2145-		*	Repair leaking oil in power box
1620			BOP Pipe rams tested @ 1040 → 948
			15 mins. = 8.8% John Shaw State Engineer
2130	470		Drill out Shoe and in new formation @ W/8000 WOB

DATE: [1-23-89]

MEI DRILLING ACTIVITY LOG WELL #: [P-88-2] DA

TIME	DEPTH	NAME	COMMENTS
2200	475	Ira Cox	Repair Rotary Table Drive Shaft
0150	475		Finish Repairs on Drive Shaft - Set Bushings one new under Rotary Table (Bill Barrington) detected H2S gas ~~use~~ Chest pains also sick as a dog
0226	490	Ira	@ Air Running 2700 c.f.m. @ 190 psi. 8 GPM. Injection Rate 28' per hr. drilling Rate @ 70 RPM W.O.B. = 8-10,000
0415	528	IRA	Made Connection Drilled 25' per Hr the 1st 15' of Single and 40' per Hr Last 15' (10-12,000 W.O.B. 60 R.P.M.
0620	559		Made Connection 15' per hr
0810	591		Connection 15' per hr. formation fracture @
		B.L.	~~Connect~~ 606' and Light Drill Brake
0935	622	WAP	CONNECTION - DRILL BREAK - TIMED 3½-5 MIN PER 5 ft. (60-100 FT/HR)
			SLOWED DRILLING DOWN
1045	653	RN	CONNECTION @ 653' 10-12,000 30' per HR
			Drilling Break @ 677' - 682'
N30	682	RH	Cir Hole Clean Change Rotating Head Pack off Rubber
			Took H2S Sample NO Trace of gas - Survey (~~Gyro~~ Wireline)

MEI DRILLING ACTIVITY LOG WELL #:[ ] DATE:[1-23-89]

TIME	DEPTH	NAME	COMMENTS
1220	682	Ride	Resume Drilling -
1312	712		Conn.
1340	717		PACK OFF RUBBER TORN OUT OF Head change
~~#~~			OUT PACK OFF
1415	717		Resume Drilling
1530	741		CONN Drilling Brk 768
1620			Jay G. - Open SE Kill valve (3") on WH - Kill line to floor.
1625			~~#~~ 588-3 WHP = 50.25 psig
1640			Fracture @ 777
		JCH.	Pressures 48.5 Linda 48 Olga 1630
		JCH.	588-1 47 1642
1652	785		End of Fractured formation Jay G. Lost.
1656		JCH.	install 0-160 WHP gauge on choke side 3" outlet
1730	803		Connection -
1750 ~~1730~~	805		FRACTURED FORM
1815	809	RW	H2S ALARM LIGHT CAME ON 10 PPM IN CELLAR
	814	BJ.	Fracture Light

Appendix C

LITHOLOGIC LOG OF MEI WELL P-88-2

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

By
Joseph N. Moore
Salt Lake City, Utah

April, 1989

This report summarizes observations made on cuttings collected from MEI well P-88-2 between depths of 17 and 630 feet. The cuttings were examined to determine the stratigraphy and alteration of the rocks encountered in this well. A lithologic log showing the stratigraphic relationships and the extent of the alteration is attached.

Lithologic Relationships

The upper 77 feet of P-88-2 consists of alluvial deposits. However, in contrast to the alluvial deposits encountered in other wells drilled by MEI, the cuttings are white to buff colored as a result of the intense alteration that has affected them. A common feature of the cuttings from P-88-2 is the presence of solution cavities and coatings of clay and sulfate minerals.

The cuttings recovered from depths between 77 and 630 feet contain approximately 50% phenocrysts in a light to medium gray matrix. Both the matrix and phenocrysts are intensely altered. The presence of quartz and partially altered biotite phenocrysts up to 1-2 mm across throughout the sample interval indicate that this portion of the well was drilled entirely within the coarse-grained Three Creeks Tuff. Unaltered phenocrysts of plagioclase, sanidine, and hornblende, which are abundant in the Three Creeks Tuff, were not observed. However, the lithologic characteristics of the rocks in P-88-2 are identical to those of the Three Creeks Tuff encountered in other MEI production and slim holes.

Hydrothermal Alteration

Two types of hydrothermal alteration occur in the well. The alluvial deposits have been affected by strong acid leaching. Cuttings in the upper 77 feet of the well are characterized by dissolution cavities, alteration to clay

and silica, the presence of native sulfur, and coatings of sulfate minerals. Only the quartz grains, which commonly display the dipyramidal form characteristic of the Three Creeks Tuff, have been unaffected by the alteration.

Traces of native sulfur are found at a depth of 32-37 feet. In contrast, sulfate minerals (gypsum?) are widespread. Sulfate minerals are found as fine-grained coatings on the chips, as millimeter size aggregates, and as euhedral crystals deposited on the altered fragments. Coarse aggregates of sulfate are concentrated at a depth of 17-22 feet.

Similar secondary mineral assemblages are found in the Sulphurdale pit. The formation of these minerals is the result of two different processes. The first process involves the deposition of native sulfur by oxidation of H_2S released from a boiling fluid at depth. The second process involves the downward percolation of surface waters or steam condensate to produce sulphuric acid from the sulfur. The intense acid alteration of the alluvial deposits observed in P-88-2 is the result of the downward movement of the sulfuric acid.

The underlying Three Creeks Tuff is characterized by argillic alteration of the phenocrysts and silicification of the matrix. Feldspar and hornblende phenocrysts, which are common in the Three Creeks Tuff, have been replaced by fine-grained aggregates of white to buff colored clays and traces of calcite. Alteration of the biotite to clays varies from moderate to complete. Little biotite is preserved below 450 feet.

Minor amounts of calcite were observed in several intervals. Millimeter size aggregates of vein (?) calcite were found at a depth of 77-82 feet. In addition, minor calcite is associated with intensely silicified cuttings occurring between 130 and 180 feet.

The matrix of the Three Creeks Tuff ranges from light to medium gray. Thin sections of MEI wells indicate that the color of the matrix primarily reflects the amount of alteration, rather than the extent of welding as previously thought. These sections show that the potassium feldspar formed by devitrification of the original glassy matrix is progressively replaced by fine-grained quartz as the degree of alteration increases. The light gray color of the matrix of the Three Creeks Tuff in P-88-2 suggests that it has been extensively silicified. Silicification has been accompanied by pyrite deposition between 450 and 630 feet.

Fine-grained chips of highly silicified rocks are common between 120 and 220 feet. The chips range in color from black to reddish brown. In places, these chips display a clastic texture suggesting that they are hydrothermal breccias similar to those encountered in other MEI wells. Thin sections of breccias in other wells indicate that the dark color is due to disseminated magnetite. Oxidation of the magnetite to hematite produces the reddish brown coloration typical of many of the chips.

The alteration assemblages observed in the Three Creeks Tuff appear to be related primarily to ascending near-neutral fluids rather than to the highly acidic downward percolating sulfuric acid. The extent of downward alteration is dependent on several factors. These include the depth to the water table (or a perched water table which can neutralize the acid), the degree of fracturing beneath the alluvium, the ability of the rocks to buffer the pH of the fluids, and a continued supply of sulfur which is required to produce the acid. The coarse-grained calcite aggregates which occur at the top of the Three Creeks Tuff show no signs of dissolution. Thus, the acid fluids probably did not penetrate to greater depths at this location.

The alteration assemblages present in the Three Creeks Tuff are typical of low to moderate temperature regimes (i.e. up to 200° to 250°C). An upper temperature limit of 250°C is indicated by the absence of epidote in the Three Creeks Tuff. Similar temperature limits have been estimated from the alteration assemblages found in other wells drilled in this area.

The presence of acid alteration and native sulfur in the alluvial deposits implies that structures connected to the geothermal system are present near the drill site. At present, the orientation of these structures is unknown. They may, however, represent important targets for future drilling. Detailed soil mercury or gas surveys may be useful in determining their orientations.

The alteration and hydrothermal brecciation of the Three Creeks Tuff is also fault controlled. However, these faults and associated alteration must pre-date the present vapor-dominated cap and the alluvium which shows no evidence of silicification.

Summary

The rocks penetrated in the upper 630 feet of P-88-2 consist of highly altered, coarse-grained Three Creeks Tuff. This unit is lithologically identical to the rocks encountered in other MEI wells. The alluvial deposits have been intensely altered by downward percolating acid fluids that originated at the surface above a fumarole. Thus, the present fumerolic activity occurring in the Sulphurdale pit must have extended further to the north than it presently does. The underlying Three Creeks shows no clear evidence of acid alteration. The alteration of the Three Creeks Tuff could have been produced by near-neutral hydrothermal fluids with temperatures in the range of 200°C.

The alteration of the alluvium indicates that unmapped structures which have been connected to the active geothermal system are present in the vicinity of P-88-2. More detailed mercury or soil gas surveys may be useful in delineating the location of these structures.

The intense alteration of the alluvium in this area may lead to difficult drilling conditions in the future. Such alteration may extend further into the bedrock at drill sites that are closer to the faults that produced the fumarolic activity or in areas where the alluvial deposits are thicker. Because of the extent of the alteration around Sulphurdale, carefully drilled slim holes may be the only means of determining the extent of "bad ground" in the area.

