UNION GEOTHERMAL COMPANY OF NEW MEXICO

WELL COMPLETION RECORD

WELL NO.: Baca 24 AFE NO.: 413701 API NO.: 30-043-90054

FIELD: Valles Caldera-Redondo Creek LEASE: BACA

OPERATOR: Union Geothermal Company of New Mexico

COUNTY: Sandoval STATE: New Mexico

LOCATION: New Mexico State Plane Co-ordinates:

1,777,750'N; 401,815'E
Projected Location: 350' fsl, 350' fel
Sec. 11, T19N, R3E

ELEVATION: 8740' G.L. 8764' K.B.

REASON FOR DRILLING: Exploratory: Test Paleozoic limestone and pre-Cambrian granite*

SPUD DATE: April 23, 1981 COMPLETION DATE: June 20, 1981

TOTAL DEPTH: 5502'
3591' ETD following unsuccessful fishing attempts

BHL: @ 5502' TD: 36'N 272'W 5491'VD
@ 3591'ETD: 4'N 132'W 3586'VD

DRILLING COMPANY: Brinkerhoff-Signal Rig 78

GEOLOGISTS: Denton, Copp

ENGINEERS: Blackwell, Hamblin, Bray

RIG TESTS: None conducted

DISPOSITION OF WELL: Awaiting production testing

DRILLING FLUID USED: Fresh water gel mud surface to 2946'
Aerated water 2946' to 5502'

* Geologic objective not reached. Stuck drillpipe at 5502'. Unsuccessful fishing attempts resulted in completing the well as a development well in the Bandelier Tuff.

UNION GEOTHERMAL COMPANY OF NEW MEXICO

WELL COMPLETION RECORD

LOGGING

DATE	TYPE*	TD	INTERVAL-KB	MAX TEMP.	TIME SINCE CIRC	REMARKS
5/16/81	HRT	2946'	0' - 2944'	180F	4-1/2 HRS	
5/16/81	DLL-GR	2946'	2944' - 782'	236F	7 HRS	

*LOG TYPES (All logs by Schlumberger)

GR = Gamma Ray
HRT = High Resolution Thermometer (Temperature Log)
DLL = Dual Laterolog

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UNION GEOTHERMAL COMPANY OF NEW MEXICO

WELL COMPLETION RECORD

LITHOLOGIC DATA

FORMATION	INTERVAL		
	This well (MD/VSS)	Baca 10 (VSS)	Baca 6 (VSS)
Caldera Fill	0 - 220'/8740'-8544'	8735'-8235'	8726'-8245'
Bandelier Tuff	220'-5020'/8544'-3753'	8235'-3555'	8245'-4058'
Paliza Canyon Fm (andesite)	5020'-5502'TD/3753'-3273'	3555'-2848'	4058'-4000'TD

CASING

SIZE	INTERVAL-KB
30"	Conductor 50'-surface, cemented
20"	782'-surface, cemented
13-3/8"	2938'-surface, cemented
7" Pre-perforated Liner	3589'-2838', hung

LOST CIRCULATION

DEPTH	REMARKS
923'	L.C. while drilling. Set cement plug

Form G-106
Adopted 10/1/74

NEW MEXICO OIL CONSERVATION COMMISSION

P. O. Box 2088, Santa Fe 87501

GEOTHERMAL RESOURCES WELL SUMMARY REPORT

Operator Union Geothermal Co. of New Mexico Address Rio Rancho, New Mexico

Lease Name BACA Well No. 24

Unit Letter P Sec. 11 Twp. 19N Rge 3E

Reservoir Redondo Creek County Sandoval

Commenced drilling April 23, 1981

Completed drilling June 3, 1981

Total depth 5502 Plugged depth 3591

Junk 12-1/4" bit, 3 pt. lead collar, 3 pt. Monel, stab, 8" drill collars, crossover, 20 jts. 4-1/2" drill pipe. Fish no. 2: 12-1/4" bit, bit sub, three 9" drill collars, crossover, jars

Commenced producing Not produced (Date)

GEOLOGICAL MARKERS	DEPTH
Caldera Fill	0-740'
Bandelier Tuff	740'-5050'
Andesite	5050'-5502'

Geologic age at total depth:

Date	Static test Shut-in well head		Production Test Data								
			Total Mass Flow Data					Separator Data			
	Temp. °F	Pres. Psig.	Lbs/Hr	Temp. °F	Pres. Psig.	Enthalpy	Orifice	Water cuft/Hr	Steam Lbs/Hr	Pres. Psig.	Temp. °F
			Not tested								

CASING RECORD (Present Hole)

Size of Hole	Size of Casing	Weight of Csg/ft.	Grade of Casing	New or Used	Seamless or Lapweld	Depth of Shoe	Top of Casing	Number of Sacks Cement	Top of Cement	Cement Top Determined By
36"	30"	0.375wt	L.P.	N	L	50'	Surface	7 yds Redi-Mix	Surface	Visual
26"	20"	94#	K-55	N	S	782'	Surface	2733	Surface	Visual
17 1/2"	13-3/8	54.5 +61#	K-55	N	S	2938'	Surface	3021	Surface	Visual
12 1/4"	7"	26#	K-55	N	S	3589'	2838'	0	--	--

PERFORATED CASING

(Size, top, bottom, perforated intervals, size and spacing of perforation and method.)

8 Rows of 1/2" drilled holes on 3" centers from 2974' to 3589'.

Was analysis of effluent made? no Electrical log depths 2944' Temperature log depths 2944'

CERTIFICATION

I hereby certify that the information given above and the data and material attached hereto are true and complete to the best of my knowledge and belief.

GSTDOE

Signed R.D. Engebretson Position Area Manager Date 7/30/81

Form G-107
Adopted 10/1/74

NEW MEXICO OIL CONSERVATION COMMISSION

P. O. Box 2088, Santa Fe 87501

GEOTHERMAL RESOURCES WELL HISTORY

Operator Union Geothermal Co. of New Mexico Address Rio Rancho, New Mexico

Lease Name BACA Well No. 24

Unit Letter P Sec. 11 Twp. 19N Rge 3E

Reservoir Redondo Creek County Sandoval

It is of the greatest importance to have a complete history of the well. Use this form to report a full account of all important operations during the drilling and testing of the well or during re-drilling; altering of casing, plugging, or abandonment with the dates thereof. Be sure to include such items as hole size, formation test details, amounts of cement used, top and bottom of plugs, perforation details, sidetracked junk, bailing tests, shooting, and initial production data and zone temperature. (Attach additional sheets if necessary.)

Date

Detailed well history attached.

CERTIFICATION

CSTDOE

I hereby certify that the information given above and the data and material attached hereto are true and complete to the best of my knowledge and belief.

Signed [signature] Position Area Manager Date 7/30/81

04-23-81	Moved in and rigged up Brinkerhoff-Signal rig number 78. On day rate at 0001 hours, 04-23-81. Mixed mud. Worked on mud pumps 3 hours. Drilled and set rat hole. Picked up 17-1/2" x 26" hole opener. Center punched hole from 50' to 55'. Spudded well at 1100 hours, 04-23-81. RIH with 17-1/2" bit and assembly. Drilled 17-1/2" hole from 55' to 180'.
04-24-81	Drilled 17-1/2" hole from 180' to 668'.
04-25-81	Drilled 17-1/2" hole from 668' to 790'. Opened 17-1/2" hole to 26" hole from 55' to 147'.
04-26-81	Opened 17-1/2" hole from 117' to 26" hole to 273'.
04-27-81	Opened 17-1/2" hole to 26" from 273' to 390'. POH. Checked tools. RIH.
04-28-81	Opened 17-1/2" hole to 26" hole from 390' to 491'. Twisted off. POH. RIH with overshot. Engaged fish.
04-29-81	POH. Recovered fish. Laid down 2 drill collars with pulled threads, Kelley saver sub with cracked pin and box and Kelley with pulled threads on pin end. Sent Kelley to Farmington for repairs.
04-30-81	Opened 17-1/2" hole from 491' to 675'.
05-01-81	Opened 17-1/2" hole to 26" from 675' to 788'. Circulated and conditioned mud to run 20" casing. POH. Ran 19 joints of 20" 94# H-40 buttress casing with shoe at 782' and HOWCO stab-in float collar at 742'.
05-02-81	Stabbed into float collar at 742'. Circulated and cooled hole. HOWCO pumped 112 cu ft preflush, 112 cu ft. water, followed by 2330 cu ft of class "H" cement with 1:1 Perlite, 40% SSA-1, 3% Gel, and 0.5% CFR-2. Followed by tail slurry of 403 cu ft of class "H" cement with 40% SSA-1 and 0.5% CFR-2. Displaced with 50 cu ft water. CIP at 0445 hours. Had good returns throughout job. POH. WOC. Cut off 30" conductor. Found cement 14' below ground surface. Rigged up and performed top job. HOWCO mixed and pumped 38 cu ft of class "H" cement. Cut off 20" casing and installed BOPE.

05-03-81 Nippled up 20" 900# double gate, 20" 900# x 20" 600# mud cross spool, and 20" 600# Hydril. Laid down 26" tools. Made up 17-1/2" BHA. Rigged up accumulator.

05-04-81 Tested BOPE to 700 psi. OK. RIH to float at 742'. Drilled out float and cement to shoe at 782'. Drilled out shoe and cement to 790'. Drilled 17-1/2" hole from 790' to 923'. Lost returns. POH. RIH with open-end drill pipe.

05-05-81 Pumped 78 bbls mud with OEDP at 923'. HOWCO pumped ahead 112 cu ft water, followed by 334 cu ft of class "H" cement with 2% CaCl2. CIP 0130 hours. POH. WOC. Filled hole with 120 bbls mud. Continued to WOC. RIH. Drilled out cement from 795' to 923'. Drilled 17-1/2" hole to 1047'.

05-06-81 Drilled 17-1/2" hole from 1047' to 1289'.

05-07-81 Drilled 17-1/2" hole from 1289' to 1555'.

05-08-81 Drilled 17-1/2" hole from 1555' to 1703'.

05-09-81 Drilled 17-1/2" hole from 1703' to 1788'.

05-10-81 Drilled 17-1/2" hole from 1788' to 1950'.

05-11-81 Drilled 17-1/2" hole from 1950' to 2149'.

05-12-81 Drilled 17-1/2" hole from 2149' to 2335'.

05-13-81 Drilled 17-1/2" hole from 2335' to 2517'

05-14-81 Drilled 17-1/2" hole from 2517' to 2661'.

05-15-81 Drilled 17-1/2" hole from 2661' to 2877'.

05-16-81 Drilled 17-1/2" hole from 2877' to 2946'. Ran temperature log - after 4-1/2 hours, static temperature was 180° at 2944'. Ran Schlumberger DIL from 782' to 2944'. Maximum temperature after 7 hours was 236°F. RIH with 17-1/2" assembly to 2944'. Circulated to run casing.

05-17-81 Rigged and ran 13-3/8" casing, 33 joints 13-3/8" 61# K-55 buttress and 44 joints 13-3/8" 54.5# K-55 buttress. Landed with float shoe at 2938' and HOWCO stab-in float collar at 2863'. RIH and stabbed into float collar. Circulated and conditioned hole for cement. HOWCO mixed and

05-17-81 (Cont'd)

pumped 112 cu ft pre-flush and 112 cu ft water, followed by 2720 cu ft class "H" cement with 50#/sack spherelite, 40% SSA-1, 4% Gel, 5% lime, 1% CFR-2 and 0.3% Hr-7 and 301 cu ft class "H" cement with 40% SSA-1, 0.5% CFR-2 and 0.3% HR-7. Displaced with 218 cu ft mud. CIP at 1630 hours. Good returns.

05-18-81 Cut off 13-3/8" casing. Nipple down 20" BOE. Cement found to have dropped to 147' in annulus. Welded on 12" - 3000 SOW casing head. Tested OK. Ran 1" pipe into 20" x 13-3/8" annulus into soft cement to 252'. No indication of water. Rigged up HOWCO.

05-19-81 HOWCO pumped 610 cu ft class "H" cement with 40% SSA-1 and 0.5% CFR-2 through 1" pipe at 252' with good cement returns to surface. Cement fell 10' and stopped. Filled 10' of annulus to surface with "H" cement. Installed 12" - 3000 BOE and flow line.

05-20-81 Tested BOP's to 1000 psi. Top double gate and flow equipment to 500 psi. Made up drill assembly and Magna-Fluxed all tools. Located cement at 2838'. Drilled cement from 2838' to 2840'. Repaired weight indicator.

05-21-81 Drilled 12-1/4" hole from 3110' to 3171'.

05-22-81 Drilled 12-1/4" hole from 3171' to 3428'.

05-23-81 Drilled 12-1/4" hole from 3428' to 3658'. Production increase at 3636'. Flowed well for clean-up. Rotating head rubber failed. Killed well. Replaced rotating head rubber. Installed thermometer well in flowline. Circulated with aerated water. Well commenced flowing. Drilled 12-1/4" hole from 3658' to 3662'. Twisted off. POH. Left bit, reamer, lead drill collar, stab, Monel, stab, drill collar, stab, and drill collar (124') in hole. Note: Twisted off pin on top stabilizer. Top of fish at 3541'. Wait on fishing tools at 2400 hours.

05-24-81 Waiting on fishing tools RIH with fishing assembly. Engaged fish. Chained out of hole. Laid down drill collar with broken pin in box. RIH with 12-1/4" drill assembly to 3638'.

05-24-81 (Cont'd)

Circulated. Flowed well. Reamed from 3638' to 3668'. Drilled 12-1/4" hole from 3638' to 3730'. Blew rotating head rubber. Killed well. Changed rotating head rubber. Circulated. Drilled 12-1/4" hole from 3730' to 3761'.

05-25-81 Drilled 12-1/4" hole from 3761' to 4005'. Repaired separator. Drilled 12-1/4" hole from 4005' to 4262'.

05-26-81 Drilled 12-1/4" hole from 4262' to 4439'.

05-27-81 Repaired separator. RIH to 4439'. Drilled 12-1/4" hole from 4439' to 4647'. Pipe torqued and spun drill pipe off at bottom of Kelly, above saver sub and lower Kelly cock. Killed well. Located top of fish at 696' with 12-1/4" bit.

05-28-81 RIH with screw-in sub, bumper sub and jars on drill pipe and collars to 696'. Screwed into fish. Jarred with no success. RIH with collar locater to 3280', where tools stopped. Tools indicated corkscrewed drill pipe from 2980' to 3280'. Unable to work below 3280'. Free-pointed and backed off at 2834'. POH. Recovered 69 joints 4-1/2" drill pipe. Laid down 47 joints for straightening. RIH with screw-in sub and fishing assembly to fish at 2540'; 292' above previous back-off. Screwed into fish and jarred.

05-29-81 Recovered lower Kelly cock, saver sub, string float and 19 joints drill pipe. Laid down 1 joint junk drill pipe. RIH with screw-in sub and fishing assembly to 2834'. Screwed into fish and jarred on fish. Jarred fish free. Recovered 18 joints drill pipe. Laid down 1 joint junk drill pipe. RIH with 11-3/4" overshot with 6-1/2" grapple to 3324'. Engaged fish. Jarred fish free. POH. Recovered entire fish. (26 joints drill pipe and BHA). Laid down 7 joints drill pipe for repair. Checked and inspected bit and tools.