GRAPHIC LOGS

DEPTH	ALTERATION (1. WEAK 2. MOD. 3. STRONG) Fe ox. (121)	Bio (122)	Matrix (123)	Pyrite (124)	Calcite (125)	(126)	(127)	GRAPHIC GEOLOGY	Tr. TRACE 1. WEAK 2. MOD. 3. STRONG VEINLETS	DESCRIPTIONS
50										17-77: alluvium, acid-altered cuttings characterized by dissolution cavities, alteration to clay and silica and coatings of gypsum and red-brown to white sulfate minerals. Traces of native sulfur at 32-37 feet
100										77-630: coarse-grained Three Creeks Tuff. Alteration generally strong. Strong alteration of matrix as indicated by gray color.
150										
200										120-220: Fragments of black to dark reddish-brown silicified breccia common. Constitutes ± 5% of chips
250										
300										
350										
400										
450										
500										

DRILL HOLE P-88-2

LOCATION Sulphurdale

LOGGED BY JNM

GRAPHIC LOGS

DEPTH	ALTERATION (1. WEAK 2. MOD. 3. STRONG) Fe Id.	Bio.	Matrix	Pyrite	Calcite				GRAPHIC GEOLOGY	Tr. TRACE 1. WEAK 2. MOD. 3. STRONG VEINLETS	DESCRIPTIONS
550											
600											

DRILL HOLE P-88-2

LOCATION Sulphurdale

LOGGED BY JNM

Appendix D

State of Utah
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

December 6, 1988

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 Production Holes P88-1 and P88-2
Expiration Date: May 5, 1989

Dear Mr. Hauth:

Reference is made to your request of October 27, 1988, which was received by the State Engineer about October 31, 1988, to drill two production geothermal wells as part of MEI's continued field development program at the Cove Fort/Sulfurdale KGRA. The location of the well is to be:

P88-1 South 2710 feet and East 1152 feet from the NW Corner of Section 7, T26S, R6W, SLB&M, which is within about 25 feet of S88-1.

P88-2 South 2951 feet and East 990 feet from the NW Corner of Section 7, T26S, R6W, SLB&M, which is within about 25 feet of S88-3.

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. The approval of this request does not grant production or use of geothermal fluids from the well(s) until proper procedures have been followed.

2. This approval is conditioned upon the proper easements and trespass agreements being obtained from Delano Development Company, the fee holder of the land where the proposed wells will reside. A copy of such agreements shall be provided the Division of Water Rights before this approval is considered final.

3. The driller must be bonded and have a current Utah water well driller's license from the Division of Water Rights.

4. The owner/operator of the wells must post a bond in the amount of $10,000 for each well or $50,000 to cover all wells drilled within the state.

5. The wells may be drilled to a maximum depth of 2000 feet, more or less. The applicant must obtain written permission from the State Engineer prior to drilling to a depth significantly beyond 2000 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 or the structural integrity of the well.

6. 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.

7. 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 (20 inch) shall be installed to a depth of 60-120 feet and the annular space shall be cemented back solid to the surface.

   B. The surface casing (13 3/8 inch) shall be set to a depth of 400-900 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.

8. 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.

9. 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.

10. 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.

11. 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.

12. 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.

13. 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.

This is permission for the licensed driller to begin drilling the geothermal test well. Note that the expiration date of this letter is May 5, 1989.

Please notify Gerald Stoker, the Area Engineer, at 586-4231 or John Solum, at 538-7406 prior to the commencement of drilling operations so that a representative of the Division may be on site when drilling is begun.

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,

Kent Jones, P.E.
Directing Appropriations Engineer

KLJ:JS:rc

cc: Gerald W. Stoker
Jerry Bronicel
Delano Development Company

Appendix E

P88-1A (Clara)
Daily field cost estimate summary
JCH 3/23/89

Date	Daily Cost	Cum Cost	Comments
	Prior to 2/1/89:	65,712	WH, csg
2/1/89	3242.00	68,954	Start rigdown on P88-2
2/2/89	660.37	69,614	
2/3/89	745.50	70,360	
2/4/89		70,360	
2/5/89		70,360	
2/6/89		70,360	
2/7/89		70,360	
2/8/89		70,360	
2/9/89		70,360	
2/10/89		70,360	
2/11/89		70,360	
2/12/89		70,360	
2/13/89	1655.43	72,015	Building location
2/14/89	1314.00	73,329	
2/15/89	1378.00	74,707	
2/16/89	3882.73	78,590	set/cmt conductor, move rig
2/17/89	4646.50	83,237	
2/18/89	7521.40	90,758	
2/19/89	2382.00	93,140	
2/20/89	1250.00	94,390	
2/21/89		94,390	
2/22/89		94,390	
2/23/89		94,390	
2/24/89	5901.81	100,292	Drilling 26" hole
2/25/89	8295.63	108,587	cmt 20" csg, parted
2/26/89	4411.56	112,999	
2/27/89	5175.00	118,174	
2/28/89	1500.00	119,674	Start rigdown for move 10'N
3/1/89	3599.10	123,273	rathole driller: cond, rh, mh
3/2/89	3614.00	126,887	skid rig
3/3/89	1850.00	128,737	big snow
3/4/89	8719.60	137,457	
3/5/89	10203.81	147,660	drlg 26" hole on P88-1A
3/6/89	2412.50	150,073	cmt 20" csg, NU
3/7/89	6095.30	156,168	start drlg 17 1/2"
3/8/89	14391.02	170,559	
3/9/89	25099.00	195,658	
3/10/89	6616.00	202,274	run/cmt 13 3/8 csg
3/11/89	8444.00	210,718	NU 12" stack
3/12/89	9805.31	220,524	drlg 12 1/4"
3/13/89	13724.01	234,248	
3/14/89	3280.31	237,528	Start rigdown
3/15/89	2570.00	240,098	moving rig
3/16/89	2360.00	**$242,458**	rig moved to yard

Appendix E

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	Prior to 1/2/89	1/2/89	1/3/89	1/4/89
	TRANSPORTATION:				
101	AIR TRAVEL - COMMERCIAL				
102	AIR TRAVEL - CHARTER				
103	RENTAL CAR				
105	FREIGHT - REGULAR				
106	FREIGHT - HOTSHOT				
	DRILLING (TANGIBLES):				
301	Casing/tubing	58474.5			
302	Wellhead Assembly	33949.05			
303	Other Completion Equipment				
	DRILLING (INTANGIBLES):				
326	Location Prep/Maintainance				
327	Rig Mob/Demob				
328	Contract drilling	9000	1400	1400	1400
329	Supervision	9625	1100	550	550
330	Bits, BHA purchase/rental/repair				
331	Mud/chemicals/Mud engr.				
332	H2S Safety				
333	BOP Rentals/Repairs				
334	Drillpipe & DC purchase/rent/rep/insp				
335	Casing Crew/Handling Services & Equip.				
336	Air Compressors				
337	Generator rental/repair				
338	Cement/Services				
339	Wellhead services/rentals				
340	Fishing Tools/services				
341	Directional Drilling				
342	Logging, surveys				
343	Water hauling/costs/pumping/lines				
	OPERATIONS:				
401	Piping, hardware, mechanical equipment	220.05	6194		845
402	Electrical equipment				
403	Equipment rental/lease	1025			
404	Welding	736		350	194
405	Roustabouts, labor				
406	Tools	500.22			
407	Repairs				
408	Instrumentation new/calibration				
409	General operating/maintenance supplies	828.05			
410	Fuel/lubricants	1223.07			1121
411	Road Maintainance				
412	Gravel/fill/concrete	2676.5			
413	Lumber/supplies				

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	Prior to 1/2/89	1/2/89	1/3/89	1/4/89
414	Trailer/toilet rentals				200
415	Geochemical equipment				
416	Steam/gas/water analyses				
417	Safety Equipment/Training				
418	Fences				
419	Buildings/maintenance				
420	Security				
421	Reclaimation/Revegetation				
	PROFESSIONAL SERVICES				
501	Geology/Geophysics				
502	Geochemical consulting				
506	Engineering-Drilling				
	Daily Total:	$118,257	$8,694	$2,300	$4,310
	Daily Cum:	$118,257	$126,951	$129,251	$133,561
	Costs direct to P88-2:	$89,820	$5,594	$2,300	$4,310
	Daily cost to 2nd well:	$28,437	$3,100	$0	$0
	Cum cost to 2nd well:	$28,437	$31,537	$31,537	$31,537
	P88-2 Cum costs:	$89,820	$95,414	$97,714	$102,024

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/5/89	1/6/89	1/7/89	1/8/89
	TRANSPORTATION:				
101	AIR TRAVEL - COMMERCIAL				
102	AIR TRAVEL - CHARTER				
103	RENTAL CAR				
105	FREIGHT - REGULAR				
106	FREIGHT - HOTSHOT		2349	540	
	DRILLING (TANGIBLES):				
301	Casing/tubing				
302	Wellhead Assembly				
303	Other Completion Equipment				
	DRILLING (INTANGIBLES):				
326	Location Prep/Maintainance				
327	Rig Mob/Demob				
328	Contract drilling	1800	2000	2000	3692
329	Supervision	550	550	550	550
330	Bits, BHA purchase/rental/repair				3000
331	Mud/chemicals/Mud engr.				597
332	H2S Safety	560	560.31	173	173
333	BOP Rentals/Repairs				
334	Drillpipe & DC purchase/rent/rep/insp				
335	Casing Crew/Handling Services & Equip.				
336	Air Compressors				
337	Generator rental/repair				
338	Cement/Services				
339	Wellhead services/rentals				
340	Fishing Tools/services				
341	Directional Drilling				
342	Logging, surveys				
343	Water hauling/costs/pumping/lines				
	OPERATIONS:				
401	Piping, hardware, mechanical equipment	918	2729.03		
402	Electrical equipment	89			
403	Equipment rental/lease				337.6
404	Welding	320	256	939	128
405	Roustabouts, labor		64		64
406	Tools	52			
407	Repairs		779.54		
408	Instrumentation new/calibration				
409	General operating/maintenance supplies		22.41		
410	Fuel/lubricants		499.5	571.34	76.64
411	Road Maintainance				
412	Gravel/fill/concrete				
413	Lumber/supplies				

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/5/89	1/6/89	1/7/89	1/8/89
414	Trailer/toilet rentals				
415	Geochemical equipment				
416	Steam/gas/water analyses				
417	Safety Equipment/Training				
418	Fences				
419	Buildings/maintenance				
420	Security				
421	Reclaimation/Revegetation				
	PROFESSIONAL SERVICES				
501	Geology/Geophysics				
502	Geochemical consulting				
506	Engineering-Drilling				
	Daily Total:	$4,289	$9,810	$4,773	$8,618
	Daily Cum:	$137,850	$147,660	$152,434	$161,052
	Costs direct to P88-2:	$4,289	$8,635	$4,773	$8,618
	Daily cost to 2nd well:	$0	$1,175	$0	$0
	Cum cost to 2nd well:	$31,537	$32,712	$32,712	$32,712
	P88-2 Cum costs:	$106,313	$114,948	$119,721	$128,340

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/9/89	1/10/89	1/11/89	1/12/89
	TRANSPORTATION:				
101	AIR TRAVEL - COMMERCIAL				
102	AIR TRAVEL - CHARTER				
103	RENTAL CAR				
105	FREIGHT - REGULAR				
106	FREIGHT - HOTSHOT				
	DRILLING (TANGIBLES):				
301	Casing/tubing				
302	Wellhead Assembly				
303	Other Completion Equipment				
	DRILLING (INTANGIBLES):				
326	Location Prep/Maintainance				
327	Rig Mob/Demob				
328	Contract drilling	2000	2000	2000	
329	Supervision	550	550	550	550
330	Bits, BHA purchase/rental/repair				
331	Mud/chemicals/Mud engr.				
332	H2S Safety	173	173		
333	BOP Rentals/Repairs		674	224	
334	Drillpipe & DC purchase/rent/rep/insp				
335	Casing Crew/Handling Services & Equip.	840			
336	Air Compressors				
337	Generator rental/repair				
338	Cement/Services	5459.52			
339	Wellhead services/rentals				
340	Fishing Tools/services				
341	Directional Drilling				
342	Logging, surveys				
343	Water hauling/costs/pumping/lines				
	OPERATIONS:				
401	Piping, hardware, mechanical equipment		4186.54		
402	Electrical equipment		1850.66		
403	Equipment rental/lease	25.6			
404	Welding	320	400		
405	Roustabouts, labor	64	64	64	64
406	Tools				
407	Repairs				
408	Instrumentation new/calibration				
409	General operating/maintenance supplies	368.45	122.5		
410	Fuel/lubricants		15		
411	Road Maintainance				
412	Gravel/fill/concrete				
413	Lumber/supplies				

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/9/89	1/10/89	1/11/89	1/12/89
414	Trailer/toilet rentals				
415	Geochemical equipment				
416	Steam/gas/water analyses				
417	Safety Equipment/Training				
418	Fences				
419	Buildings/maintenance				
420	Security				
421	Reclaimation/Revegetation				
	PROFESSIONAL SERVICES				
501	Geology/Geophysics		370	370	
502	Geochemical consulting				
506	Engineering-Drilling				
	Daily Total:	$9,801	$10,406	$3,208	$614
	Daily Cum:	$170,852	$181,258	$184,466	$185,080
	Costs direct to P88-2:	$9,801	$10,406	$3,208	$614
	Daily cost to 2nd well:	$0	$0	$0	$0
	Cum cost to 2nd well:	$32,712	$32,712	$32,712	$32,712
	P88-2 Cum costs:	$138,140	$148,546	$151,754	$152,368

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/13/89	1/14/89	1/15/89	1/16/89
	TRANSPORTATION:				
101	AIR TRAVEL - COMMERCIAL				
102	AIR TRAVEL - CHARTER				
103	RENTAL CAR				
105	FREIGHT - REGULAR				
106	FREIGHT - HOTSHOT				
	DRILLING (TANGIBLES):				
301	Casing/tubing				
302	Wellhead Assembly				
303	Other Completion Equipment				
	DRILLING (INTANGIBLES):				
326	Location Prep/Maintainance				
327	Rig Mob/Demob				
328	Contract drilling				2575
329	Supervision			350	700
330	Bits, BHA purchase/rental/repair				
331	Mud/chemicals/Mud engr.				
332	H2S Safety				
333	BOP Rentals/Repairs				
334	Drillpipe & DC purchase/rent/rep/insp				
335	Casing Crew/Handling Services & Equip.				
336	Air Compressors				
337	Generator rental/repair				
338	Cement/Services				5585.9
339	Wellhead services/rentals				
340	Fishing Tools/services				
341	Directional Drilling				
342	Logging, surveys				
343	Water hauling/costs/pumping/lines				
	OPERATIONS:				
401	Piping, hardware, mechanical equipment				
402	Electrical equipment				
403	Equipment rental/lease				
404	Welding				160
405	Roustabouts, labor	64			64
406	Tools				
407	Repairs				
408	Instrumentation new/calibration				
409	General operating/maintenance supplies				
410	Fuel/lubricants				
411	Road Maintainance				
412	Gravel/fill/concrete				
413	Lumber/supplies				

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/13/89	1/14/89	1/15/89	1/16/89
414	Trailer/toilet rentals				
415	Geochemical equipment				
416	Steam/gas/water analyses				
417	Safety Equipment/Training				
418	Fences				
419	Buildings/maintenance				
420	Security				
421	Reclaimation/Revegetation				
	PROFESSIONAL SERVICES				
501	Geology/Geophysics				
502	Geochemical consulting				
506	Engineering-Drilling				
	Daily Total:	$64	$0	$350	$9,085
	Daily Cum:	$185,144	$185,144	$185,494	$194,579
	Costs direct to P88-2:	$64	$0	$350	$9,085
	Daily cost to 2nd well:	$0	$0	$0	$0
	Cum cost to 2nd well:	$32,712	$32,712	$32,712	$32,712
	P88-2 Cum costs:	$152,432	$152,432	$152,782	$161,867

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/17/89	1/18/89	1/19/89	1/20/89
	TRANSPORTATION:				
101	AIR TRAVEL - COMMERCIAL				
102	AIR TRAVEL - CHARTER				
103	RENTAL CAR				
105	FREIGHT - REGULAR	56.37		23	
106	FREIGHT - HOTSHOT				
	DRILLING (TANGIBLES):				
301	Casing/tubing				
302	Wellhead Assembly				
303	Other Completion Equipment				
	DRILLING (INTANGIBLES):				
326	Location Prep/Maintainance				
327	Rig Mob/Demob				
328	Contract drilling	2575	2575	2575	2575
329	Supervision	700		700	700
330	Bits, BHA purchase/rental/repair		4362.96		
331	Mud/chemicals/Mud engr.		1219	2070	
332	H2S Safety	560.31	450.31	450.31	535.31
333	BOP Rentals/Repairs			6359.83	850
334	Drillpipe & DC purchase/rent/rep/insp				
335	Casing Crew/Handling Services & Equip.				
336	Air Compressors		250	1100	
337	Generator rental/repair				
338	Cement/Services				
339	Wellhead services/rentals				
340	Fishing Tools/services				
341	Directional Drilling				
342	Logging, surveys				
343	Water hauling/costs/pumping/lines				
	OPERATIONS:				
401	Piping, hardware, mechanical equipment				
402	Electrical equipment				
403	Equipment rental/lease	891.66	761		
404	Welding	352	128		
405	Roustabouts, labor	64			
406	Tools				
407	Repairs			1426.6	
408	Instrumentation new/calibration				
409	General operating/maintenance supplies			32.14	
410	Fuel/lubricants		1607.81		
411	Road Maintainance				
412	Gravel/fill/concrete				
413	Lumber/supplies				

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/17/89	1/18/89	1/19/89	1/20/89
414	Trailer/toilet rentals				
415	Geochemical equipment				
416	Steam/gas/water analyses				
417	Safety Equipment/Training				
418	Fences				
419	Buildings/maintenance				
420	Security				
421	Reclaimation/Revegetation				
	PROFESSIONAL SERVICES				
501	Geology/Geophysics	501	332	320	320
502	Geochemical consulting				
506	Engineering-Drilling				
	Daily Total:	$5,700	$11,686	$15,057	$4,980
	Daily Cum:	$200,279	$211,965	$227,022	$232,003
	Costs direct to P88-2:	$5,700	$11,686	$15,057	$4,980
	Daily cost to 2nd well:	$0	$0	$0	$0
	Cum cost to 2nd well:	$32,712	$32,712	$32,712	$32,712
	P88-2 Cum costs:	$167,567	$179,253	$194,310	$199,290