05-30-81 RIH with drill assembly. Magna-Glo'd all joints. Laid down six 9" drill collars. RIH to 1065'. RIH to tight spot at 3984'. Unable to break circulation. POH.

05-31-81 Circulated. RIH to 3519'. Circulated with air. RIH to 3984'. Reamed from 3984' to 4046'. RIH, picking up drill pipe to 4586'. Reamed to 4647'. Drilled 12-1/4" hole from 4647' to 4720'. Killed well. POH to 3984'. Retrieved string float. RIH to 4720'. Drilled 12-1/4" hole from 4720' to 4875'.

06-01-81 Drilled 12-1/4" hole from 4875' to 5039'.

06-02-81 Drilled 12-1/4" hole from 5039' to 5368'.

06-03-81 Drilled 12-1/4" hole from 5368' to 5502'. Encountered drilling break in badly altered red colored Andesite at 5490'. Stuck pipe and tools while drilling at 5502'. Screwed into drill pipe. Free-point indicated stuck at shoe of 13-3/8" casing (2938').

06-04-81 Backed off drill pipe at 2914'. POH. RIH with screw-in fishing assembly to 2914'. Screwed into fish at 2914'. Jarred on fish with no success. Ran 5 back-off shots with no success. Rigged up replacement back-off truck. Backed off at 2914'. POH.

06-05-81 Made up 3 joints 10-3/4" wash over pipe. RIH to 2914'. Washed down to 3003' with restriction from 2914' to 2964', then free to 3003'. POH. RIH with screw-in assembly with jars and bumper sub. Screwed into fish. Jarred top of fish to 2904', while pumping water through fish, possibly through damaged drill pipe. Ran sinker bars to 3400' inside drill pipe with no obstructions. Jarred top of fish to 2902'. Drill pipe parted. POH. Recovered as 3' drill pipe stub. RIH with 10-3/4" overshot with 4-1/2" grapple.

06-06-81 RIH with overshot to catch drill pipe to 2902'. No success engaging fish. POH. Overshot indicated having been over fish but dulled on ragged top working down over fish. Made up overshot with 4-1/2" grapples and 4' extension to 2902'. Engaged fish. Ran two back-off shots with no success, from 4015'. Backed off at 3022'. POH. Recovered 3 joints drill pipe plus 28' drill pipe stub.

06-07-81 RIH with screw-in assembly to 3022'. Screwed into fish. Jarred on fish with no success. Ran free-point; pipe free at 4296'. Backed off on second attempt at 4296'. Recovered 41 joints 4-1/2" drill pipe. RIH with 4 joints 10-3/4" wash over pipe to bridge at 3750'. Unable to break circulation at 3750'. POH to 2592'. Unloaded hole with air.

06-08-81 RIH to 3243' with wash over pipe. Unloaded hole. POH to 2592'. Retrieved string float. RIH to 3360'. Broke circulation with air and water. Wash pipe sticking. POH for bit and drilling assembly. RIH with 12-1/4" bit. Broke circulation. Cleaned out hole from 3286' to 3686'. POH for bit change. While cleaning out from 3286' to 3686', recovered large amounts of gravel-sized formation to surface.

06-09-81 POH for bit change. RIH to 3400'. Attempted to flow well. Blew top off of separatoir tank mounted on mud pit. POH to 2900'. Repaired separator tank. POH. Laid down undercut drill pipe for hardbanding and repair.

06-10-81 Laid down drill pipe with worn ,undercut tool joints. Picked up replacement drill pipe. Changed ram rubbers. RIH with drilling assembly to 3454'. Circulated. Flowed well. Cleaned out gravel-sized plus some large pieces of formation to 3779'. Changed rotating head rubber. Attempted to flow well at 3752'. Unable to start flow. POH to 3402'. Circulated. Flowed well. Hole unloaded large quantities of formation.

06-11-81 RIH with no success due to bridging below. Circulated at 3402' with air and water. Cleaned hole. Killed well. Changed rotating head rubber. Circulated and flowed well. RIH from 3402' to 3495'. Circulated. Reamed and cleaned out large amounts of fill from 3495' to 3526'. RIH to 3712'. Circulated and cleaned out fill from 3712' to 3743'. RIH to 3832' with no obstructions. Circulated hole. Hole surged and unloaded large amounts of formation, plugging both flow lines and separator, sticking tools. Rotated and worked pipe and attempted to POH with no success. Rigged up Dia-Log. Attempted to back off drill pipe below float sub at 592'. Backed off on 3rd attempt. Recovered float sub.

06-12-81 Removed flow lines, separator. Replaced one section of flow line. Cleaned out large amounts of cuttings from flow lines and separator. Nippled up all lines. RIH with open-end drill pipe to 592'. Screwed into drill pipe. Pumped through fish. Attempted to circulate with air and water. Rigged up Dia-log. Found free-point at 3529', 70% free; 3557', 72% free; 3623', 100% stuck. RIh with back-off tools. Attempted to back off with no success. Re-ran back off. Backed off at 3552'.

06-13-81 POH with drill pipe to 3552'. RIH with ported screw-in sub with one 6" drill collar crossover, bumper sub, jar, crossover, and three 8" drill collars with crossover to five 6" drill collars (292'). Screwed into fish at 3552'. Flowed well and jarred on fish. Moved fish up hole 30', screw-in sub at 3522' with bottom of fish at 3802'. Produced large amounts of tuff, plugged separator, cleaned out separator. Made repairs to mounting braces.

06-14-81 Jarred on fish. Moved fish up hole 15'. Screw-in sub at 3507'. Bottom of fish at 3787'. Plugged suparator. Broke hold-down brackets on two 10" vent lines. Repaired brackets. Injected water and air. Flowed well. Jarred on fish to 200,000 lbs. Unable to jar fish further. RIH with Dia-log sinker bar to 3733' inside drilling assembly. Ran free-point, found fish free at 3616'. Ran back-off shot. Backed off at 3616'. POH. Recovered 3 joints drill pipe and one 8" drill collar. Top of fish at 3616'.

06-15-81 RIH with 12-1/4" rerun bit and 8" drill collar with jar plus three 8" drill collars to fill at 3585'. Kept well dead through annulus and drill pipe. Pumped fluid down hole. Reamed and cleaned out from 3585' to 3614'. Re-reamed from 3585' to 3614'. Unable to dissipate fill. POH to 2938'. RIH to fill at 3595'. POH.

06-16-81 RIH with 13-3/8" RTTS tool with drill collars and tools on RTTS. Set RTTS at 2037'. Filled hole - tested to 300 psi. Backed off above inside BOP. Installed 12"-900 x 12"-600 crossover spool on casing head and 12"-600 series WKM valve with 12"-600 x 12"-900 crossover spool to 12"-900 series double shaffer. Cut and realigned spacer spool.

06-17-81 Tested BOE and 13-3/8" casing to 800 psi, 15 minutes, OK. Released RTTS tool. POH. RIH with 12-1/4" bit to fill at 3595'. Changed top ram rubbers. Picked up 2 joints 10-3/4" wash over pipe. Tagged fill at 3585'. Pumped air and water to flow well.

06-18-81 Cleaned out fill with 10-3/4" wash over pipe from 3585' to 3601'. POH. RIH with 12-1/4" bit to fill at 3591'. Reamed and cleaned out fill with large amounts of cuttings from 3572' to 3591'. Increased flow and fill level moved up hole with increase in height of fill . Pipe sticking, requiring use of jars. Killed well. POH.

06-19-81 POH. Changed bit. RIH to fill at 3561'. Broke circulation with air and water. Cleaned out repeatedly from 3561' to 3595'. Circulated out large amounts of formation but unable to keep well bore open below 3591'. Killed well. Pulled bit to 2895'. Waited for fill to stabilize. RIH to top of fill at 3591'. POH. Rigged and ran 18 joints (15 joints perforated and 3 blank) 7" 26# K-55 LT&C on Midway 13-3/8" x 9-5/8" x 7" liner hanger. Top of hanger at 2838' and orange peeled shoe at 3589'.

06-20-81 Continued POH. Laid down liner setting tools. Laid down drill pipe, drill collars, and tools. Rigged down BOE. Cleaned mud pits. Released rig at 2400 hours.

BACA-24

CASING DETAIL

NO. JTS.	DESCRIPTION	LENGTH	TOP	BOTTOM
	20" CASING			
1	HOWCO Super Seal Float Shoe	2.05	780.70	782.75
1	20" 94# H-40 Buttress Casing	3980	740.90	780.70
1	HOWCO Super Seal Stab-in Float Collar	3.00	737.90	740.90
18	20" 94# H-40 Buttress Casing	737.90	0	737.90
	13-3/8" CASING			
1	HOWCO Super Seal Float Shoe	1.94	2936.24	2938.18
2	13-3/8" 61# K-55 Buttress Casing	74.78	2861.46	2936.24
1	HOWCO Stab-in Float Collar	1.70	2859.76	2861.46
31	13-3/8" 61# K-55 Buttress Casing	1187.09	1672.67	2859.76
41	13-3/8" 54.5# K-55 Buttress Casing	1672.67	0	1672.67
	7" LINER			
15	7" 26# K-55 8-RD LT&C Casing With 1/2" Drilled Holes, 8 Rows, on 3" Centers. Bottom Joint Orange Peeled.	615.25	2974.44	3589.69
3	7" 26# K-55 8-RD LT&C Casing	128.44	2846.00	2974.44
	7" 8-RD LT&C x 9-5/8" Buttress Swage	1.20	2844.80	2846.00
	13-3/8"x9-5/8" Buttress Midway Liner Hanger With Tie-Back Receptacle	6.80	2838.00	2844.80

CSTDOE

R.O. ENGEBRETSEN
OCT 27 1981

Calculation Record
Union Oil Company of California

UNION

Encl. 6

Prepared by	Checked by	Date	Sheet
JPR		/ /	1 of 3

Title: BACA No. 24 WATER INJECTION DATA

W.O. / A.F.E. no.:

DATE	TIME HRS.	WHP PSIG	WHT °F	ΔH "W.C.	RATE GPM	CUMMULATIVE M-GALS.	REMARKS
10-19-81	0641	160	—	—	—		RUN B24-S14 P/T
	0920	159	—	—	—	0	START WATER INJECTION
	0930	75	160	24	259.6	2.50X6	@ 0920 HRS., 10-19-81
	0940	75	162	21	242.9	5.102	
	0950	60	162	23	254.2	7.621	INJECTION LINE = 6"
	1040	40	170	22	248.6	20.331	ORIFICE BORE = 3.75"
	1105	36.5	170	22.5	251.4	26.546	COEFFICIENT = 53
	1125	30	171	23	254.2	31.574	
	1245	14.5	173	24	259.6	51.910	
	1305	14	173	22	248.6	57.102	
	1345	11.5	171	23	254.2	67.046	
	1715	6	168	22.5	251.4	120.428	POH B24-S14 P/T @ 1755 HRS
	1930	6	168	22	248.6	154.367	
	2055	6	165	14	108.3	175.408	
	2305	3	165	18	224.8	201.277	
	2320	3	165	22	248.6	204.649	
	2340	2	163	26	270.2	209.621	
10-20-81	0005	2	163	24	259.6	216.376	
	0040	2.5	163	23	254.2	225.462	
	0200	2.5	163	23	254.2	245.798	
	0400	2	160	23	254.2	276.302	
	0600	2	161	23	254.2	306.806	@ 0650 HRS. RIH B24-S15 P/T
	0705	2	162	22.75	252.8	323.329	
	0840	2	162	23	254.2	347.345	
	0850	2	162	24	259.6	349.887	
	0915	2	163	23	254.2	356.377	
	0935	2	160	15	205.3	361.461	THE DROPPED IN RATE
	0950	0	105	22	248.6	364.540	AND TEMP. WAS DUE
	1100	6" Hg.	113	22	248.6	381.942	TO DRILLING WATER
CSTDOE	1130	7.5" Hg.	118	21	242.9	389.400	DEMAND.
	1410	6.5"	150	21.5	245.75	428.264	
	1530	6"	165	21.5	245.75	447.924	
	1800	7"	165	21.25	245.75	484.787	@ 1746 HRS. POH B24-S15 P/T
	1900	7.5"	165	21	242.9	499.532	

Calculation Record
Union Oil Company of California

UNION

Prepared by	Checked by	Date	Sheet
JPR		/ /	2 of 3

Title: BACA No. 24 WATER INJECTION DATA

W.O. / A.F.E. No.:

DATE	TIME HRS.	WHP "Hg.	WHT °F	ΔH "W.C.	RATE GPM	CUMMULATIVE M-GALS.	REMARKS
10-20-81	2150	7.5	163	20.5	239.9	540.825	
	2215	7.5	163	22	248.6	546.822	
	2320	7.5	163	21	242.9	562.981	
10-21-81	2400	7.5	163	21	242.9	572.697	
	0200	7.5	163	21	242.9	601.845	
	0300	7.5	163	21.5	245.75	616.410	
	0435	7.5	163	22	248.6	639.766	
	0600	7.5	163	22	248.6	660.897	
	0800	7.5	163	22	248.6	690.729	
	0850	9	164	21.5	245.75	703.159	
	1130	8	164	21.75	247.2	742.479	@1010 HRS. R.I.H.
	1230	9	166	22	248.6	757.311	B24-S16 P/T
	1400	9.5	165	22		770.685	POH @ 1212 HRS.
	1545	10	165	22		805.788	
	1700	10	165	22		824.433	
	1900	10	165	22		854.265	
	2100	10	165	22		884.097	
	2350	10	164	22		926.359	
10-22-81	2400	10	164	22		928.845	
	0230	10.5	164	22		966.135	
	0430	9	164	22		995.967	
	0545	9	164	22		1,014.612	
	0745	10	164	22		1,044.444	
	0945	10	164	22		1,074.276	
	1300	10	168	22		1,122.753	@1012 HRS. R.I.H.
	1600	10	167	22		1,167.501	SPINNER SURVEY
	1735	11	167	21	242.9	1,191.118	B24-S17
	1800	11	167	21		1,197.191	POH @ 1046 HRS.
	2000	11	164	21		1,226.34	@1347 HRS. - 1540 HRS.
CSTDOE	2200	11	164	21		1,255.49	HLA SURVEY B24-S18 P/T
10-23-81	2400	12	164	21		1,284.63	
	0200	12	164	21		1,313.78	
	0400	11	164	21		1,342.93	
	0700	11	164	21		1,386.65	

Calculation Record
Union Oil Company of California

UNION

Prepared by	Checked by	Date	Sheet
JPR		/ /	3 of 3

Title: BACA No. 24 WATER INJECTION DATA

W.O. / A.F.E. no.:

DATE	TIME HRS.	WHP "Hg.	WHT °F	ΔH "W.C.	RATE GPM	CUMULATIVE M-GALS.	REMARKS
10-23-81	1120	11	165	21.25	244.3	1,449.81	
	1300	11.5	164	21	242.9	1,474.24	
	1530	11.5	164	20.5	239.9	1,510.67	
	1625	11.5	164	22	248.6	1,523.87	
	1810	11.5	164	21.25	244.3	1,549.97	
	1930	11.5	164	22	248.6	1,569.52	
	2000	11.5	164	21	242.9	1,576.97	
↓	2200	11.5	164	21.25	244.3	1,606.12	
10-24-81	2460	11.5	164	21.25	244.3	1,635.44	
	0200	11.5	164	21.25	244.3	1,664.75	
	0400	11.5	164	21.25	244.3	1,694.07	
	0500	12	164	21	242.9	1,708.73	
	0700	12	164	21	242.9	1,737.88	
↓	0928	12	164	21	242.9	1,773.83	SHUT-IN WATER INJECTION @ 0928HR

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

R.O. ENGEBRETSEN

WELL BACA NO 24

DATE 7-3-81 TIME 0850 HRS. TEST NO. 2 CHOKE TYPE 1981

FLOW RATE DATA

WHP 125 PSIG WHT 351 °F CALORIMETRIC: SEP. EFF. ____ %

SEPARATOR PRESSURE ____ TEMP. ____ °F PRESS. ____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			5"
QUALITY			
P_1			115 PSIG
Δ P			77 PSI
FLOW RATE			
MASS			341,140
STEAM			92,108
WATER			249,032

#/HR.

TOTAL MASS FLOW ____ ENTHALPY-EFF. ____

STEAM FRAC. 27% (BASED ON MIN) EQUIV. TEMP. ____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY ____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

@ 30%

MASS = 313,947 #/HR.

STM = 94,184

WTR = 219,763

@ 40%

MASS = 248,042 #/HR.

STM = 99,217

WTR = 148,825

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

R.O. ENGEBRETSEN

JUL 06 1981

WELL BACA No. 24

DATE 7-4-81 TIME 1200 HRS TEST NO. 2 CHOKE TYPE _____

FLOW RATE DATA

WHP 115 PSIG WHT 351°F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			5"
QUALITY			
P_1			112 PSIG
Δ P			74 PSI
FLOW RATE			
MASS			332,328 #/HR.
STEAM			89,729 #/HR.
WATER			242,599 #/HR.

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____

STEAM FRAC. 27% (BASED ON MINEQUIV. TEMP. _____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

@ 20%

M = 305,701 #/HR.

S = 91,737 #/HR.

W = 214,054 #/HR.

@ 40%

M = 241,508 #/HR.

S = 96,603 #/HR.

W = 144,905 #/HR.

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

R.O. ENGEBRETSEN

JUL 06 1981

WELL BACA No. 24

DATE 7-5-81 TIME 0700 HRS. TEST NO. 2 CHOKE TYPE _____

FLOW RATE DATA

WHP 124 PSIG WHT 350 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			5"
QUALITY			
P_1			108 PSIG
Δ P			73 PSI
FLOW RATE			
MASS			324,509 #/HR.
STEAM			87,617 #/HR.
WATER			236,892 #/HR.

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____

STEAM FRAC. 27% (BASED ON MASS) EQUIV. TEMP. _____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

@ 30 %

MASS = 208,478 #/HR.

STM = 89,544 #/HR.

WTR = 208,035 #/HR.

@ 40 %

MASS = 235,508 #/HR.

STM = 94,203 #/HR.

WTR = 141,305 #/HR.

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

R.O. ENGEBRETSEN

JUL 0 6 1981

WELL BAGA No. 24

DATE 7-6-81 TIME 0640 ~~HRS~~ TEST NO. 2 CHOKE TYPE _____

FLOW RATE DATA

WHP 124 PSIG WHT 350 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			5"
QUALITY			
P_1			112 PSIG
Δ P			72 PSI
FLOW RATE			
MASS			329,505
STEAM			88,901 #/HR.
WATER			240,605

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____

STEAM FRAC. 27% (~~BASED~~ ON MASS) EQUIV. TEMP. _____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

@ 30 %

MASS = 303,314

STM = 90,994 #/HR.

WTR = 212,320

@ 40 %

MASS = 239,623

STM = 95,849 #/HR.

WTR = 143,774

R.O. ENGEBRETSEN
JUL 09 1981

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA No. 24

DATE 7-6-81 TIME 1300 Hrs. TEST NO. 2 CHOKE TYPE _____

FLOW RATE DATA

WHP 125 PSIG WHT 350 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 105 PSIG TEMP. _____ °F PRESS. _____ PSIG

	① STEAM	① WATER	② TWO-PHASE
ORIFICE	1" @ 2" LINE	1" @ 2" LINE	5"
QUALITY			
P_1	104 PSIG	104 PSIG	110 PSIG
Δ P	13 " Hg.	3 " R.F.	73 PSI
FLOW RATE			
MASS			326,531 #/Hr.
STEAM	1457 #/Hr.		88,588 #/Hr.
WATER		3,914 #/Hr.	237,943 #/Hr.

① TOTAL MASS FLOW 5,371 #/Hr. ENTHALPY-EFF. _____

② STEAM FRAC. 27.13% EQUIV. TEMP. _____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

1. SEPARATOR DATA TAKEN @ MINI-SEPARATOR
2. USED MINI-SEP. STEAM FRACTION ON TWO-PHASE RATE.

R.O. ENGEBRETSEN

JUL 09 1981

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA No. 24

DATE 7-7-81 TIME 0000 HRS. TEST NO. 2 CHOKE TYPE _____

FLOW RATE DATA

WHP 124 PSIG WHT 340°F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 105 PSIG TEMP. _____ °F PRESS. _____ PSIG

	① STEAM	① WATER	② TWO-PHASE
ORIFICE	1"	1"	5"
QUALITY			
P_1	104 PSIG	104 PSIG	110 PSIG
ΔP	13 "Hg.	3.2 "R.F.	73 PSI
FLOW RATE			
MASS			332,582
STEAM	1,457 #/HR.		88,134 #/HR.
WATER		4,042 #/HR.	~~234,448~~ 244,448

① TOTAL MASS FLOW 5,499 #/HR. ENTHALPY-EFF. _____

② STEAM FRAC. 26.5 % EQUIV. TEMP. _____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

1. SEPARATOR DATA TAKEN @ MINI-SEPARATOR
2. USED STEAM FRACTION @ MINI ON TWO-PHASE RATE
3. SHUT-IN WELL @ 0037 HRS., 7-7-81

(3)

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL B-24

DATE 7-18-81 TIME 1600 TEST NO. #3 CHOKE TYPE _____

FLOW RATE DATA

WHP 134 psig WHT 355 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 122 psig TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1 (psig)	122	123	127
Δ P	2.4 psi	8.0" H_2O (?)	4 psi
FLOW RATE			
MASS			
STEAM	38,142 #/hr		
WATER		173,108 #/hr (?)	

TOTAL MASS FLOW 18.06 % ENTHALPY-EFF. 477.61 Btu/#

STEAM FRAC. 211,250 #/hr. EQUIV. TEMP. 491 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN
JUL 27 1981

REMARKS:

Put flow through separator @ 1155 hrs.

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL B-24

DATE 7-19-81 TIME 1700 TEST NO. #3 CHOKE TYPE _____

FLOW RATE DATA

WHP 88 psig WHT 325 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P_1			74 psig
Δ P			17 psi
FLOW RATE			
MASS			291,206 / 212,789
STEAM	58,241 / 63,837		
WATER		232,964 / 148,952	

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____

STEAM FRAC. * 20% / 30% (assumed) EQUIV. TEMP. _____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN
JUL 27 1981

REMARKS:

Bypassed separator from 1210 hrs. to 1600 hrs. for separator flush.

* Rates calculated for 20% flash / 30% flash

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL B-24

DATE 7-20-81 TIME 1315 hrs. TEST NO. #3 CHOKE TYPE _____

FLOW RATE DATA

WHP 112 psig WHT 342 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 95 psig TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1 (psig)	94	95	130
Δ P	3.51 psi	6.2" H_2O	4.5 psi
FLOW RATE			
MASS			
STEAM	41,147 #/hr.		
WATER		153,177 #/hr.	

TOTAL MASS FLOW 194,324 #/hr. ENTHALPY-EFF. 483.47 Btu/#

STEAM FRAC. 21.17 % EQUIV. TEMP. 496 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN
JUL 27 1981

REMARKS:

Back-pressured separator to 95 psig @ 0900 hrs.

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA No 24

DATE 7-21-81 TIME 1200 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 142 PSIG WHT 359 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 130 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	C"
QUALITY			
P_1	128 PSIG	130 PSIG	133 PSIG
Δ P	2 PSI	6.3" W.C.	5.5 PSI
FLOW RATE			
MASS			
STEAM	35,588 #/HR.		
WATER		153,433 #/HR.	

TOTAL MASS FLOW 189,021 #/HR. ENTHALPY-EFF. 488 BTU/#

STEAM FRAC. 18.83 % EQUIV. TEMP. 500 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN
JUL 27 1981

REMARKS:

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA № 24

DATE 7-22-81 TIME 1040 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 1660 PSIG WHT 374 PSIG CALORIMETRIC: SEP. EFF. 99.2 %

SEPARATOR PRESSURE 161 PSIG TEMP. 202 °F PRESS. 160 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	157 PSIG	160 PSIG	163 PSIG
Δ P	18.1" R.F.	7.6" B.F.	4 PSI
FLOW RATE			
MASS			206,270 #/HR.
STEAM	31,136 #/HR.		36,410
WATER		145,227 #/HR.	169,880

TOTAL MASS FLOW 176,363 #/HR. ENTHALPY-EFF. 493 BTU/#

STEAM FRAC. 17.65 % EQUIV. TEMP. 504 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN
JUL 27 1981

REMARKS:

1. ADJUSTED SEPARATOR PRESSURE TO 150 PSIG @ 1430 HRS 7-21-81 CSTDOE
2. @ 0815 HRS. 7-22-81 ADJUSTED AGAIN TO 160 PSIG AND STABILIZED.

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA NO. 24

DATE 7-23-81 TIME 0745 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 172 PSIG WHT 375 °F CALORIMETRIC: SEP. EFF. 99.1 %

SEPARATOR PRESSURE 168 PSIG TEMP. 291 °F PRESS. 164 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	163 PSIG	166 PSIG	169 PSIG
Δ P	16.3" R.F.	8" B.F.	3.75 PSI
FLOW RATE			
MASS			208,221 #/HR.
STEAM	30,055 #/HR.		34,981 #/HR.
WATER		148,861 #/HR.	173,240 #/HR.

TOTAL MASS FLOW 178,916 #/HR. ENTHALPY-EFF. 488 BTU/#

STEAM FRAC. 16.8 % EQUIV. TEMP. 500 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN

JUL 27 1981

REMARKS:

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA U# 24

DATE 7-23-81 TIME 1615 HRS. TEST NO. 3 CHOKE TYPE

FLOW RATE DATA

WHP 166 PSIG WHT 374 °F CALORIMETRIC: SEP. EFF. 907.1 %

SEPARATOR PRESSURE 158 PSIG TEMP. 287 °F PRESS. 157 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	155 PSIG	158 PSIG	160 PSIG
Δ P	10.8" R.F.	9" B.F.	5 PSI
FLOW RATE			
MASS			234,342 #/HR.
STEAM	32,371 #/HR.		39,838 #/HR.
WATER		158,080 #/HR.	194,504 #/HR.

TOTAL MASS FLOW 190,460 #/HR. ENTHALPY-EFF. 486 BTU/#

STEAM FRAC. 17.0 % EQUIV. TEMP. 408 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN

JUL 27 1981

REMARKS:

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA No. 24

DATE 7-24-81 TIME 1310 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 168 PSIG WHT 375 °F CALORIMETRIC: SEP. EFF. 99.1 %

SEPARATOR PRESSURE 162 PSIG TEMP. 290 °F PRESS. 161 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	160 PSIG	162 PSIG	164 PSIG
Δ P	15.4" R.F.	7.7" B.F.	3.75 PSI
FLOW RATE			
MASS			208,087 #/HR.
STEAM	28,975 #/HR.		34,438 #/HR.
WATER		146,134 #/HR.	173,648 #/HR.

TOTAL MASS FLOW 175,109 #/HR. ENTHALPY-EFF. 484 BTU/#

STEAM FRAC. 16.55 % EQUIV. TEMP. 497 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN

JUL 27 1981

REMARKS:

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA No. 24

DATE 7-25-81 TIME 1400 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 162 PSIG WHT 371 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 154 PSIG TEMP. 290 °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	151 PSIG	154 PSIG	156 PSIG
Δ P	20.6 "R.F.	8.5 "B.F.	4.25 PSI
FLOW RATE			
MASS			210,791
STEAM	32,632 #/HR.		36,910 #/HR.
WATER		153,732 #/HR.	173,882 #/HR.

TOTAL MASS FLOW 186,364 #/HR. ENTHALPY-EFF. 488 BTU/#

STEAM FRAC. 17.51 % EQUIV. TEMP. 500 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

R.O. ENGEBRETSEN
JUL 27 1981

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA #24

DATE 7-26-81 TIME 1400 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 160 PSIG WHT 371 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 153 PSIG TEMP. 290 °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	149 PSIG	152 PSIG	154 PSIG
Δ P	20.3 " R.F.	8.3 " B.F.	4 PSI
FLOW RATE			
MASS			203,908
STEAM	32,204 #/HR.		35,663 #/HR.
WATER		151,062 #/HR.	168,244

TOTAL MASS FLOW 184,166 #/HR. ENTHALPY-EFF. 488 BTU/#

STEAM FRAC. 17.49 % EQUIV. TEMP. 500 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN
JUL 27 1981

REMARKS:

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA № 24

DATE 7-27-81 TIME 1145 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 160 PSIG WHT 371 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 152 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	149 PSIG	152 PSIG	154 PSIG
Δ P	20.3" R.F.	7.8" B.F.	4 PSI
FLOW RATE			
MASS			
STEAM	32,204 #/HR.		
WATER		147,313 #/HR.	

TOTAL MASS FLOW 179,517 #/HR. ENTHALPY-EFF. 491 BTU/#

STEAM FRAC. 17.94 % EQUIV. TEMP. 503 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

REMARKS:

R.O. ENGEBRETSEN
JUL 29 1981

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA No. 24

DATE 7-28-81 TIME 1250 HRS. TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 161 PSIG WHT 370 °F CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 152 PSIG TEMP. 294 °F PRESS. 151 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	149 PSIG	152 PSIG	154 PSIG
Δ P	20.3 " R.F.	7.8 " R.F.	4.25 PSI
FLOW RATE			
MASS			
STEAM	32,204 #/HR.		
WATER		147,313 #/HR.	