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/21/89	1/22/89	1/23/89	1/24/89
	TRANSPORTATION:				
101	AIR TRAVEL - COMMERCIAL				
102	AIR TRAVEL - CHARTER				
103	RENTAL CAR				
105	FREIGHT - REGULAR				
106	FREIGHT - HOTSHOT				
	DRILLING (TANGIBLES):				
301	Casing/tubing				
302	Wellhead Assembly				
303	Other Completion Equipment				
	DRILLING (INTANGIBLES):				
326	Location Prep/Maintainance				
327	Rig Mob/Demob				
328	Contract drilling	2575	2575	2575	2575
329	Supervision	700	700	700	700
330	Bits, BHA purchase/rental/repair				
331	Mud/chemicals/Mud engr.			2438	300
332	H2S Safety	450.31	450.31	450.31	450.31
333	BOP Rentals/Repairs		2201	1465.4	1650
334	Drillpipe & DC purchase/rent/rep/insp				
335	Casing Crew/Handling Services & Equip.				
336	Air Compressors		2450	1250	1250
337	Generator rental/repair				
338	Cement/Services	12517.49			
339	Wellhead services/rentals				
340	Fishing Tools/services				
341	Directional Drilling				
342	Logging, surveys				
343	Water hauling/costs/pumping/lines				
	OPERATIONS:				
401	Piping, hardware, mechanical equipment				
402	Electrical equipment				
403	Equipment rental/lease			60	
404	Welding	374	800		
405	Roustabouts, labor				
406	Tools				
407	Repairs		514.52		
408	Instrumentation new/calibration				
409	General operating/maintenance supplies			14.76	
410	Fuel/lubricants			2226.03	
411	Road Maintainance				
412	Gravel/fill/concrete				
413	Lumber/supplies				

P88-2 Daily drilling cost summary					
	Last edit date: 2/7/89				
ACCT. #	ACCT. DESCRIPTION	1/21/89	1/22/89	1/23/89	1/24/89
414	Trailer/toilet rentals				
415	Geochemical equipment				
416	Steam/gas/water analyses				
417	Safety Equipment/Training				
418	Fences				
419	Buildings/maintenance				
420	Security				
421	Reclaimation/Revegetation				
	PROFESSIONAL SERVICES				
501	Geology/Geophysics	320	501	320	320
502	Geochemical consulting				
506	Engineering-Drilling				
	Daily Total:	$16,937	$10,192	$11,500	$7,245
	Daily Cum:	$248,939	$259,131	$270,631	$277,876
	Costs direct to P88-2:	$16,937	$10,192	$11,500	$7,245
	Daily cost to 2nd well:	$0	$0	$0	$0
	Cum cost to 2nd well:	$32,712	$32,712	$32,712	$32,712
	P88-2 Cum costs:	$216,227	$226,419	$237,918	$245,164

P88-2 Daily drilling cost summary				
	Last edit date: 2/7/89			
ACCT. #	ACCT. DESCRIPTION	1/25/89		Item totals
	TRANSPORTATION:			
101	AIR TRAVEL - COMMERCIAL			0
102	AIR TRAVEL - CHARTER			0
103	RENTAL CAR			0
105	FREIGHT - REGULAR			79.37
106	FREIGHT - HOTSHOT			2889
	DRILLING (TANGIBLES):			
301	Casing/tubing			58474.5
302	Wellhead Assembly			33949.05
303	Other Completion Equipment			0
	DRILLING (INTANGIBLES):			
326	Location Prep/Maintainance			0
327	Rig Mob/Demob			0
328	Contract drilling	1606		53473
329	Supervision	700		22875
330	Bits, BHA purchase/rental/repair			7362.96
331	Mud/chemicals/Mud engr.			6624
332	H2S Safety	560.31		6170.1
333	BOP Rentals/Repairs			13424.23
334	Drillpipe & DC purchase/rent/rep/insp			0
335	Casing Crew/Handling Services & Equip.			840
336	Air Compressors	875		7175
337	Generator rental/repair			0
338	Cement/Services			23562.91
339	Wellhead services/rentals			0
340	Fishing Tools/services			0
341	Directional Drilling			0
342	Logging, surveys			0
343	Water hauling/costs/pumping/lines			0
	OPERATIONS:			
401	Piping, hardware, mechanical equipment			15092.62
402	Electrical equipment			1939.66
403	Equipment rental/lease			3100.86
404	Welding			5457
405	Roustabouts, labor			576
406	Tools			552.22
407	Repairs			2720.66
408	Instrumentation new/calibration			0
409	General operating/maintenance supplies			1388.31
410	Fuel/lubricants			7340.39
411	Road Maintainance			0
412	Gravel/fill/concrete			2676.5
413	Lumber/supplies			0

P88-2 Daily drilling cost summary				
	Last edit date: 2/7/89			
ACCT. #	ACCT. DESCRIPTION	1/25/89		Item totals
414	Trailer/toilet rentals			200
415	Geochemical equipment			0
416	Steam/gas/water analyses			0
417	Safety Equipment/Training			0
418	Fences			0
419	Buildings/maintenance			0
420	Security			0
421	Reclaimation/Revegetation			0
	PROFESSIONAL SERVICES			
501	Geology/Geophysics	350		4024
502	Geochemical consulting			0
506	Engineering-Drilling			0
	Daily Total:	$4,091		
	Daily Cum:	$281,967	Check cum:	$281,967
	Costs direct to P88-2:	$4,091		
	Daily cost to 2nd well:	$0		
	Cum cost to 2nd well:	$32,712		
	P88-2 Cum costs:	$249,255		

MEI DRILLING ACTIVITY LOG WELL #:[P88-2] DATE:[1/23/89]

TIME	DEPTH	NAME	COMMENTS
~~1844~~			
1844	815	J.H.	Steam observed @ flowline discharge! 145°F TEMP
1828	820		Fracture
1954	828	JH	Dry Drill 828 – 833
2015	833		Pick up & cir & Clean Hole
2045	833		Conn with mask
2045	833		Drill 3 FT work pipe Drill 3 FT work pipe Drill 5 FT. work pipe watch for Fractures & Breaks
2200	864'	Fra Cox	Drilling F/854 T/864 Fractured Rock
			About 45' per hr. work kelly up 10' Every 5'
			of hole made no Fill hole Cleaning very Well
			10-12,000 W.O.B. @ 65 R.P.M.
2320	864'	Wap	CONNECTION, START DRILLING AFTER 45 MIN CIRC & CLEANG
2350	895	Wap	KELLY DOWN, DRILLING AT 66' PER HOUR, CIRC & ROTATE 30 MIN
0017	895	Wap	CONNECTION, START DRILLING
0048	925	Wap	KELLY DOWN, DRILLING AT 66' PER HOUR, ROUGH W/FRACTURES
~~0114~~			CIRC & ROTATE 30 MIN.
0114	925	Wap	CONNECTION START DRILLING
0120	932	Wap	FLOW TEE LEAK DISCOVERED, STOP DRILLING, CLEAN HOLE

2	16.60	R	6	XH	1	1

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL	2	4.15	
REAMING			
CORING			
CONDITION MUD & CIRCULATE	5	1	
TRIPS			
LUBRICATE RIG	1/2	1/2	
REPAIR RIG	2	1/2	
CUT OFF DRILLING LINE			
DEVIATION SURVEY			
WIRE LINE LOGS			
RUN CASING & CEMENT			
WAIT ON CEMENT			
NIPPLE UP B.O.P.			
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
P.U. Subs	1 1/2	5.5	
SPUD	1		
A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
TOTALS	12	12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

W/CONTR. D.P.	
W/OPR. D.P.	
W/O/D.P.	
STANDBY	
DAY WORK	
DAYS FROM SPUD	
CUMULATIVE ROTATING HRS.	
CUM. MUD COST	

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	OD	FT.
	BIT 1		2 FT.
1	C OH 4 1/2 / 6 3/8		2.18
1	SUB RMR Bit sub		2.60
	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	41	FT.
	TOTAL	47.78	FT.
	WT. OF STRING	6	LBS.

BIT RECORD

BIT NO.	1	1
SIZE		26
IADC CODE		
MFG.		
TYPE		
SER. NO.		
JETS 1/32" /TFA in²		
DEPTH OUT		
DEPTH IN		0
TOTAL FTG.		
TOTAL HRS.		
DULL: CUT. STRUC. I O D L B G O R		
GPM/PUMP-PSI		

MUD RECORD

TIME	12:30	6:00	11:30
WEIGHT			
PRESSURE GRADIENT			
VISC.-SEC.	40	38	42
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.
GEL	82		
Costic	3		

FOOTAGE / FORMATION

FROM	TO	DR.-D RM.-R CORE.-C	CORE NO.	FORMATION (SHOW CORE RECOVERY)	ROTARY RPM	WT. ON BIT 1000 #	PUMP PRESS	PUMP NO. 1 LINER SIZE	PUMP NO. 1 S.P.M.	PUMP NO. 2 LINER SIZE	PUMP NO. 2 S.P.M.	METHOD RUN
20	47	D		Surface	70	–	300	~~5 1/2~~ 6	~~82~~	~~3 1/2~~ 7 1/4	62	5

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
12:00	12:30	1/2	7	Rig ✓
12:30	2:00	1 1/2	21	Pick up Subs
2:00	4:00	2	8	work on pump #2 Though Hydr lines
4:00	5:00	1	22	spud in
5:00	6:00	1	2	Drlg
6:00	8:00	2	5	Run out Fluied – Build Vou
8:00	9:00	1	2	Drlg
9:00	1200	3	5	Condition mud – Build Vou

DRILLER Brent Larsen

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	OD	FT.
	BIT		FT.
7 3/4 Reg	Caller #1	9" OD	31.80
	SUB RMR Sub	9 5/8 OD	1.50 FT.
	D.C. ID Kelly sub	8 OD	2.20 FT.
	STB RMR Caller #2	9"	30.45
	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

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
47					36		100	5 1/2	62	3 1/2	62	5

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
1200	12:45	45 min	7	Serviced Rig
12:45	3:45	3	22	Picked up Caller + Made up (Started Drilling 3:45)
4:05	4:20			Strata Change – Gray Tuff (60' in the hole)
4:20	4:55		5	~~Pumped Hole out~~ Circulate +
4:55	7:35		21	~~Spud~~ Pick up (#2 Caller)
7:35				Started Drilling

DRILLER

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	OD	FT.
	BIT 1		2 FT.
	STB RMR	OD	FT.
2	D.C. ID	9" OD	62.08 FT.
2	STB RMR	OD	3.70 FT.
	D.C. ID	OD	FT.
	STB RMR	OD	FT.
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN	33	FT.
	TOTAL	100	FT.
	WT. OF STRING		LBS.