TOTAL MASS FLOW 179,517 #/HR. ENTHALPY-EFF. 401 BTU/#

STEAM FRAC. 17.94 % EQUIV. TEMP. 503

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
		0 PPM		
		PH – 5.3		

NON-CONDENSIBLE GAS

DENSITY 1.3125 GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %
1320 HRS.	155	155	2845	3.7841	158.7341	2.35
1324 "	150	150	2850	3.7406	153.7406	2.43
1341 "	176	176	2824	3.7065	179.7065	2.06

REMARKS:

R.O. ENGEBRETSEN

JUL 29 1981

CSTDOE

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT

WELL BACA #2 24

DATE 7-29-81 TIME 0800 HRS. TEST NO. 3 CHOKE TYPE

FLOW RATE DATA

WHP 160 PSIG WHT 370 °F CALORIMETRIC: SEP. EFF. 90.3 %

SEPARATOR PRESSURE 151 PSIG. TEMP. 292 °F PRESS. 150 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	6"	6"
QUALITY			
P_1	148 PSIG	151 PSIG	153 PSIG
Δ P	20.1 "R.F.	7.7 "B.F.	4 PSI
FLOW RATE			
MASS			200,559 #/HR.
STEAM	31,950 #/HR.		35,940 #/HR.
WATER		146,390 #/HR.	164,619 #/HR.

TOTAL MASS FLOW 178,340 #/HR. ENTHALPY-EFF. 491 BTU/#

STEAM FRAC. 17.92 % EQUIV. TEMP. 502 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.

NON-CONDENSIBLE GAS

DENSITY _____ GM/L

Time	Vol. H_2O Ml.	Wt. H_2O Grams	Vol. Gas Ml.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensible By Wt. %

R.O. ENGEBRETSEN
JUL 29 1981

REMARKS:

USDOE

Baca 24 Flowtest 3 (p. 1 of 2)

Encl. 2

DATE	TIME	WHP	SEP PRES	STEAM	WATER	TOTAL MASS FLOW	STM FRAC	ENTHALPY	
07/18/81	1600	134	122	38142	173108	211250	.181	478	PUT FLOW THROUGH SEP. @1155
07/19/81	1700	88		58241	232964	291206	.20	ASSUMED	
~~07/19/81~~	~~1700~~	~~88~~		~~63837~~	~~148952~~	~~212789~~	~~.30~~	~~ASSUMED~~	~~BYPASSED SEP~~ FROM 1210 TO 1600 FOR SEP FLUSH
07/20/81	1315	112	95	41147	153177	194324	.212	493	BACK PRESSURED SEP TO 95PSIG @0900
07/21/81	1200	142	130	35588	153433	189021	.188	488	
~~07/22/81~~	~~1040~~	~~166~~	~~161~~	~~31136~~	~~145227~~	~~176363~~	~~.177~~	~~493~~	~~ADJ. SEP PRES TO~~ 150PSIG @1430/TO 160 @0815
07/23/81	0745	172	168	30055	148861	178916	.168	488	
07/23/81	1615	166	158	32371	158089	190460	.170	486	
~~07/24/81~~	~~1310~~	~~168~~	~~162~~	~~28975~~	~~146134~~	~~175109~~	~~.166~~	~~484~~	
07/25/81	1400	162	154	32632	153732	186364	.175	488	
07/26/81	1400	160	153	32204	151962	184166	.175	488	
~~07/27/81~~	~~1145~~	~~160~~	~~152~~	~~32204~~	~~147313~~	~~179517~~	~~.179~~	~~491~~	
07/28/81	1250	161	152	32204	147313	179517	.179	491	
07/29/81	0800	160	151	31950	146390	178340	.179	491	
~~07/30/81~~	~~0700~~	~~158~~	~~150~~	~~31792~~	~~143533~~	~~175325~~	~~.181~~	~~492~~	
07/31/81	0800	158	150	31697	143533	175230	.181	492	
08/01/81	1530	158	150	31776	142560	174336	.182	493	
~~08/02/81~~	~~0900~~	~~158~~	~~150~~	~~31617~~	~~137591~~	~~169208~~	~~.187~~	~~497~~	
08/03/81	1325	156	150	31776	141580	173356	.183	494	
08/04/81	1140	156	150	31776	139600	171376	.185	495	
~~08/05/01~~	~~1230~~	~~154~~	~~148~~	~~31426~~	~~137635~~	~~169061~~	~~.186~~	~~495~~	
08/06/81	1330	134	125	34935	136121	171056	.204	500	ADJ. SEP PRES F 148 TO 125 PSIG @0850
08/07/81	0800	124	116	32253	126700	158953	.203	494	
08/07/81	0930	131	124	31081	123147	154228	.202	497	
08/08/81	1100	131	125	31191	127605	158796	.196	493	
[illegible]	[illegible]	[illegible]	123	30971	126544	157515	.197	492	

Baca 24 Flowtest 3 (6 2 of 2)

08/10/81	1145	131	125	31629	125385	157014	.201	497	
08/11/81	0800	131	125	30745	127605	158350	.194	491	
08/12/81	0800	132	126	31191	125363	156554	.199	496	
08/13/81	0900	134	126	32062	126478	158540	.202	499	
08/14/81	0845	130	124	32144	119719	151863	.212	506	
08/15/81	0900	134	127	33853	130840	164693	.206	502	
08/16/81	0900	134	127	34260	124219	158478	.216	511	
08/17/81	0750	132	126	31629	126478	158107	.200	497	
08/18/81	0800	130	124	31081	124218	155299	.200	496	
08/19/81	0800	103	90	39492	135958	175450	.225	499	SEP PRES REDUCE TO 90 PSIG @ 0940 8/18/81
08/20/81	0810	102	89	39492	135985	175477	.225	498	
08/21/81	0810	101	89	39491	132810	172301	.229	502	

UNION GEOTHERMAL CO. OF NEW MEXICO
PRESSURE INTERFERENCE DATA

WELL NAME: BACA № 24
TRANSDUCER: PAROSCIENTIFIC
MODEL #: 2900 - A - 002
SERIAL #: 4225 0-2000 PSIA

CHAMBER SETTING: 3,000 FT. @ KB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS. PRESS.	TRANSR. RDGS. FREQ.	WHP PSIG	WHT	INITIALS	REMARKS
2-2-82	1330	25	—	—	147			INSTALLED TUBING/CHAMBER
"	1450	25	688.850	28.48374	147			@ 3,000 FT. KB.
2-3-82	1330	27	689.701	28.48732	147			
4	1345	28	682.706	28.47860	147			
5	1450	40	688.740	28.48327	148			
8	1335	29	688.681	28.48300	148			
9	1515	37	688.715	28.48315	148			
10	1120	31	688.750	28.48326	147		@1045 HRS.	PURGED TUBING W/ N_2
11	0855	27	688.532	28.48239	147			
12	1450	50	688.660	28.48278	147			
16	1205	50	688.857	28.48360	148			START B-18 INJECTION @ 1500 HRS.
17	1325	62	694.460	28.50751	148			
18	1045	32	694.210	28.50640	148			
19	1200	66	694.686	28.50829	149			
20	1125	65	695.551	28.51210	148			
21	1000	63	695.431	28.51185	148			
22	1350	60	695.840	28.51330	149			
23	1355	52	696.220	28.51491	148			

UNION GEOTHERMAL CO. OF NEW MEXICO
PRESSURE INTERFERENCE DATA

WELL NAME: BACA Nº 24
TRANSDUCER: PAROSCIENTIFIC
MODEL#: 2900 - A - 002
SERIAL#: 4225 900 PSIA

CHAMBER SETTING: 3,000' RKB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS. PRESS.	TRANSR. RDGS. FREQ.	WHP PSIG	WHT	INITIALS	REMARKS
2-24-82	1100	56	606.602	28.51648	147			
25	0950	31	606.607	28.51660	146			
26	1020	61	606.834	28.51742	147			
27								NO DATA TAKEN
28	1005	50	607.082	28.51856	147			
3-01-82	0950	53	607.382	28.51981	148			
02	1440	50	607.547	28.52048	148			
03	1400	50	607.625	28.52078	148			
04	1505	38	607.536	28.52053	149			
05	1350	32	608.133	28.52297	148			
06	0950	34	608.450	28.52419	148			
07	1020	52	608.216	28.52336	148			
08	1130	44	608.330	28.52381	147			
09	1235	54	608.587	28.52489	148			
10	1425	55	609.141	28.52723	148			
11	1030	50	609.238	28.52761	147			
12	1455	44	608.934	28.52653	146			
13	1005	42	609.613	28.52921	146			

UNION GEOTHERMAL CO. OF NEW MEXICO
PRESSURE INTERFERENCE DATA

WELL NAME: BACA № 24
TRANSDUCER: PAROSCIENTIFIC
MODEL #: 2900 - A - 002
SERIAL #: 4225 900 PSIA

CHAMBER SETTING: 3000' EKB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS. PRESS.	TRANSR. RDGS. FREQ.	WHP PSIG	WHT	INITIALS	REMARKS
3-14-82	1020	50	699.677	28.529722	147			
15	1450	35	699.644	28.529639	147			
16	0955	58	699.538	28.528911	147			
17	1230	56	699.951	28.530433	147			
18	1105	48	699.800	28.530000	147			
19	1310	30	699.918	28.530556	145			
20	1120	52	700.057	28.531097	146			
21	1055	57	700.050	28.530933	147			
22	1205	44	700.272	28.532122	147			
23	1020	49	700.043	28.531278	146			
24	1035	42.5	700.418	28.532633	146.5			
25	1135	45	700.453	28.532756	146.5			
26	1005	38	700.430	28.532733	146			
27	0945	58	701.053	28.535794	147			
28	1005	64	700.831	28.534411	147			
29	1415	28	701.093	28.535856	146			
30	1310	40	701.090	28.535833	146.5			
31	0911	58	700.925	28.534786	147			

UNION GEOTHERMAL CO. OF NEW MEXICO
PRESSURE INTERFERENCE DATA

WELL NAME: BACA № 24
TRANSDUCER: PAROSCIENTIFIC
MODEL #: 2900 - A - 002
SERIAL #: 4225 900 PSIA

CHAMBER SETTING: 3000' EKB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS. PRESS.	TRANSR. RDGS. FREQ.	WHP PSIG	WHT	INITIALS	REMARKS
4-1-82	0041	54	701.123	28.53565	147			
2	1315	42	701.230	28.53614	147			
3	0024	45	701.430	28.53715	147			
4	1205	60	701.651	28.53825	147			
5	0915	52	701.642	28.53816	147.5			
6	1005	42	701.503	28.53720	147			
7	0955	42	701.961	28.53869	147			
8	1051	58	701.866	28.53868	147			
9	0901	41	701.760	28.53770	147			
10	1040	64	701.720	28.53812	147			
11	—	—	—	—	—			
12	1410	56	79.859	28.53874	147			
13	0710	40	701.816	28.53861	146			SHUT-IN B18 W-INJ. @ 0850 HRS.
13	1045	58	701.3	28.53607	147			
13	1328	70	700.8	28.5341	148			
14	1035	55	699.229	28.52749	147			
14	1320	60	611.064	28.52695	147			
15	1300	58	698.079	28.52273	146.5			

UNION GEOTHERMAL CO. OF NEW MEXICO
PRESSURE INTERFERENCE DATA

WELL NAME: BACA № 24
TRANSDUCER: PAROSCIENTIFIC
MODEL #: 2900 - A - 002
SERIAL #: 4225 900 PSIA

CHAMBER SETTING: 3000' @ KB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS. PRESS.	TRANSR. RDGS. FREQ.	WHP PSIG	WHT	INITIALS	REMARKS
4-16-82	1055	60	697.737	28.52143	146			
17	1140	54	697.061	28.51831	146			
18	1058	68	696.487	28.51623	146			
19	1400	57	696.241	28.51487	146			
20	1105	48	695.882	28.51342	146	- PURGED	N_2 @	1320 HRS.
20	1337	43	695.532	28.51214	146			
21	1040	46	695.537	28.51130	145.5			
22	1210	35	695.090	28.51016	145.5			
23	1040	32	694.858	28.50920	145.5			
24	1150	52	694.553	28.50782	146			
25	0849	60	694.595	28.50790	147			
26	1255	66	694.375	28.50700	147			
27	1040	64	694.068	28.50577	147			
28	0845	50	694.198	28.50631	147			
29	1410	72	694.051	28.50567	147			
30	1316	72	694.075	28.50580	147.5			
5-1-82	1120	68	693.895	28.50487	147			
2	1050	63	693.611	28.50385	147			

UNION GEOTHERMAL CO. OF NEW MEXICO
PRESSURE INTERFERENCE DATA

WELL NAME: BACA № 24
TRANSDUCER: PAROSCIENTIFIC
MODEL#: 2900 - A - 002
SERIAL#: 4225 900 PSIA

CHAMBER SETTING: 3000' EKB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS. PRESS.	TRANSR. RDGS. FREQ.	WHP PSIG	WHT	INITIALS	REMARKS
5-4-82	0055	66	693.562	28.50361	148			
5	1254	56	693.500	28.50329	148			
6	0934	56	693.465	28.50285	148			
7	1255	67	693.760	28.50442	148			
8	0855	54	693.630	28.50470	148			
9	1013	48	693.159	28.50191	147			
10	1020	58	692.801	28.50058	149			
11	1014	48	692.930	28.50140	149			
12	1330	39	693.286	28.50263	149			
13	0959	38	693.083	28.50155	149			
14	0852	50	692.964	28.50108	150			
15	0929	62	693.316	28.50220	150			
16	1220	64	692.860	28.50068	151			
17	1008	66	692.975	28.50095	151.5			
18	0851	60	692.776	28.50053	152			
18	1300	70	692.894	28.50092	153			
19	0939	54	692.655	28.50040	152			
20	0907	60	693.050	28.50149	152			

UNION GEOTHERMAL CO. OF NEW MEXICO
PRESSURE INTERFERENCE DATA

WELL NAME: BACA № 24
TRANSDUCER: PAROSCIENTIFIC
MODEL#: 2900 - A - 002
SERIAL#: 4225 900 PSIA

CHAMBER SETTING: 3000' EKB

DATE	TIME HRS	AMBIENT TEMP. °F	TRANSR. RDGS. PRESS.	TRANSR. RDGS. FREQ.	WHP PSIG	WHT	INITIALS	REMARKS
5-21-82	0855	60	692.617	28.40969	152			
22	1112	64	692.634	28.40971	152			
23	0945	64	692.662	28.40925	153			
24	1545	60	692.579	28.40958	151			
25	0916	58	692.778	28.50041	151			
26	1051	78	692.620	28.40907	152			
27	0907	43	692.468	28.40902	151.5			
27	1300	- PULLED OUT TUBING/CHAMBER, GET STOCKED AFTER PULLING 1,435 FT. OF TUBING.						
		- KILLED WELL BY INJECTING APPROXIMATELY 24,000 GALLONS OF COLD WATER THEN RECOVERED TUBING AND CHAMBER @ 1535 HRS, 5-27-82.						

B24-S1 P/T

R.O. ENGEBRETSEN

JUN 29 1981

Union Geothermal Co. of New Mexico

SURVEY DATE: 6-26-81

TITLE BACA No. 24 TEMP/PRESS.