BIT RECORD

BIT NO.	1	1
SIZE		26
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	3:45	7:35	10:00
WEIGHT			
PRESSURE GRADIENT	42	42	43
VISC.-SEC.	~~42~~	~~42~~	~~43~~
PV/YP	/	/	/
GELS	/	/	/
WL -CC'S			
pH			
SOLIDS %			

MUD & CHEMICALS ADDED

TYPE	AMT.	TYPE	AMT.
Gel	5		

FOOTAGE / FORMATION

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
~~[illegible]~~ 47	100											

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
12:00	1:05	1	7	Ser. Rig
1:05	3:45	2 hr 40	21	Pick up (#1 Caller) 2 hr. 40 m
3:45	5:04		2	Drill (at 60' hit Gray Tuff)
5:04	7:35		21	Pick up (#2 Caller)
7:35	11:08		2	Drill
10:08	12:00		5	Circulate @ 11:30 P.OH To check For Full

DRILLER

FORM 3T-4 PRINTED IN U.S.A. APPROVED APPROVED

IADC – API OFFICIAL DAILY DRILLING REPORT FORM

IADC – API OFFICIAL DAILY DRILLING REPORT FORM

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL			
REAMING			
CORING			
CONDITION MUD & CIRCULATE	4¼		
TRIPS	1¼		
LUBRICATE RIG	½		
REPAIR RIG			
CUT OFF DRILLING LINE			
DEVIATION SURVEY			
WIRE LINE LOGS			
RUN CASING & CEMENT	6	2½	
WAIT ON CEMENT		9½	
NIPPLE UP B.O.P.			
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
Cleaned out Cement			
COMPLETION: A. PERF'R'TN			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
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			
CUMULATIVE ROTATING HRS.			
TOTAL MUD COST			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM		
1	BIT	2	FT.
1	XO	3.70	
	STB RMR OD		FT.
2	D.C. 9" OD	62.08	FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	BHA	67.78	
	STANDS DP		FT.
	SINGLES DP		FT.
	KELLY DOWN	33.	FT.
	TOTAL	100	FT.
	WT. OF STRING	14	LBS.

BIT RECORD

BIT NO.	1
SIZE	26
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	3:00
WEIGHT	
PRESSURE GRADIENT	
VISC.-SEC.	44
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. 1 LINER SIZE	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
100						–	200	5"	84			5

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
12:00	4:15	4¼	5	Circ - Hole
4:15	4:45	½	7	Rig Serv
4:45	6:30	1¾	6	~~Rig up to Run Casing~~ T.O.H.
6:30	12:00	6	12	Rig up ~~to~~ Run Casing ~~+~~ 20"

DRILLER Brent Larsen

DAY TOUR

DRILLING ASSEMBLY (At end of tour): BIT / STB RMR OD / D.C. ID OD / STB RMR OD / D.C. ID OD / STB RMR OD / STANDS DP / SINGLES DP / KELLY DOWN / TOTAL / WT. OF STRING (blank)

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 (blank)

MUD RECORD: TIME / WEIGHT / PRESSURE GRADIENT / VISC.-SEC. / PV/YP / GELS / WL -CC'S / pH / SOLIDS % (blank)

MUD & CHEMICALS ADDED: TYPE | AMT. | TYPE | AMT.

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 | S.P.M. | PUMP NO. LINER SIZE | 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
12:00	2:30			Run ~~10~~ 99.39 20 CASING K55 94#
				with Float Shoe 2.30 SET @ 97F
				CEMENT with 12yd Class G cement
				with 2% CAL in Place @ 2:30 good Return
			on	CEMENT ~~SET~~ 80FT of 2" pipe in Ann

DRILLER

EVENING TOUR

DRILLING ASSEMBLY (At end of tour): Cemented

BIT / STB RMR OD / D.C. ID OD / STB RMR OD / D.C. ID OD / STB RMR OD / STANDS DP / SINGLES DP / KELLY DOWN / TOTAL / WT. OF STRING

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 (blank)

MUD RECORD: TIME / WEIGHT / PRESSURE GRADIENT / VISC.-SEC. / PV/YP / GELS / WL -CC'S / pH / SOLIDS % (blank)

MUD & CHEMICALS ADDED: TYPE | AMT. | TYPE | AMT.

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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
100												

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
12:00	1:30	1½	12	Install 20" casing (finnished)
1:30	2:00	½	12	Neppelled up Grout tude (2")
2:00	2:30	½	12	Cemented hole
2:30	12:00	9½	13	Cleaned out all line, tubes + tanks with
				Cement in them. Cleaned out seller
				Serviced Engines
				W.O.C.

DRILLER [signature]

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½	14.66	~~??~~E	6¼	X 14	34

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL			
REAMING			
CORING			
CONDITION MUD CIRCULATE			
TRIPS			
LUBRICATE RIG			
REPAIR RIG			
CUT OFF DRILLING LINE			
DEVIATION SURVEY			
WIRE LINE LOGS			
RUN CASING CEMENT			
WAIT ON CEMENT			
NIPPLE UP spool and annuler		12	
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
W.O.C.	3		
cut off	2½		
weld ? Head	6½		
A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
TOTALS	12		

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

W/CONTR. D.P.

W/OPR. D.P.

W/O D.P.

STANDBY

TOTAL DAY WORK

NO. OF DAYS FROM SPUD

CUMULATIVE ROTATING HRS.

TOTAL MUD COST

MORNING TOUR

NO.	DRILLING ASSEMBLY (At end of tour)		
	BIT		FT.
	STB RMR	OD	FT.
2	D.C. ID	9" OD	62.08 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.	W.O.C.
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, 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, S.P.M.), PUMP NO. (LINER SIZE, S.P.M.), METHOD RUN

DEVIATION RECORD: DEPTH, DEV., DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
12:00	3:00	3	21	W.O.C. – Rig Serv.
3:00	5:30	2½	22	cut off Casing Lay it Down 30" + 20"
5:30	12:00	6½	23	Clean out Cellar + weld on Head
				~~?~~ Test To 3000# for 30 min

DRILLER Brent Jensen

DAY TOUR

NO.	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.
	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, 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, S.P.M.), PUMP NO. (LINER SIZE, S.P.M.), METHOD RUN

DEVIATION RECORD: DEPTH, DEV., DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
12:00	8:00	8	14	Nippled up spool + annuler, welded on mud return line and then set top 20" ~~Casing~~ ~~of~~ Pincher near annuler.
8:00	10:00	2	14	Change out 3" and 2" mud Valve on 1" Pump
~~10:00~~	~~12:00~~			instill Flow Line
10:00	12:00			instill Kelly ~~?~~ Hose Rig up To Drill Mouse Hole

DRILLER

EVENING TOUR

NO.	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.
	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, 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, S.P.M.), PUMP NO. (LINER SIZE, S.P.M.), METHOD RUN

DEVIATION RECORD: DEPTH, DEV., DIRECTION

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

DRILLER

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			
TOTAL DAY WORK			
NO. OF DAYS FROM SPUD			
CUMULATIVE ROTATING HRS.			
TOTAL MUD COST			

CUMULATIVE TON MI. OR TRIPS

MORNING TOUR

NO.	DRILLING ASSEMBLY (At end of tour)		FT.
1	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.	2
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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN SGL-S PAREL-P COMB-C
				Surf								

DEVIATION RECORD	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION
							FUEL	45"	

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
12:00	12:30	1/2	7	Rig Serv.
12:30	1:30	1	8	Air lines to Rig froze up – Though out
1:30	3:00	1 1/2	2	Drilled mouse Hole Empty muD Tanks –
3:00	3:30	1/2	8	H2O Line from Water tank Froze, Thoughout
3:30	5:00	1 1/2	8	Drained muD system – Hydrolic pump Frezeing
				Broke Down Mouse Hole Assembley –
5:00	6:00			Bucket out Celler Drain won't Drain –

DRILLER Brent Jensen

DAY TOUR

NO.	DRILLING ASSEMBLY (At end of tour)		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 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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN SGL-S PAREL-P COMB-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
6:00	10:00	~~[illegible]~~		Hook up Hyd To BoP + Acc. Kill line

DRILLER

EVENING TOUR

NO.	DRILLING ASSEMBLY (At end of tour)		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 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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN SGL-S PAREL-P COMB-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

DRILLER

IADC – API OFFICIAL DAILY DRILLING REPORT FORM

SINCE LAST CUT
CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO. – OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL			
REAMING			
CORING			
CONDITION MUD & CIRCULATE			
TRIPS			
LUBRICATE RIG			
REPAIR RIG			
CUT OFF DRILLING LINE			
DEVIATION SURVEY			
WIRE LINE LOGS			
RUN CASING & CEMENT			
WAIT ON CEMENT			
NIPPLE UP B.O.P.			
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
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)

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

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 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 S.P.M. — PUMP NO. LINER SIZE 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	8	12		Work as directed Thaw out Service lines get Rig prepared for Squeeze Job - Familize Crew with Rig's Equip - do Maint on Rig