TEMP. EL. S/N	: KTB10222	PRESS. EL. S/N	: KPG9235
RANGE	: 93° - 618°F	RANGE	: 0 - 2950 psi
CALIBRATED	: 11-10-76	CALIBRATED	: 7-26-76
CLOCK: 12 HRS.	: S/N: 14089	CLOCK: 12 HRS.	: S/N: 23778

WHP AT START OF SURVEY : 149 PSIG

WHP AT END OF SURVEY : 149 PSIG

OPENED WELL TO ELEMENT : 1200 HRS.

POH : 1341 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

_____MOS., _____DAYS, _____HRS., _____MINS.

DATE AND TIME OF LATEST S. I. (FT. NO._____) _____HRS._____19___

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	1200-1205	0.002	93.35	0.106	+0.092	162.83	
2	500	1206-1221	0.209	162.74	0.108	0.095	168.14	
3	1000	1222-1233	0.437	235.63	0.108	0.095	168.14	
4	1500	1234-1245	0.606	286.50	0.107	0.094	166.37	
5	2000	1246-1257	0.789	340.22	0.216	0.209	340.48	
6	2500	1258-1308	0.899	371.64	0.346	0.343	536.54	
7	3000	1309-1319	1.036	410.28	0.475	0.474	728.07	
8	3500	1320-1330	1.046	412.99	0.603	0.605	919.59	
9	3550	1331-1341	1.050	414.08	0.617	0.619	940.05	

B 24 - S1 P/T

Union Geothermal Co. of New Mexico

R.O. ENGEBRETSEN

JUN 29 1981

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No. 24

CASING 20" @ 782'; 13 3/8 @ 2038' ELEV. 8,740' DATE: 6-26-81

LINER DESCRIPTION: 7" LINER @ 2838 - 3580' ZERO POINT 12' ABOVE GL

DEPTH 3580 FT.

HOLE DESCRIPTION: 120 FT BELOW LINER HANGER ARE BULRAK

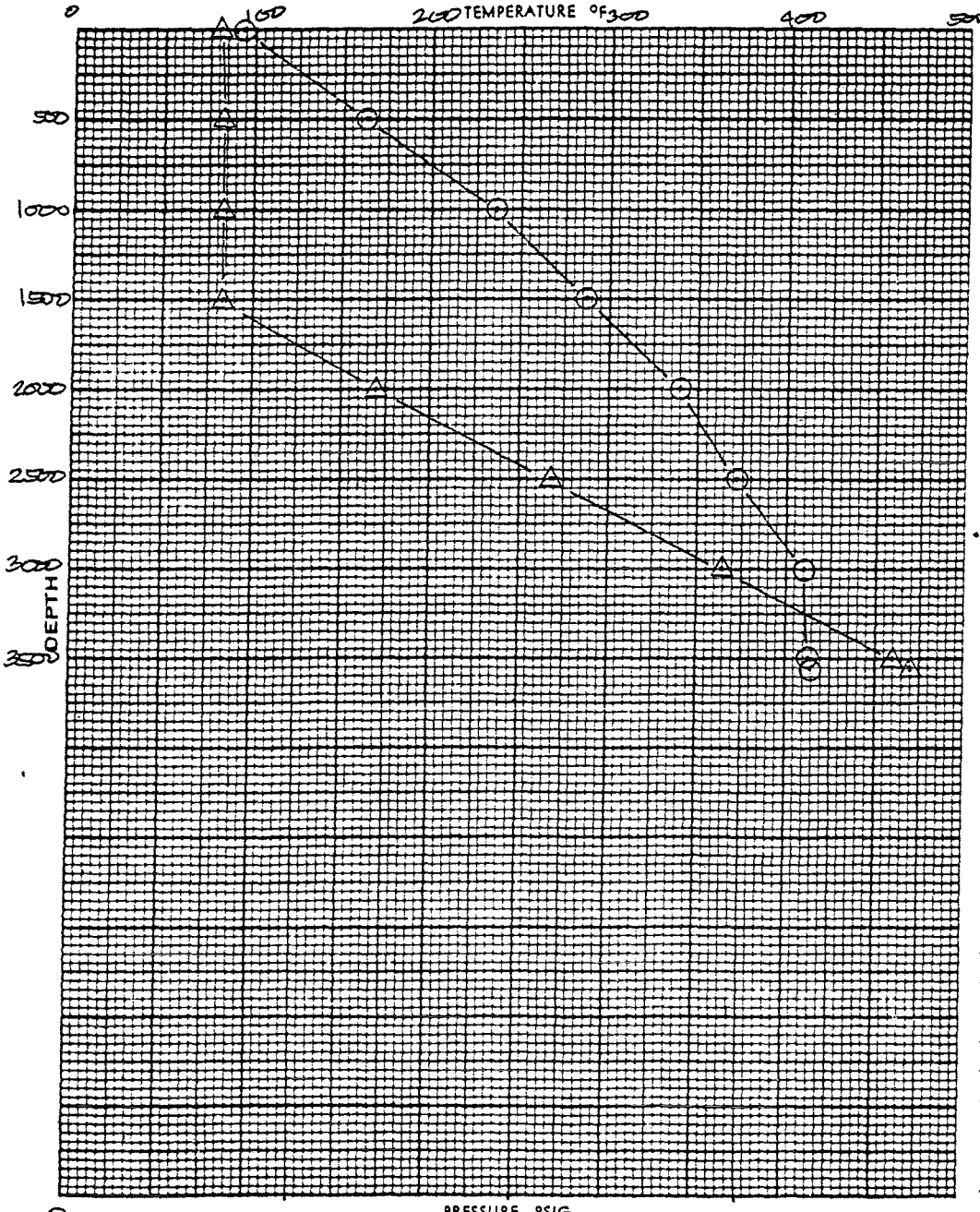
INSTRUMENT 073 - 618 FAHR.

SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550' MAX. TEMP. 414 °F @ 3550'

REMARKS:

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	93.35	162.83	—
500	162.74	168.14	—
1000	235.63	168.14	—
1500	286.50	166.27	—
2000	340.22	340.98	0.34
2500	371.64	536.54	0.39
3000	410.28	728.07	0.38
3500	412.99	919.57	0.38
3550	414.08	940.05	0.4

⊙ TEMPERATURE
△ PRESSURE

BY: JPR

B 24 - S 2 P/T

Union Geothermal Co. of New Mexico

R. O. ENGEBRETSEN

JUL 0 2 1981

SURVEY DATE: 6 - 30 - 81

TITLE B 24 - S 2 P/T

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 0235
RANGE	: 92° - 618 °F	RANGE	: 2050 PSI
CALIBRATED	: 11 - 10 - 76	CALIBRATED	: 7 - 26 - 76
CLOCK: 12 HRS.	: S/N: 14080	CLOCK: 12 HRS.	: S/N: 23778

WHP AT START OF SURVEY : 1 PSIG

WHP AT END OF SURVEY : 1 PSIG

OPENED WELL TO ELEMENT : 0950 HRS.

POH : 1138 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

_____MOS., _____DAYS, _____HRS., _____MINS.

DATE AND TIME OF LATEST S. I. (FT. NO._____) _____HRS._____19___

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	100	0951-1006	0.257	178	0.002	—	3.53	
2	500	1007-1018	0.280	186	0.002	—	3.53	
3	1000	1019-1030	0.321	199	0.002	—	3.53	
4	1500	1031-1042	0.707	317	0.091	—	161	
5	2000	1043-1054	0.888	360	0.221	0.215	349	
6	2500	1055-1105	0.995	399	0.349	0.347	542	
7	3000	1106-1116	1.119	433	0.478	0.477	732	
8	3500	1117-1127	1.130	436	0.602	0.603	917	
9	3550	1128-1138	1.172	447	0.615	0.616	936	

B24 - S2 P/T

Union Geothermal Co. of New Mexico

R. O. ENGEBRETSEN

JUL 16 1981

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No 24

CASING 20" @ 782' ; 13 3/8" @ 2038' ELEV. 8740' DATE: 6-30-81

LINER DESCRIPTION: 7" LINER @ 2838' - 3580' ZERO POINT GL + 12'

DEPTH 3580 FT.

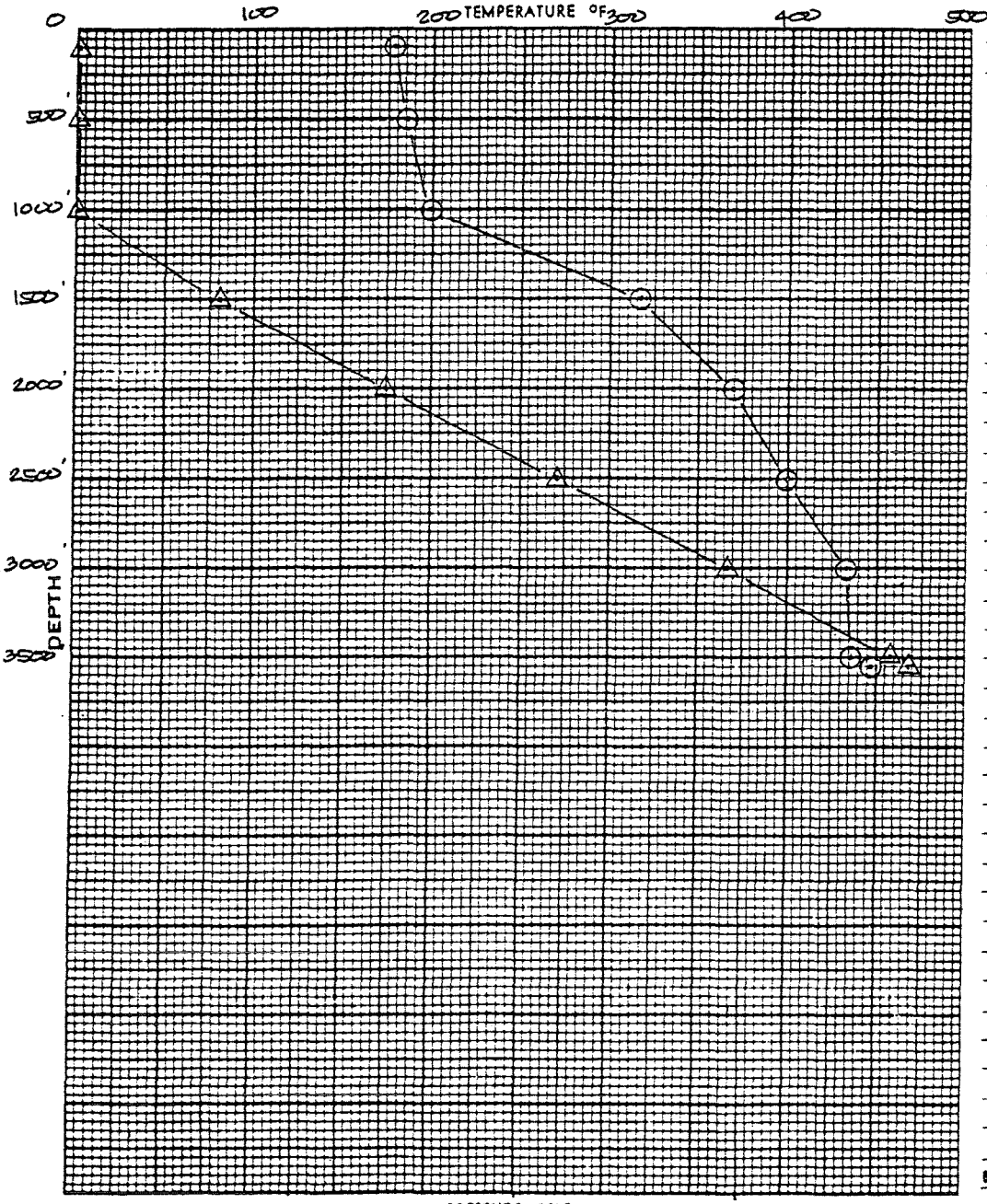
HOLE DESCRIPTION: 120 FT. FROM LINER HANGER ARE BLANK

2050 PSI INSTRUMENT DJ-618 FAHR.

KPC 0235 SERIAL NO. KTD 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3,550 FT. MAX. TEMP. 447 °F @ 3550'

REMARKS:



STABLIZATION PERIOD

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
100	178	3.53	-
500	186	3.53	-
1000	199	3.53	-
1500	317	161	0.31
2000	369	349	0.37
2500	399	542	0.38
3000	433	732	0.38
3500	436	917	0.37
3550	447	936	0.38

⊙ TEMPERATURE
△ PRESSURE

BY: JPR

B 24 - S 3 P/T

R. O. ENGEBRETSEN

Union Geothermal Co. of New Mexico

JUL 0 9 1981

SURVEY DATE: 7-7-81

TITLE B 24 - S 3 P/T (S.I. WELL @ 0037 HRS., 7-7-81)

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 0235
RANGE	: 93°F - 618°F	RANGE	: 2050 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 7-26-76
CLOCK: 12 HRS.	: S/N: 14089	CLOCK: 12 HRS.	: S/N: 23778

WHP AT START OF SURVEY : 170 PSIG

WHP AT END OF SURVEY : 130 PSIG

OPENED WELL TO ELEMENT : 0047 HRS.

POH : 1140 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

_____MOS., _____DAYS, _____HRS., _____MINS.

DATE AND TIME OF LATEST S. I. (FT. NO._____) _____HRS._____ 19___

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	0047-1002	0.004	94.07	0.115	0.101	179	CORR. MADE AT 200 PSI LIN
2	500	1003-1013	0.8099	371.64	0.108	0.0917	175	
3	1000	1014-1024	0.0900	371.93	0.106	0.097	172	
4	1500	1025-1035	0.8098	371.36	0.102	0.0973	165	
5	2000	1036-1046	0.0980	307.35	0.151	0.145	247	
6	2500	1047-1057	1.127	435.00	0.283	0.279	443	
7	3000	1058-1108	1.226	461.89	0.412	0.410	635	
8	3500	1109-1119	1.2129	462.71	0.541	0.542	827	
9	3550	1120-1130	1.230	462.98	0.558	0.559	852	
"	"	1140	1.225	461.62	0.562	0.563	858	

B24-S3 P/T

Union Geothermal Co. of New Mexico

R. O. ENGEBRETSEN

JUL 0 9 1981

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA № 24

CASING 20" @ 782' ; 13 3/8" @ 2938' ELEV. 8740' DATE: 7-7-81

LINER DESCRIPTION: 7" LINER @ 2838' - 3580' ZERO POINT GL + 12'

DEPTH 3580'

HOLE DESCRIPTION:

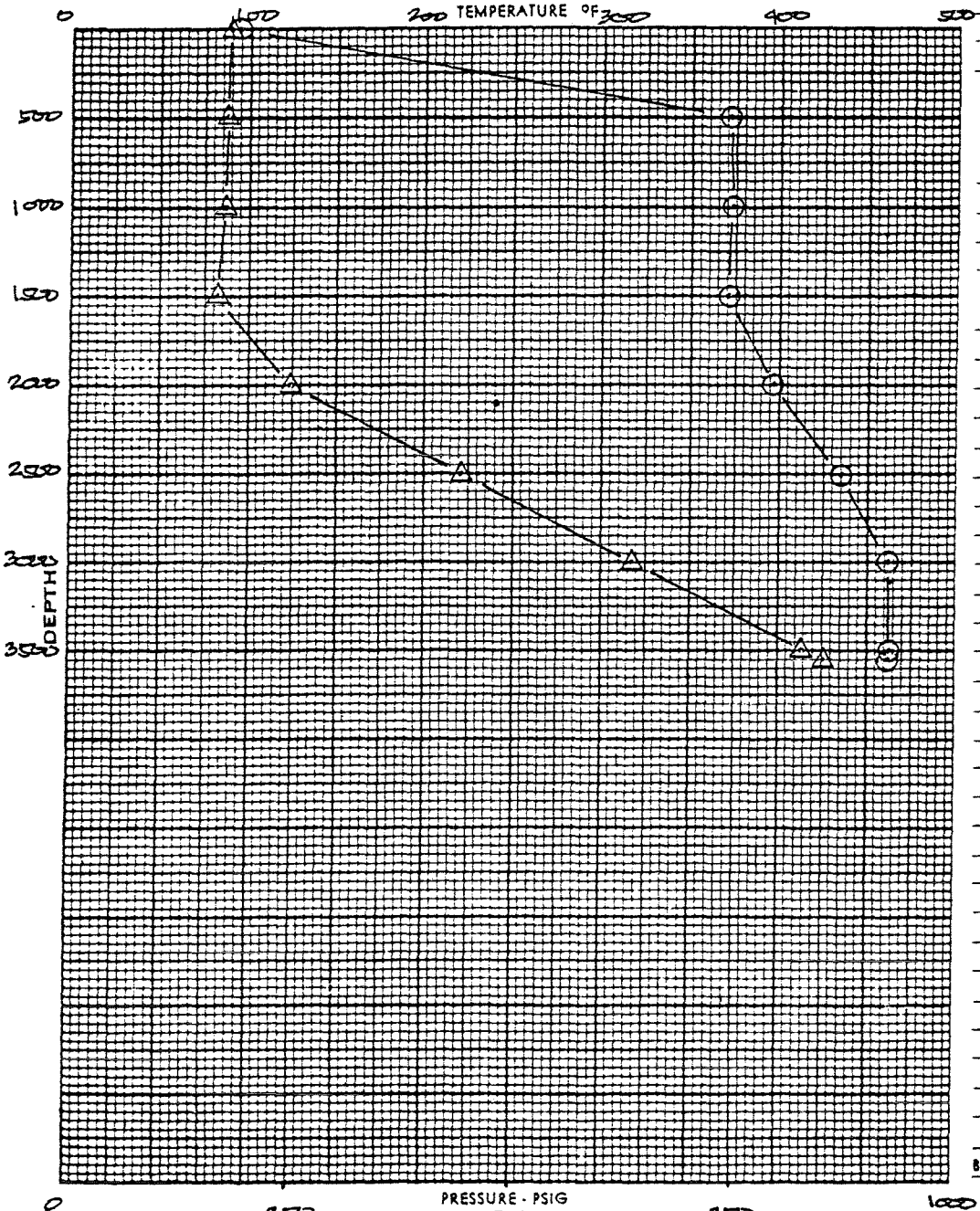
2050 PSI INSTRUMENT 093°F - 618 FAHR.

KPC 0235 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TD 3550' MAX. TEMP. 462.08 °F @ 3550'

REMARKS: FOLLOWING SHUT-IN OF FLOWTEST № 2

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	104.07	179	-
500	371.64	175	-
1000	371.93	172	-
1500	371.36	165	-
2000	397.35	247	0.16
2500	435.00	443	0.39
3000	461.85	635	0.38
3500	462.71	827	0.34
3550	462.08	852	0.52
"	461.62	858	

⊙ TEMPERATURE

△ PRESSURE

BY:

R.O. ENGEBRETSEN B 24-S 4 P/T

JUL 0 9 1981

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No. 24

CASING 20" @ 782' ; 13 3/8" @ 2938' ELEV. 8740' DATE: 7-8-81

LINER DESCRIPTION: 7" LINER @ 2838' — 3580' ZERO POINT GL + 12'

DEPTH 3580 FT.

HOLE DESCRIPTION:

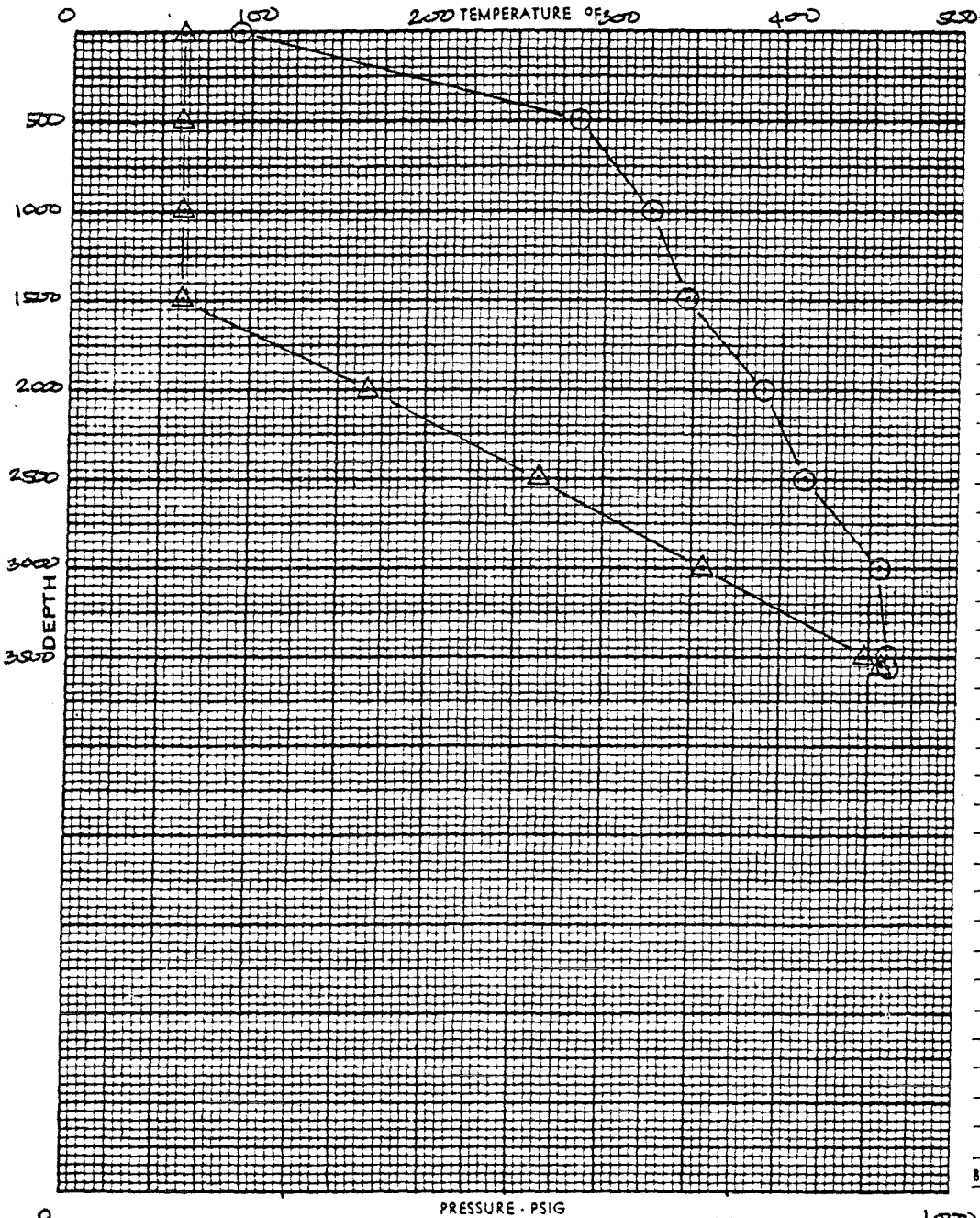
2950 PSI INSTRUMENT 93-618 FAHR.

KPC 9235 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550' MAX. TEMP. 461 °F @ 3500' 3550'

REMARKS:

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI	124	124

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	93.35	124	-
500	284	122	-
1000	327	124	-
1500	347	126	-
2000	390	335	0.418
2500	413	528	0.386
3000	456	713	0.370
3500	461	895	0.364
3550	461	914	0.38

⊙ TEMPERATURE

△ PRESSURE

BY:

B24-S4 P/T

R.O. ENGEBRETSEN

JUL 0 9 1981

Union Geothermal Co. of New Mexico

SURVEY DATE: 7-8-81

TITLE B24-S4 P/T

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 9235
RANGE	: 93 - 618 °F	RANGE	: 2950 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 7-26-76
CLOCK: 12 HRS.	: S/N: 14089	CLOCK: 12 HRS.	: S/N: 23778

WHP AT START OF SURVEY : 124 PSIG

WHP AT END OF SURVEY : 131 PSIG

OPENED WELL TO ELEMENT : 0915 HRS.

POH : 1115 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

____ MOS., 1 DAYS, 0 HRS., 22 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 2) 0937 HRS. 7-7-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	0915-0930	0.002	93.35	0.084	0.070	124	CORRECTION MADE ON 200 PSI LINE
2	500	0932-0942	0.598	284	0.082	0.069	122	
3	1000	0944-0954	0.744	327	0.082	0.070	124	
4	1500	0956-1006	0.812	347	0.082	0.071	126	
5	2000	1008-1018	0.962	390	0.211	0.205	335	
6	2500	1020-1030	1.045	413	0.340	0.337	528	
7	3000	1032-1042	1.206	456	0.465	0.464	713	
8	3500	1044-1054	1.223	461	0.588	—	895	
9	3580	1055-1115	1.223	461	0.601	—	914	

B24-SS P/T

R.O. ENGEBRETSEN
JUL 10 1981

Union Geothermal Co. of New Mexico

SURVEY DATE: 7-9-81

TITLE B24-SS P/T

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 9235
RANGE	: 93°F - 618°F	RANGE	: 2950 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 7-26-76
CLOCK: 12 HRS.	: S/N: 14089	CLOCK: 12 HRS.	: S/N: 23778

WHP AT START OF SURVEY : 153 PSIG
WHP AT END OF SURVEY : 151 PSIG
OPENED WELL TO ELEMENT : 0910 HRS.
POH : 1102 HRS.
TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
____MOS., ____DAYS, ____HRS., ____MINS.
DATE AND TIME OF LATEST S. I. (FT. NO. 2) 0937 HRS. 7-7-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	0910-0925	0.002	93	0.107	0.093	165	CORRECTION MADE ON 200 PSI LINE
2	500	0928-0938	0.477	248	0.107	0.094	166	
3	1000	0941-0951	0.738	326	0.104	0.092	163	
4	1500	0953-1003	0.812	347	0.103	0.093	165	
5	2000	1005-1015	0.955	388	0.218	0.212	345	
6	2500	1017-1027	1.051	414	0.345	0.342	535	
7	3000	1029-1039	1.222	461	0.472	0.471	724	
8	3500	1041-1051	1.230	463	0.595	0.596	906	
9	3550	1052-1102	1.232	464	0.607	0.608	924	

B24-SSP/T

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

R.O. ENGEBRETSEN

JUL 10 1981

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No. 24

CASING 20" @ 782' ; 13 3/8" @ 2038' ELEV. 8740' DATE: 7-9-81

LINER DESCRIPTION: 7" LINER @ 2838' - 3580' ZERO POINT GL + 12'

DEPTH 3580'

HOLE DESCRIPTION:

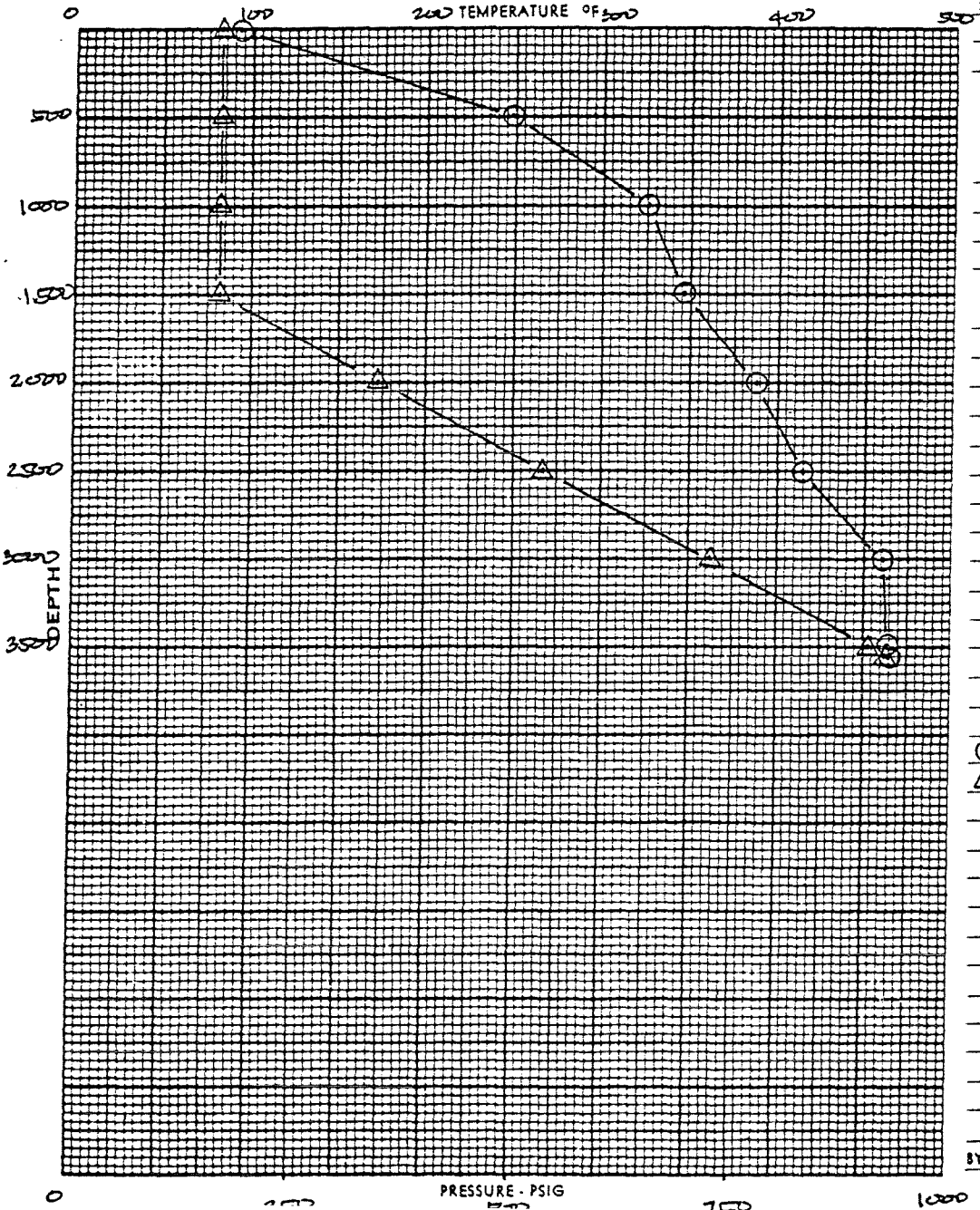
2050 PSI INSTRUMENT 93-618 FAHR.