DRILLER *[signature]*

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 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 S.P.M. — PUMP NO. LINER SIZE 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	8	12		Same as Above
				2:00pm / 3:30pm Squeeze 20" w/BJ Hughes mud surfaced But not Green Cmt

DRILLER *[signature]*

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. — 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 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 S.P.M. — PUMP NO. LINER SIZE 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

SINCE LAST CUT
CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
UP AND AR DOWN			
LL ACTUAL			
AMING			
RING			
NDITION MUD IRCULATE			
IPS			
BRICATE RIG			
PAIR RIG			
T OFF LLING LINE			
VIATION SURVEY			
E LINE LOGS			
CASING EMENT			
T ON ENT			
PLE UP P.			
T B.O.P.			
LL STEM TEST			
G BACK			
EEZE CEMENT			
RING			
WORK			
A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
TALS			

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

CONTR. D.P.			
OPR. D.P.			
W.D.P.			
ANDBY			
DAY WORK			
DAYS MUD			
TIVE NG HRS.			
MUD COST			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour) — BIT; 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 in^2; 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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN SGL–S PARLEL–P COMB–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
8				Nipple down Flowline - Pitcher Nipple - prepare Rotating Head to Nipple up
				Attend H_2S Training

DRILLER [signature]

DAY TOUR

DRILLING ASSEMBLY (At end of tour) — BIT; 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 in^2; 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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN SGL–S PARLEL–P COMB–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
10:00	12:30	2½	21	Attend H2S Training School
12:30	4:00	3½	14	Nipple up Rotating Head & Build & nipple up Flowline
4:00	5:30	1½	14	Rig up Accumulator & Air Comp.
5:30	6:30	1	8	Repair Deadline Anchor Bolts & Torque gauge
6:30	8:30	2	21	Pick up mouse Hole, Kelly & Swivel & make up Hose
8:30	10:00	1½	21	Hook up Air Comp., Booster, mist pump

DRILLER [signature]

EVENING TOUR

DRILLING ASSEMBLY (At end of tour) — BIT; 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 in^2; 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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN SGL–S PARLEL–P COMB–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

DRILLER

'2	16.6	E	6/4	X11	34										CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
…P AND …R DOWN			
…L ACTUAL		5	
…ING		2	
…NG			
…ITION MUD …RCULATE			
…S			
…ICATE RIG			
…IR RIG			
…OFF …LING LINE			
…IATION SURVEY			
…LINE LOGS			
…CASING …MENT			
…ON …ENT			
…LE UP …P.			
…F B.O.P.			
…L STEM TEST			
…G BACK			
…EEZE CEMENT			
…ING			
…WORK			
		5	
A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
…TALS		12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

CONTR. D.P.			
OPR. D.P.			
…D.P.			
…ANDBY			
DAY WORK			
DAYS …PUD			
…ATIVE …ING HRS.			
MUD COST			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	LENGTH
	BIT 17½	1.50 FT.
	Bit Sub	158
	STB RMR OD	FT.
1	D.C. ID monel OD	25.54 FT.
	STB RMR OD	FT.
1	D.C. ID 6½ OD	30.14 FT.
	STB RMR OD	FT.
1	Dbl-Pin Sub	2.06
	STANDS DP	FT.
	SINGLES DP	FT.
	KELLY DOWN	FT.
	TOTAL	FT.
	WT. OF STRING	LBS.

BIT RECORD

BIT NO.	
SIZE	17½
IADC CODE	
MFG.	Reed
TYPE	13-J
SER. NO.	959085
JETS 1/32" /TFA in^2	3X16
DEPTH OUT	
DEPTH IN	100
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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
100'												

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
10:00	12:00	2	21	Hook up water and Diesel lines to Compressors.
12:00	3:00	3	21	modify and Install piping to Standpipe
3:00	4:00	1	8	Try to find Electrical Short in Rig lighting System
4:00				make up Bit e monel e 1 Dc
	7:00	3	6	install Rotating Pack off
7:00	10:00	3	21	wait on Air Compresser Engines will not Start

DRILLER [signature]

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	LENGTH
	BIT 17½	1.50 FT.
	BIT SUB	158
	STB RMR OD	FT.
1	D.C. ID monel OD	25.54 FT.
	STB RMR OD	FT.
1	D.C. ID 6½ OD	30.14 FT.
	STB RMR OD	FT.
1	⊗ SUB	2.06
	BHA	60.82
1	STANDS DP	60.10 FT.
	SINGLES DP	FT.
	KELLY DOWN	38 FT.
	TOTAL	159 FT.
	WT. OF STRING	9000 LBS.

BIT RECORD

BIT NO.	17½
SIZE	
IADC CODE	
MFG.	Reed
TYPE	13-J
SER. NO.	959085
JETS 1/32" /TFA in^2	3X16
DEPTH OUT	—
DEPTH IN	100
TOTAL FTG.	59
TOTAL HRS.	5
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.
Polymer Le Foam	38		

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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
100'	159	D			50/80	2/8	200		(Air)			

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
10:00	11:30	1½	21	Rig up Accumulator + Remote + work on Air Comp.
11:30	12:00	½	3	Break cir w/Air + Clean out cement F/77'
12:00	12:30	½	21	Work on Compressors
12:30	2:00	1½	3	Clean out cmt + Drlg Shoe @ 95'
2:00	3:30	1½	21	Work on Compressors
3:30	6:30	3	2	Drlg F/95' (Junk under shoe)
6:30	8:00	1½	21	Cir Hole w/Air + Test Formation w/water
8:00	10:00	2	2	Drlg F/128' T/159'

DRILLER [signature]

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	LENGTH
	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 in^2 / 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 | 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 | S.P.M. | PUMP NO. LINER SIZE | 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

½	16.6	E	6¼	XH	34

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL	10	11½	
REAMING			
CORING			
CONDITION MUD & CIRCULATE	½	½	
TRIPS	1		
LUBRICATE RIG			
REPAIR RIG			
CUT OFF DRILLING LINE			
DEVIATION SURVEY	½		
WIRE LINE LOGS			
RUN CASING & CEMENT			
WAIT ON CEMENT			
NIPPLE UP B.O.P.			
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
TOTALS	12	12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

W/CONTR. D.P.			
W/OPR. D.P.			
NO/D.P.			
STANDBY			
TOTAL DAY WORK			
NO. OF DAYS FROM SPUD			
CUMULATIVE ROTATING HRS.			
DAILY MUD COST			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	LENGTH
	BIT 17½	1.50 FT.
	Bit-Sub	1.58
	STB RMR OD	FT.
1	D.C. ID monel OD	25.54 FT.
	STB RMR OD	FT.
2	D.C. ID 9" OD	62.09 FT.
2	STB RMR ®'s OD	2.66 FT.
	BHA =	93.37
3	STANDS DP	180.67 FT.
	SINGLES DP	FT.
	KELLY DOWN	26' FT.
	TOTAL	300 FT.
	WT. OF STRING	19 000 LBS.

BIT RECORD

BIT NO.	2
SIZE	17½
IADC CODE	
MFG.	Reed
TYPE	13-J
SER. NO.	959085
JETS 1/32" /TFA in²	3x16
DEPTH OUT	
DEPTH IN	100
TOTAL FTG.	200
TOTAL HRS.	15
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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
159	300	D			60/70	8/10	250		Air			

DEVIATION RECORD	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION
	159'	½°	N-60-W						

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2200	2230	½	5	circ hole Clean
2230	2300	½	10	wire line Survey @ 159'
2300	2400	1	6	Lay Down 1-6½" Dc-pickup 2-9" Dc's
2400	1000	10	2	Drilling 17½" hole

DRILLER [signature]

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	ITEM	LENGTH
	BIT 17½	1.50 FT.
	BitSub	1.58
	STB RMR OD	FT.
1	D.C. ID monel OD	25.54 FT.
	STB RMR OD	FT.
2	D.C. ID 9" OD	62.09 FT.
2	STB RMR ®. OD	2.66 FT.
	BHA:	93.37
5	STANDS DP	FT.
1	SINGLES DP	331.67 FT.
	KELLY DOWN	35 FT.
	TOTAL	460 FT.
	WT. OF STRING	20,000 LBS.

BIT RECORD

BIT NO.	2
SIZE	17½
IADC CODE	
MFG.	Reed
TYPE	13-J
SER. NO.	959085
JETS 1/32" /TFA in²	3x16
DEPTH OUT	-0-
DEPTH IN	100
TOTAL FTG.	360
TOTAL HRS.	26½
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.
Polymer	30 gal		
Foam	45 gal		

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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
300		D			50/80	10/12	250		AIR			

DEVIATION RECORD	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION
	312	½	N88E						

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
10:00	11:00	1	2	Drilling F/300'
11:00	11:30	½	10	cir & Survey @ 312
11:30	2200	10½	2	Drilling

DRILLER

EVENING TOUR

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. / 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 / 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 / S.P.M. / PUMP NO. LINER SIZE / 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

FORM 3T-4 PRINTED IN U.S.A. APPROVED APPROVED

IADC – API OFFICIAL DAILY DRILLING REPORT FORM

½	16.6	E	6¼	XH	54

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL	½		
REAMING			
CORING			
CONDITION MUD & CIRCULATE	10½	2½	
TRIPS		2	
LUBRICATE RIG			
REPAIR RIG			
CUT OFF DRILLING LINE			
DEVIATION SURVEY	½		
WIRE LINE LOGS			
RUN CASING & CEMENT		2½	
WAIT ON CEMENT			
NIPPLE UP B.O.P.			
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
	½	5	
A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
TOTALS	12	12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

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

MORNING TOUR

DRILLING ASSEMBLY (At end of tour)

NO.	DRILLING ASSEMBLY	FT.
	BIT 17½	1.50
	Bit sub	1.58
	STB RMR OD	
1	D.C. ID Mon Bd	25.54
	STB RMR OD	
2	D.C. ID 9" OD	62.09
2	8" OD	2.66
	BHA	93.37
6	STANDS DP	361.89
	SINGLES DP	
	KELLY DOWN	15'
	TOTAL	470

WT. OF STRING 25,000 LBS.