KAE 9235 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TD 3550' MAX. TEMP. 464 °F @ 3550'

REMARKS:

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	93	165	—
500	248	166	—
1000	326	163	—
1500	347	165	—
2000	388	345	0.36
2500	414	535	0.38
3000	461	724	0.378
3550	463	906	0.36
3550	464	924	0.36

⊙ TEMPERATURE

△ PRESSURE

BY:

Union Geothermal Co. of New Mexico

R.O. ENGEBRETSEN
JUL 20 1981

SURVEY DATE: 7-17-81

TITLE BACA № 24 Temp / Press Survey

TEMP. EL. S/N	: 10222	PRESS. EL. S/N	: 9235
RANGE	: 93-618 °F	RANGE	: 0-2950 Psig
CALIBRATED	: 11/10/77	CALIBRATED	: 7/26/76
CLOCK: 12 HRS.	: S/N: 23780	CLOCK: 12 HRS.	: S/N: 14089

WHP AT START OF SURVEY : 151 PSIG
WHP AT END OF SURVEY : 151 PSIG
OPENED WELL TO ELEMENT : 0848 HRS.
POH : 1035 HRS.
TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
_____MOS., _____DAYS, _____HRS., _____MINS.
DATE AND TIME OF LATEST S. I. (FT. NO._____) _____HRS._____19___

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	5 min	NR	NR	.100	.100	177	
2	500	15 min	.353	209	.100	.100	177	
3	1000	11 min	.720	321	.100	.100	177	
4	1500	11 min	.810	346	.100	.100	177	
5	2000	11 min	.976	394	.228	.221	358	
6	2500	10 min	1.086	424	.354	.352	550	
7	3000	10 min	1.247	468	.479	.478	734	
8	3500	10 min	1.256	470	.602	.602	915	
9	3550	10 min	1.281	477	.615	.615	934	
CSTDOE		—						

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

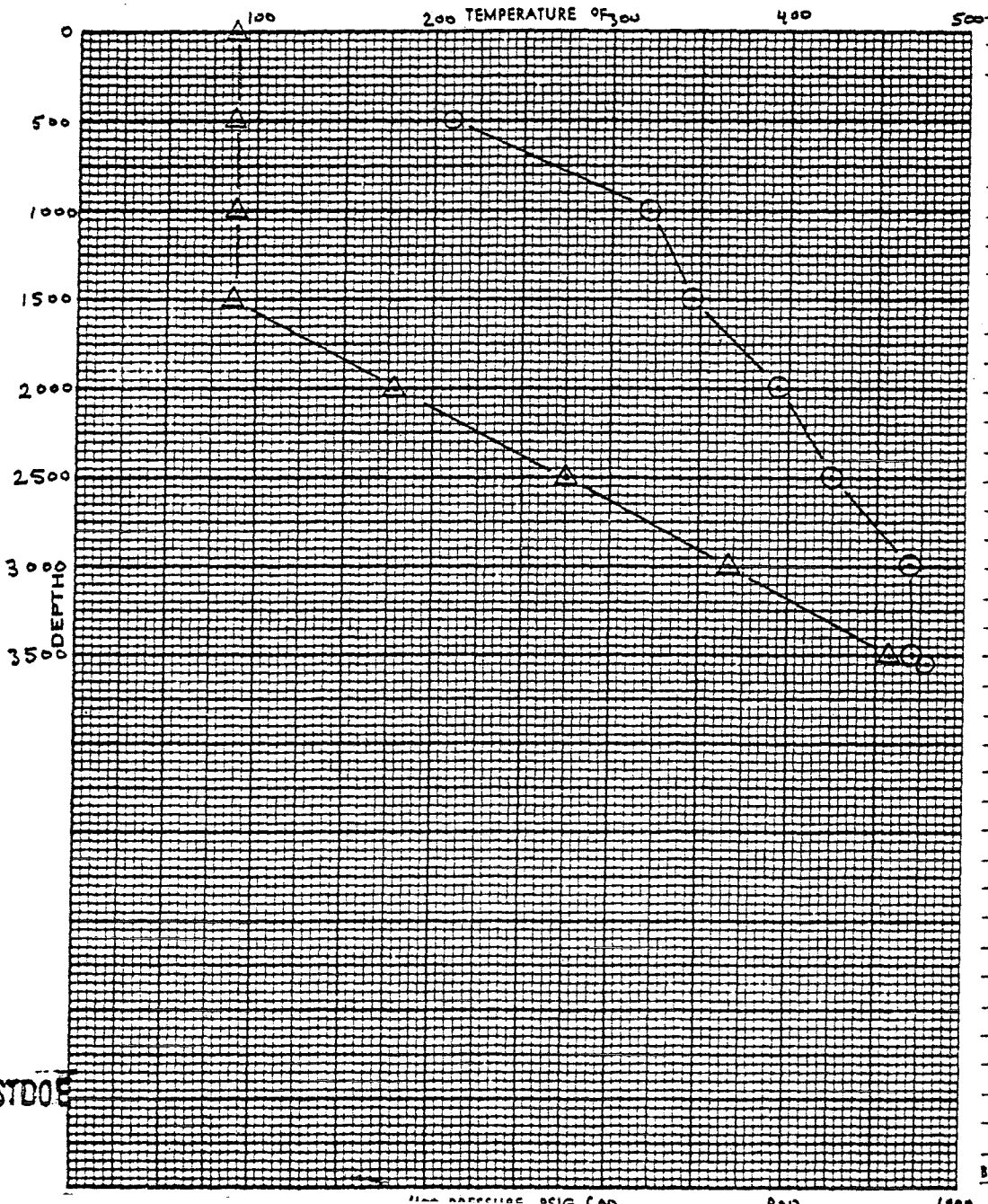
R.O. ENGEBRETSEN
JUL 20 1981

OWNER UNION Geothermal Co. of N.M. FIELD Redondo Canyon WELL NAME Baca No 24
CASING 20"@ 782' ; 13 3/8" @ 2938 ELEV. 8740' DATE: 7-17-81
LINER DESCRIPTION: ZERO POINT GL + 12'
7" Liner @ 2838' - 3589' DEPTH 3589'

HOLE DESCRIPTION:
2950 PSI INSTRUMENT 93-618 FAHR
KPG 9235 SERIAL NO. KTB 10222

PURPOSE TEMP/Press Gradient Survey to 3550' MAX. TEMP. 477 °F @ 3550'
REMARKS:

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD
0	NR	177	
500	209	177	
1000	321	177	
1500	346	177	
2000	394	358	.36
2500	424	550	.38
3000	468	734	.39
3500	470	915	.31
3550	477	934	.38

△ — Pressure
⊙ — Temperature

BY:

CSTDOE

Union Geothermal Co. of New Mexico

SURVEY DATE: 9 - 15 - 81

TITLE BACA No 24 PRESS/TEMP BUILD-UP SURVEY @ 3250 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 1410
RANGE	: 93 - 618°F	RANGE	: 4575 PSI
CALIBRATED	: 11 - 10 - 76	CALIBRATED	: 4 - 17 - 81
CLOCK: 12 HRS.	: S/N: 23780	CLOCK: 12 HRS.	: S/N: 14087

WHP AT START OF SURVEY : 160 PSIG
WHP AT END OF SURVEY : 123 PSIG
OPENED WELL TO ELEMENT : 0937 HRS.
POH : 1612 HRS.
TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
0 MOS., 0 DAYS, 0 HRS., 2 MINS.
DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0930 HRS. 9 - 15 - 19 81

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	3250'	0946	CLOCK		0.178	0.180	421	
		0951	STOPPED		0.188	0.190	444	
		0956			0.212	0.214	500	
		1001	MAXIMUM		0.239	0.241	563	
		1006	READINGS		0.268	0.271	633	
		1011	1.272	474	0.286	0.289	675	
		1016			0.296	0.299	692	
		1021			0.299	0.302	706	
		1031			0.303	0.306	715	
		1046			0.308	0.311	727	
		1101			0.312	0.315	736	
		1116			0.314	0.317	741	
		1131			0.316	0.319	745	
		1146			0.317	0.320	748	
		1201			0.318	0.321	750	
		1216			0.318	0.321	750	
	↓	1231	↓		0.318	0.321	750	

STDOE

R.O. ENGEBRET
SEP 21 198

B24-ST P/T

Union Geothermal Co. of New Mexico

SURVEY DATE: 9-15-81

TITLE B24-ST P/T BUILD-UP. (CONT.)

TEMP. EL. S/N	: KTD 10222	PRESS. EL. S/N	: KPG 14101
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 23780	CLOCK: 12 HRS.	: S/N: 14087

WHP AT START OF SURVEY : _____ PSIG

WHP AT END OF SURVEY : _____ PSIG

OPENED WELL TO ELEMENT : _____ HRS.

POH : _____ HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

_____ MOS., _____ DAYS, _____ HRS., _____ MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. _____) _____ HRS. _____ 19___

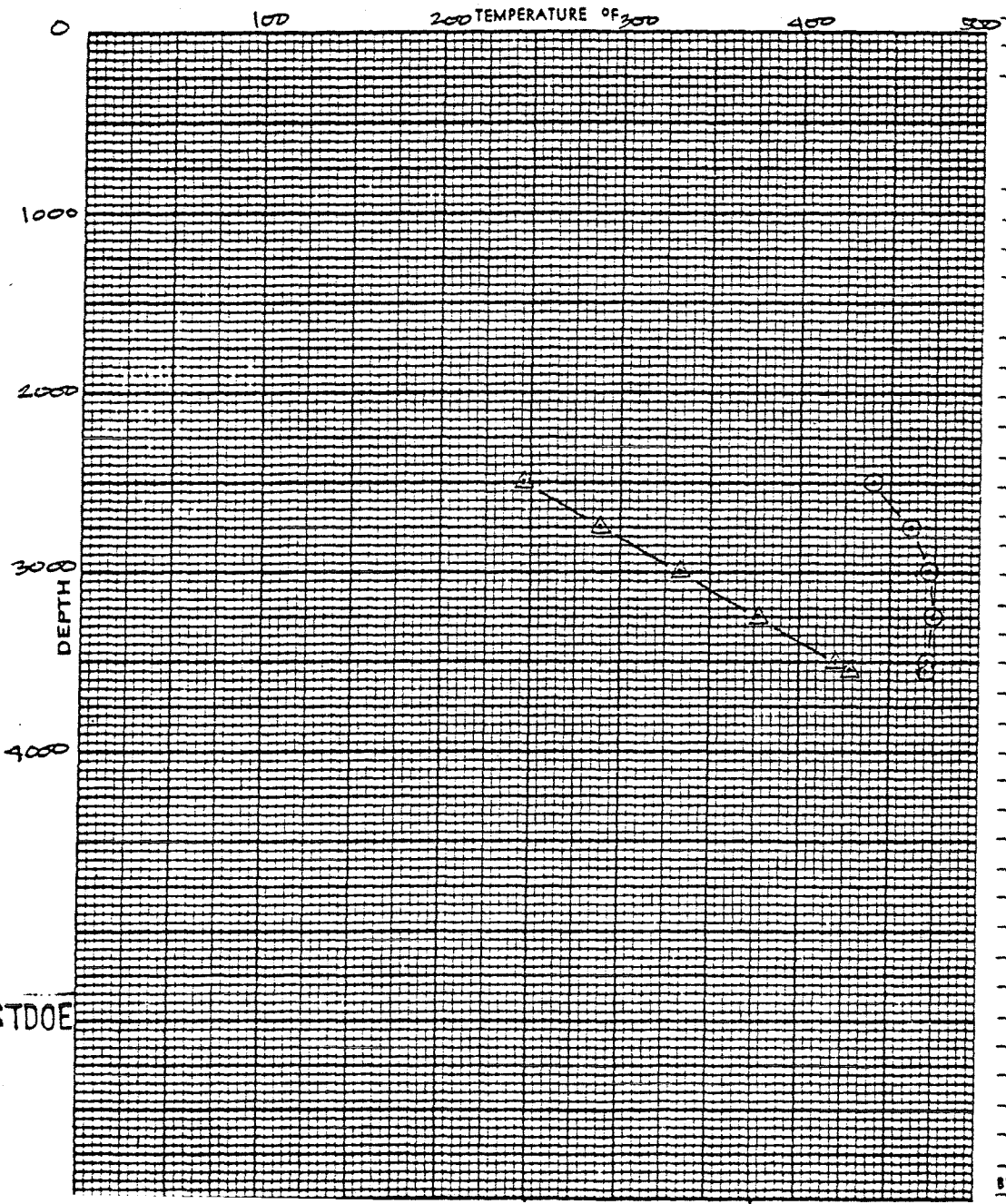
			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	3250'	1256	1.272	474	0.319	0.322	752	
2	2500	1309	1.150	441	0.206	0.211	493	
3	2750	1320	1.228	462	0.245	0.248	579	
4	3000	1331	1.265	472	0.282	0.285	666	
5	3250	1342	1.270	474	0.320	0.323	755	
6	3500	1353	1.261	471	0.357	0.361	843	
7	3550	1404	1.257	470	0.363	0.367	857	
1	3250	1416	1.269	474	0.318	0.321	750	
		1431	"	"	0.318	0.321	750	
		1446	"	"	0.319	0.322	752	
		1501	"	"	0.319	0.322	752	
		1516	"	"	0.319	0.322	752	
		1531	"	"	0.319	0.322	752	
		1546	"	"	0.320	0.323	755	
		1612	"	"	0.320	0.323	755	

B24-57 P/T

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA NO 24
CASING 20" @ 782' ; 13 3/8" @ 2035' ELEV. 8740' DATE: 9-15-81
LINER DESCRIPTION: 7" LINER @ 2838' - 3589' ZERO POINT KB
DEPTH 3589 FT.
HOLE DESCRIPTION:
4575 PSI INSTRUMENT 93-618 FAHR.
KPC 14191 SERIAL NO. KTB 10222
PURPOSE TEMP/PRESS BUILD-UP SURVEY TO 3250 FT. MAX. TEMP. 474 °F @ 3250'
REMARKS: FOLLOWING FLOWTEST NO 3 SHUT-IN



STABLIZATION PERIOD

PRESSURES	GAUGE	BOMB
CASING. PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
2500	441	403	—
2750	462	579	0.34
3000	472	666	0.34
3250	474	755	0.35
3500	471	843	0.35
3550	470	857	0.21

⊙ TEMPERATURE
△ PRESSURE

R.O. ENGEBRETSEN

SEP 21 1981

BY:

CSTDOE

B24-58 T/T

Union Geothermal Co. of New Mexico

SURVEY DATE: 9-16-81

TITLE BACA NO 24 PRESS/TEMP POINT SURVEY @ 3250'

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 14101
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 14087	CLOCK: 12 HRS.	: S/N: 23781

WHP AT START OF SURVEY : 123 PSIG
WHP AT END OF SURVEY : 121 PSIG
OPENED WELL TO ELEMENT : 1059 HRS.
POH : 1205 HRS.
TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
____ MOS., 1 DAYS, 1 HRS., 20 MINS.
DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0939 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	3250'	1120	1.285	478	0.326	0.329	769	
	"	1135	1.285	478	0.326	0.329	769	
	"	1150	1.285	478	0.326	0.329	769	
	"	1205	1.286	478	0.326	0.329	769	
CSTDOE								

R.O. ENGEBRETSEN
SEP 21 1981

B24-S of P/T

Union Geothermal Co. of New Mexico

SURVEY DATE: 9-17-81

TITLE BACA No. 24 TEMP/PRESS GRADIENT SURVEY TO 3550 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 14191
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 14087	CLOCK: 12 HRS.	: S/N: 23781

WHP AT START OF SURVEY : 130 PSIG
WHP AT END OF SURVEY : 130 PSIG.
OPENED WELL TO ELEMENT : 1015 HRS.
POH : 1211 HRS.
TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
MOS., 2 DAYS, 0 HRS., 36 MINS.
DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0039 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	500	1017-1032	0.632	204	0.053	—	124	NO CORRECTIONS
2	1000	1033-1043	0.852	358	0.053	—	124	
3	1500	1044-1054	0.876	365	0.057	—	133	
4	2000	1055-1105	1.033	409	0.137	—	320	
5	2500	1106-1116	1.117	432	0.214	0.218	509	
6	2750	1117-1127	1.162	445	0.252	0.255	596	
7	3000	1128-1138	1.286	478	0.290	0.293	685	
8	3250	1139-1149	1.293	480	0.331	0.334	780	
9	3500	1150-1200	1.288	479	0.365	0.369	862	
10	3550	1201-1211	1.282	477	0.375	0.379	886	
CSTDOE								

R.O. ENGEBRETSEN
SEP 21 1981

B24-SD P/T

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No. 24

CASING 20" @ 782' ; 13 3/8" @ 2938' ELEV. 8740' DATE: 9-17-81

LINER DESCRIPTION: 7" LINER @ 2838' - 3589' ZERO POINT KB

DEPTH 3589 FT.