BIT RECORD

BIT NO.	2
SIZE	17½
IADC CODE	
MFG.	Reed
TYPE	13J
SER. NO.	959085
JETS 1/32" /TFA in²	3x16
DEPTH OUT	470
DEPTH IN	100
TOTAL FTG.	370
TOTAL HRS.	27
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

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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
460	470	D			60/70	10/12	320			Air		

DEVIATION RECORD

DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION
470	1°	S-31-W						

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2200	2230	½	21	work on Air Booster
2230	0100	½-2½	2-5	Drill To/470' ½ circ. hole Clean
0100	0130	½	10	wire line Survey wipe hole T/Dc's
0130	0200	½	6	wipe hole T/Dc's H^2S 10 ppm To 100 ppm @ head-Flowline
0200	0600	4	5	mix mud to kill H^2S pump 42 S.P.M 60 min.
0600	1000	4	5	" " " " " Fill hole

DRILLER [illegible signature]

DAY TOUR

DRILLING ASSEMBLY (At end of tour)

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

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

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 S.P.M. / PUMP NO. LINER SIZE S.P.M. / METHOD RUN

DEVIATION RECORD

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

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
10:00	12:00	2	21	ReRun Flow Line To Cir Hole
12:00	13:30	1½	5	Cir + clean out Fill F/455-T/470' cir + cond Hole
1330	1400	½	6	wipe Hole T/DC's 6' Fill
1400		1	5	clean out Fill + Cond Hole F/13⅜ csg. Pull up wait
	1500			30 min RIH (NO Fill)
1500	1630	1½	6	POOH Break Bit
1630				Rig up to Run 13⅜" csg. wrong Slips + Spider, Have
	1930	3	21	welder Build up Slips

DRILLER [illegible signature]

EVENING TOUR

DRILLING ASSEMBLY (At end of tour)

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

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

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 S.P.M. / PUMP NO. LINER SIZE S.P.M. / METHOD RUN

DEVIATION RECORD

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

FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
1930	2200	2½	12	Run 13⅜" csg. w/Rope

DRILLER

4/12	16.6	E	6'14	XH	34

TON MI. OR TRIPS SINCE LAST CUT

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO. – OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL			
REAMING			
CORING			
CONDITION MUD & CIRCULATE			
TRIPS			
LUBRICATE RIG			
REPAIR RIG			
CUT OFF DRILLING LINE			
DEVIATION SURVEY			
WIRE LINE LOGS			
RUN CASING & CEMENT			
WAIT ON CEMENT			
NIPPLE UP B.O.P.			
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
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)

W/CONTR. D.P.			
W/OPR. D.P.			
NO/D.P.			
STANDBY			
DAY WORK			
DAYS FROM SPUD			
CUMULATIVE ROTATING HRS.			
MUD COST			

MORNING TOUR

DRILLING ASSEMBLY (At end of tour): BIT; STB RMR OD; D.C. ID OD; STB RMR OD; D.C. ID OD; STB RMR OD; STANDS DP; SINGLES DP; KELLY DOWN; TOTAL; 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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
470												

DEVIATION RECORD: DEPTH, DEV., DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
2200	0130		12	Run 13 3/8" csg. T/470'
0130	0230		6	Run Stab in tool in csg. Rig up B.J.
0230	0400		12	Fill csg. w/mud set Stab in tool in Float
0400	0500		12	CMT. csg. w/ B.J. C.I.P. @0440 Rig Down B.J.
0500	0530		6	P.O.H w/stab in Tool
0530	1000		13	W.O.C.

DRILLER [signature]

DAY TOUR

DRILLING ASSEMBLY (At end of tour) · BIT RECORD · MUD RECORD (blank)

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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN

DEVIATION RECORD: DEPTH, DEV., DIRECTION

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
10.00	1300			W.O.C.
1300	1700			Nipple Down Diverter make Rough cut + Final cut
1700	2000			weld on 13 3/8" Csg Head + Test To 2500# Lot Cool
2000	2200			Nipple up BOPE

DRILLER [signature]

EVENING TOUR

DRILLING ASSEMBLY (At end of tour) · BIT RECORD · MUD RECORD (blank)

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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN

DEVIATION RECORD: DEPTH, DEV., DIRECTION

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

DRILLER

[redacted]

Morning Tour

Time Log / Details of Operations in Sequence and Remarks

From	To	Elapsed Time	Code No.	Details of Operations in Sequence and Remarks
2200	0700	9	14	Nipple up B.O.P.'s
0700	1000	3	14	Free up 12" Flow valve

DRILLER: Ira Cox

Day Tour

Drilling Assembly (At end of tour)

No.	Item	Ft.
	Bit	1.00
	monel	25.54
	STB RMR (X) OD	2.55
7	D.C. ID OD	218.16
	STB RMR OD	
	D.C. ID OD	
	STB RMR OD	
	BHA:	247.25
3	Stands DP	
1	Singles DP	212.20
	Kelly Down	16
	Total	475
	Wt. of String	29,000 lbs.

Bit Record

Bit No.	#3
Size	12¼
IADC Code	
Mfg.	Smith
Type	F-2
Ser. No.	XH3746
Jets 1/32" /TFA in²	3x22
Depth Out	
Depth In	470
Total Ftg.	
Total Hrs.	

Footage / Formation

Footage From	To	Dr.-D Rm.-R Core-C	Core No.	Formation	Rotary RPM	Wt. on Bit 1000 #	Pump Press	Method Run
409		R			5%/20	10/18	180	Air

Time Log / Details of Operations in Sequence and Remarks

From	To	Elapsed Time	Code No.	Details of Operations in Sequence and Remarks
1000	1200	2	14	Nipple up BOPS & Test To 750#
1200	1530	3½	6	Lay dn 9" DC Pick up 6¼" & make up BHA & RIH
				Tag Float @ 409'
1530	1630	1	15	Test csg, Pipe Rams To 1000#
1620				Witnessed BOP test. Start 1040# End 948# State Engineer [signature]
1630	1830	2	21	Rig up Flowline & Air Compressors.
1830	2130	3	3	Drill Float, clean out cement & Drill Shoe
2130	2200	½	2	Drlg T/475'

DRILLER: [signature]

Evening Tour

DRILLER:

FORM 3T-4 PRINTED IN U.S.A. APPROVED APPROVED

IADC – API OFFICIAL DAILY DRILLING REPORT FORM

[redacted]

12	16.6	E	6¼	XH	34

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

OPERATION	MORN.	DAY	EVE.
RIG UP AND TEAR DOWN			
DRILL ACTUAL		10½	
REAMING			
CORING			
CONDITION MUD & CIRCULATE			
TRIPS			
LUBRICATE RIG			
REPAIR RIG			
CUT OFF DRILLING LINE			
DEVIATION SURVEY		½	
WIRE LINE LOGS			
RUN CASING & CEMENT			
WAIT ON CEMENT			
NIPPLE UP B.O.P.			
TEST B.O.P.			
DRILL STEM TEST			
PLUG BACK			
SQUEEZE CEMENT			
FISHING			
DIR. WORK			
		1	
A. PERF'R'T'N			
B. TBG TRIPS			
C. TREATING			
D. SWABBING			
E. TESTING			
F. ADDIT'N'L			
G.			
TOTALS		12	

DAY WORK TIME SUMMARY (OFFICE USE ONLY)

W/CONTR. D.P.			
W/OPR. D.P.			
NO D.P.			
STANDBY			
TOTAL DAY WORK			

NO. OF DAYS FROM SPUD

CUMULATIVE ROTATING HRS.

TOTAL MUD COST

MORNING TOUR

NO.	DRILLING ASSEMBLY (At end of tour)		
	BIT 12¼	1.00	FT.
	Monel	25.54	
1	STB RMR (X) OD	2.55	FT.
7	D.C. ID 6½ OD	218.16	FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	B.H.A.	247.25	
6	STANDS DP	367.88	FT.
	SINGLES DP		FT.
	KELLY DOWN	25'	FT.
	TOTAL	640	FT.
	WT. OF STRING	33,000	LBS.

BIT RECORD	
BIT NO.	#3
SIZE	12¼
IADC CODE	
MFG.	Smith
TYPE	F-2
SER. NO.	XH 3746
JETS 1/32" /TFA in²	3x22
DEPTH OUT	
DEPTH IN	470
TOTAL FTG.	
TOTAL HRS.	8
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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
475	640'	D			70	8/10						

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 Dewit 5' 7"
2200	0200	4	8	Repair Rotary table Drive Shaft
0200	1000	8	2	Drilling 12¼ hole F/475' T/640

DRILLER Ira Cox

DAY TOUR

NO.	DRILLING ASSEMBLY (At end of tour)		
	BIT 12¼	1.00	FT.
	Monel	25.54	
1	STB RMR (X) OD	2.55	FT.
7	D.C. ID 6½ OD	218.16	FT.
	STB RMR OD		FT.
	D.C. ID OD		FT.
	STB RMR OD		FT.
	BHA =	247.25	
9	STANDS DP		FT.
1	SINGLES DP	579.29	FT.
	KELLY DOWN	28	FT.
	TOTAL	854	FT.
	WT. OF STRING	33,000	LBS.

BIT RECORD	
BIT NO.	#3
SIZE	12¼
IADC CODE	
MFG.	Smith
TYPE	F-2
SER. NO.	XH 3746
JETS 1/32" /TFA in²	3x22
DEPTH OUT	
DEPTH IN	470
TOTAL FTG.	384
TOTAL HRS.	18½
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	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	S.P.M.	PUMP NO. LINER SIZE	S.P.M.	METHOD RUN
640	854	D			60/70	4/10	300		Air			

DEVIATION RECORD	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION	DEPTH	DEV.	DIRECTION
	682	½°	S 1° E						

TIME LOG FROM	TO	ELAPSED TIME	CODE NO.	DETAILS OF OPERATIONS IN SEQUENCE AND REMARKS
10:00	11:30	1½	2	Drilling F/640' T/682'
1130	1200	½	21	Change Pack off Rubber
1200	1230	½	10	Survey @ 682'
1230	1330	1	2	Drilling F/682 T/717
1330	1400	½	21	Change Pack off Rubber
1400	2200	8	2	Drilling F/717 T/854 Hit Steam @ 815

DRILLER [illegible]

EVENING TOUR

NO.	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.
	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	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	S.P.M.	PUMP NO. LINER SIZE	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

4 1/2 | 16.6 | E | 6 14 | X17 | 34

CUMULATIVE TON MI. OR TRIPS

TIME DISTRIBUTION – HOURS

CODE NO.	OPERATION	MORN.	DAY	EVE.
1	RIG UP AND TEAR DOWN			
2	DRILL ACTUAL		3½	
3	REAMING			
4	CORING			
5	CONDITION MUD & CIRCULATE			
6	TRIPS		3½	
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.		2	
15	TEST B.O.P.			
16	DRILL STEM TEST			
17	PLUG BACK			
18	SQUEEZE CEMENT			
19	FISHING			
20	DIR. WORK			
21			3	
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
CUMULATIVE ROTATING HRS.
TOTAL MUD COST

DRILLING ASSEMBLY (At end of tour)

NO.		FT.
	BIT	
	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.	3
SIZE	12¼
IADC CODE	
MFG.	Smith
TYPE	F-2
SER. NO.	XH 3746
JETS 1/32" /TFA in²	3X22
DEPTH OUT	932
DEPTH IN	470
TOTAL FTG.	462
TOTAL HRS.	22
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.	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
854	932	D										

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	0130	3½	2	Drilling F/854 T/932
0130	0400	2½	5	Flow Tee on Stack Cracked circ. hole Clean
0400	0600	2	6	Strip out of hole Lay Down 6-DCs
0600	0700	1	21	Shut in well
0700	0830	1½	6	Brk bit Lay Down mouels 1-Dc
0830	1000	1½		prepare to Nipple Down to Flow Tee

DRILLER Ira Cox

DRILLING ASSEMBLY (At end of tour)

NO.		FT.
	BIT	100 FT.
	B.T. SUB	328
	STB RMR (R) OD	1.53 FT.
	D.C. ID OD	FT.
	STB RMR OD	FT.
	D.C. ID OD	FT.
	STB RMR OD	FT.
	BHA	581
15	STANDS DP	911.37 FT.
	SINGLES DP	FT.
	KELLY DOWN	FT.
	TOTAL	FT.
	WT. OF STRING	18000 LBS.

BIT RECORD

BIT NO.	3
SIZE	12¼
IADC CODE	
MFG.	Smith
TYPE	F-2
SER. NO.	XH 3746
JETS 1/32" /TFA in²	3X22
DEPTH OUT	
DEPTH IN	470
TOTAL FTG.	
TOTAL HRS.	25½
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.

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
932		D			65	4/10	200		AIR			

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
1000	1300	3	21	Weld Flange on Banjo Box + Let Cool
1300	1500	2	14	Nipple up Stack
1500	1600	1	6	make up BHA
1600	1830	2½	6	Strip in Hole
1830	2200	3½	2	Drilling F/932

DRILLER Bud Hodge

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.

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

DRILLER

Appendix B

Production Well Drilling Program
Cove Fort - Sulphurdale KGRA

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

September, 1987
Updated October, 1988

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

Abbreviated sequence of operations:

1. Prepare location and sump per attached dwgs.

2. MIRU rotary rig on conductor.

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

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

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

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

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

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

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

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

11. Prepare and submit completion reports to appropriate agencies.

Detailed sequence of operations:

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

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

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

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

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

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

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

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

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

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

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

10. WOC 12 hrs or as dictated by samples.

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

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

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

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

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

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

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

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

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

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

H2S Safety

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

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

H2S monitors will be installed at the following locations:

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

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

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

H2S ALARM PROCEDURE
POST PROMINENTLY IN DOGHOUSE

IN CASE OF H2S ALARM:

1. MASK UP WITH ESCAPE UNIT

2. GO IMMEDIATELY TO THE UPWIND BRIEFING AREA

NO EXCEPTIONS UNLESS DIRECTED BY H2S SAFETY MAN ON LOCATION

Casing/Cementing Program

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

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

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

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

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

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

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

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

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

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

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

Blowout Prevention equipment, 13 3/8" casing

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

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

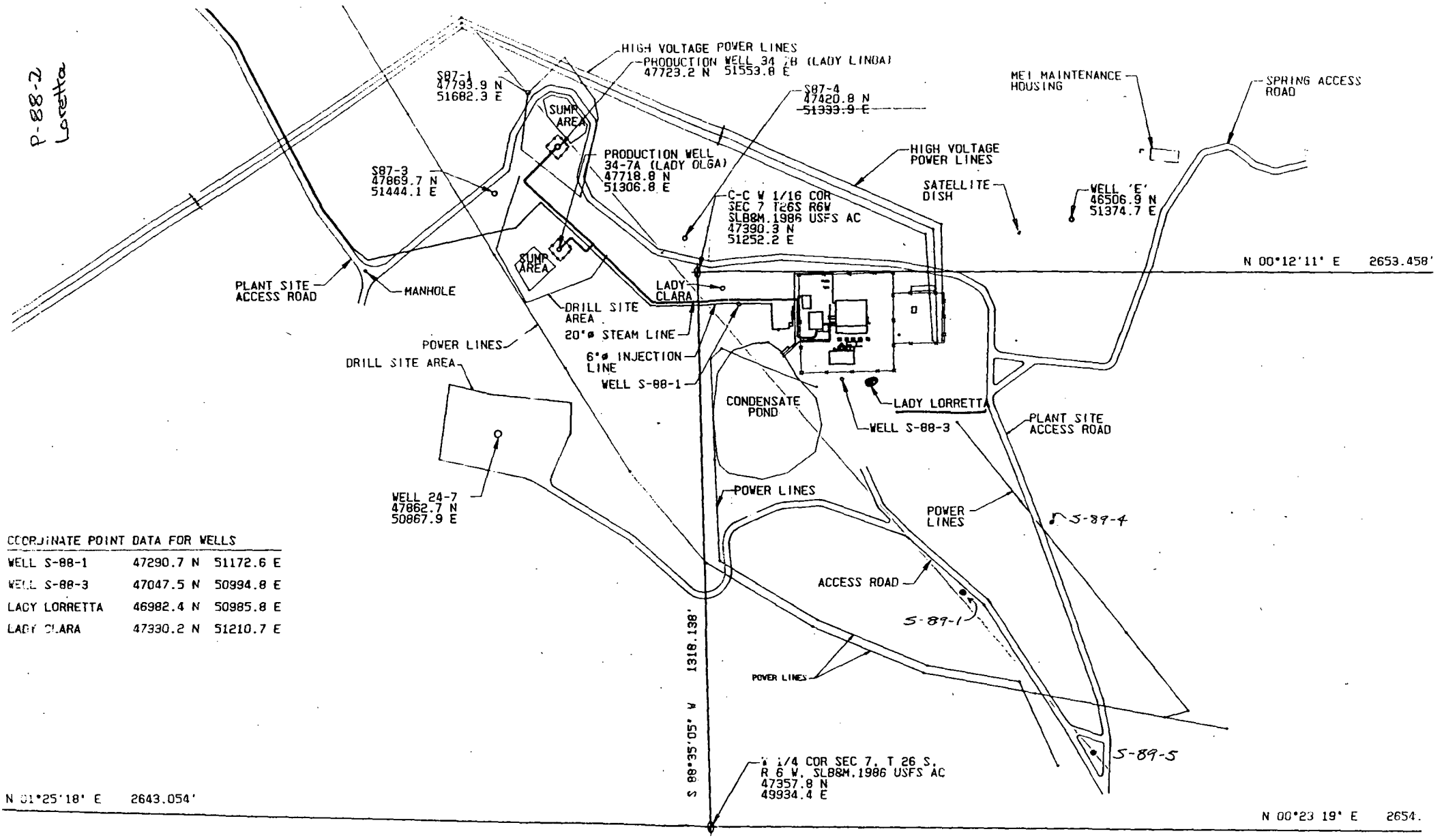
2. 12" 400 RTJ WKM Power Seal through-conduit gate valve, with geothermal trim for steam service with 300 Deg F steam containing approx. 7% carbon dioxide and approx. 0.1% H2S

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

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

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

P-88-2
Loretta



COORDINATE POINT DATA FOR WELLS

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

Plate I

1" = 307'