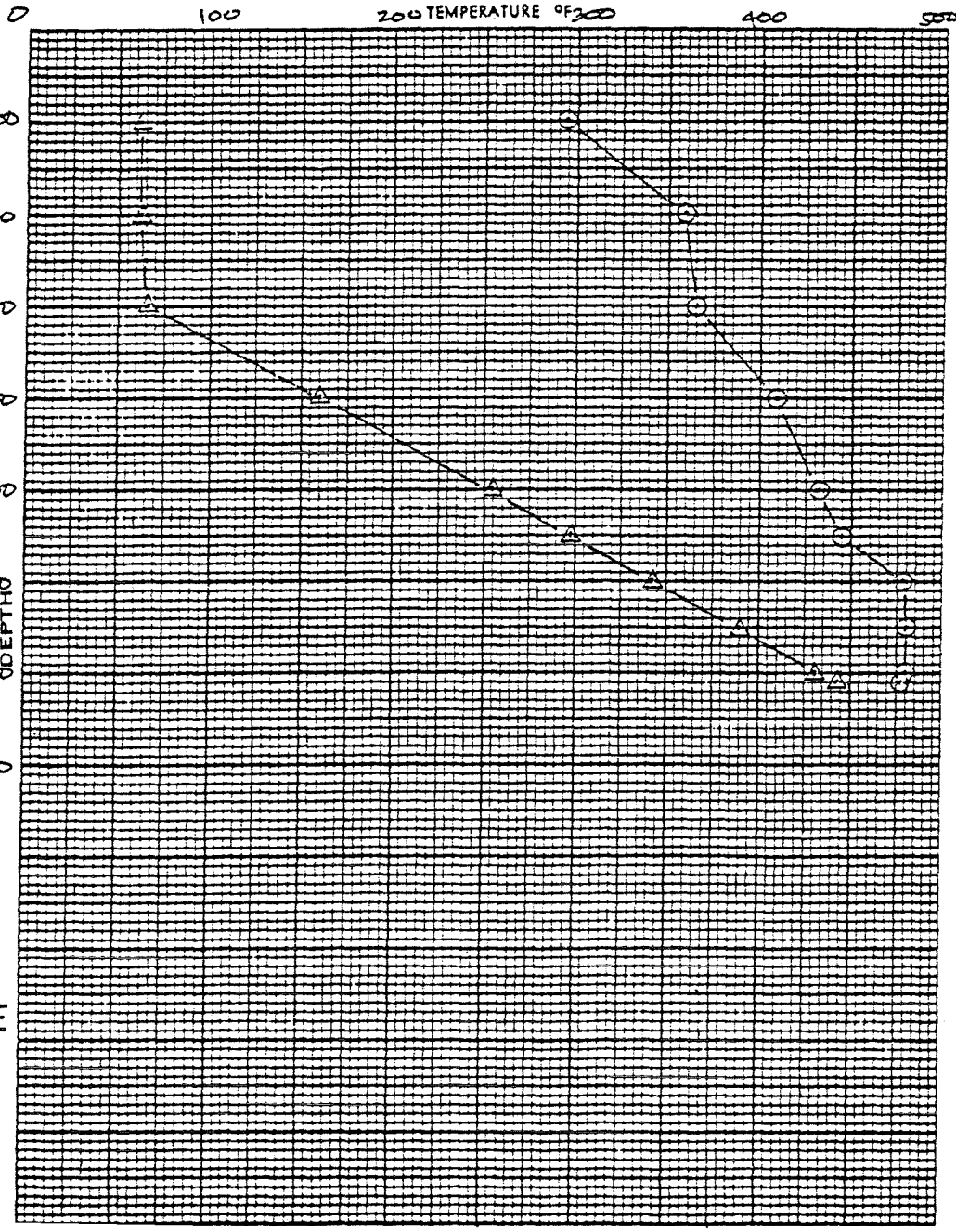
HOLE DESCRIPTION:

4575 PSI INSTRUMENT 93-618 FAHR.

KPC 14191 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550 FT. MAX. TEMP. 480 °F @ 3250'

REMARKS:



STABLIZATION PERIOD

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0			
550	204	124	-
1000	358	124	-
1500	365	133	-
2000	909	320	0.374
2500	932	509	0.378
2750	945	596	0.348
3000	978	685	0.356
3250	980	780	0.380
3500	979	862	0.328
3550	977	886	0.480

⊙ TEMPERATURE

△ PRESSURE

R. D. ENGEBRETSEN

SEP 21 1981

BY:

STDOE

R.O. ENGEBRETSEN

B24-S10 P/T

SEP 21 1981

Union Geothermal Co. of New Mexico

SURVEY DATE: 9-10-81

TITLE BACA No. 24 P/T POINT SURVEY TO 3,250 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 1410
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 14087	CLOCK: 12 HRS.	: S/N: 23781

WHP AT START OF SURVEY : 143 PSIG

WHP AT END OF SURVEY : 141 PSIG

OPENED WELL TO ELEMENT : 1115 HRS.

POH : 1210 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

____ MOS., 4 DAYS, 1 HRS., 36 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0030 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	3,250'	1138	1.302	482	0.330	0.333	778	
	"	1153	1.303	483	0.330	0.333	778	
	"	1210	1.306	483	0.330	0.333	778	
CSTDOE								

B24 - S11 P/T

Union Geothermal Co. of New Mexico

R.O. ENGEBRETSEN

SEP 22 1981

SURVEY DATE: 9-22-81

TITLE BACA No. 24 P/T GRADIENT SURVEY TO 3550 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 14191
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 14087	CLOCK: 12 HRS.	: S/N: 23781

WHP AT START OF SURVEY : 145 PSIG

WHP AT END OF SURVEY : 143 PSIG

OPENED WELL TO ELEMENT : 1054 HRS.

POH : 1255 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

____ MOS., 7 DAYS, 1 HRS., 15 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0930 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	1054-1059	N.R.	—	0.060	—	140	NO CORRECTION
2	500	1100-1115	0.415	220	0.060	—		
3	1000	1117-1127	0.858	360	0.060	—		
4	1550	1128-1138	0.884	367	0.060	—		
5	2000	1130-1149	1.042	412	0.140	—	327	
6	2500	1150-1200	1.141	439	0.216	0.219	512	
7	2750	1201-1211	1.192	453	0.255	0.258	603	
8	3000	1212-1222	1.308	484	0.292	0.295	689	
9	3250	1223-1233	1.318	486	0.331	0.334	780	
10	3500	1234-1244	1.319	486	0.367	0.371	867	
11	3550	1245-1255	1.307	484	0.374	0.378	883	
CSTDOE								

B24-S11 P/T

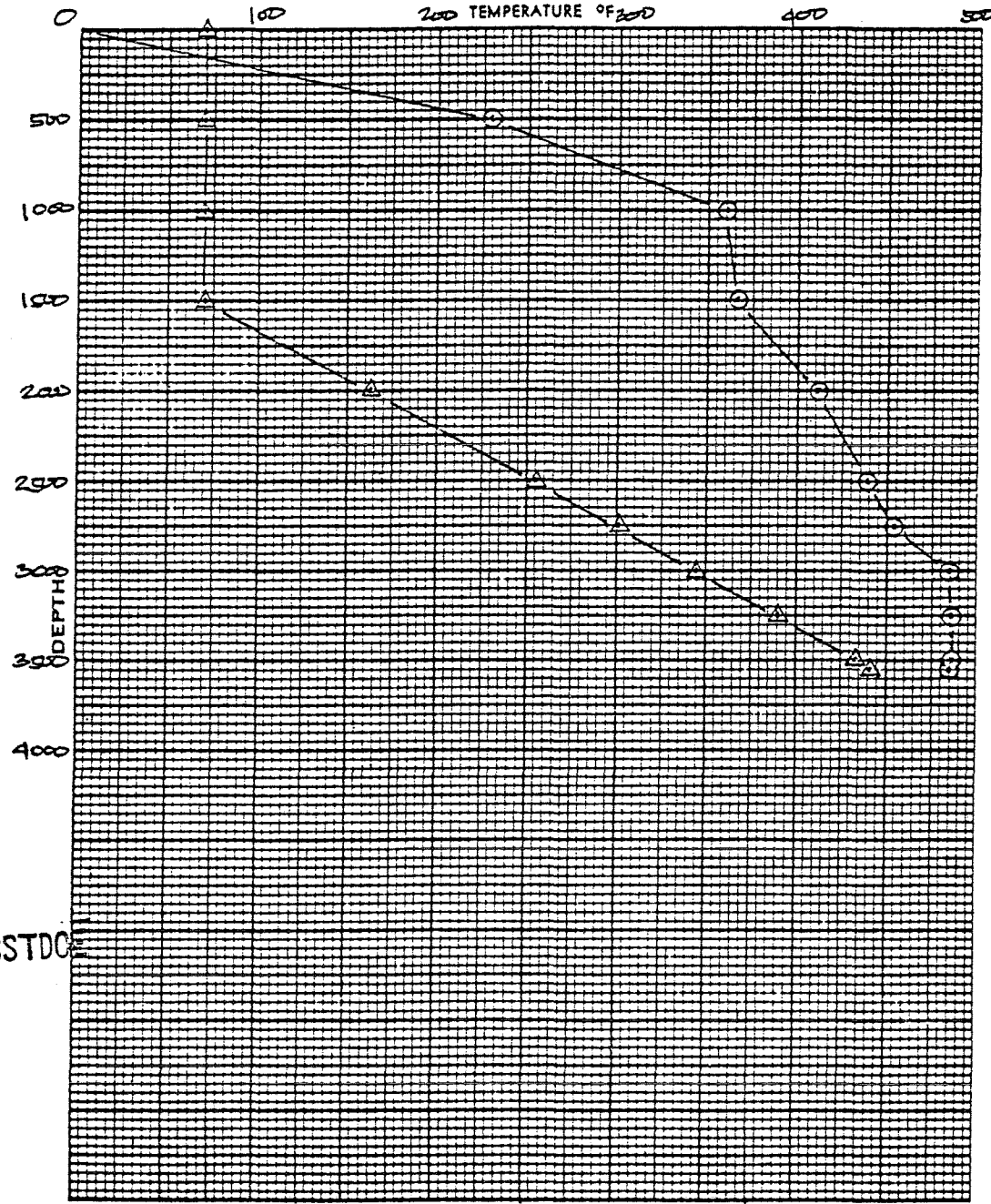
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL Co. OF N.M. FIELD REDONDO CANYON WELL NAME BACA № 24
CASING 20" @ 782' ; 13 3/8" @ 2038' ELEV. 8740' DATE: 9-22-81
LINER DESCRIPTION: ZERO POINT KB
7" LINER @ 2838' - 3589' DEPTH 3589 FT.

HOLE DESCRIPTION:
4575 PSI INSTRUMENT 93-618 FAHR.
KPG 14101 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550' MAX. TEMP. 486 °F @ 3250', 3500'
REMARKS:



STABLIZATION PERIOD

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	—	140	
500	220	"	—
1000	360	"	—
1500	367	"	—
2000	412	327	0.374
2500	439	512	0.370
2750	453	603	0.364
3000	484	689	0.344
3250	486	780	0.364
3500	486	867	0.348
3550	484	883	0.320

⊙ TEMPERATURE
△ PRESSURE

R.O. ENGEBRETSEN

SEP 22 1981

BY: JPB

CSTDC

B24-5-12 P/T

R.O. ENGEBRETSEN

SEP 30 1981

Union Geothermal Co. of New Mexico

SURVEY DATE: 9-20-81

TITLE BACA No. 24 TEMP/PRESS POINT SURVEY TO 3,250 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 14191
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 18338	CLOCK: 12 HRS.	: S/N: 23781

WHP AT START OF SURVEY : 154 PSIG

WHP AT END OF SURVEY : 154 PSIG

OPENED WELL TO ELEMENT : 1345 HRS.

POH : 1432 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

0 MOS., 14 DAYS, 4 HRS., 6 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0930 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	3,250'	1402-1432	1.336	490	0.331	0.334	780	

TDOE

B24-S13 F/T

R.O. ENGEBRETSEN
OCT 09 1981

Union Geothermal Co. of New Mexico

SURVEY DATE: 10-06-81

TITLE BACA NO 24 TEMP/PRESS GRADIENT SURVEY TO 3,550 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 14101
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 14089	CLOCK: 12 HRS.	: S/N: 12889

WHP AT START OF SURVEY : 160 PSIG
WHP AT END OF SURVEY : 158 PSIG
OPENED WELL TO ELEMENT : 1223 HRS.
POH : 1425 HRS.
TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
0 MOS., 21 DAYS, 2 HRS., 44 MINS.
DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0039 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	1223-1228	N.R.	—	0.067	—	157	NO CORRECTIONS
2	500	1229-1244	0.396	223	0.067	—	157	
3	1000	1245-1256	0.870	363	0.067	—	157	
4	1500	1257-1308	0.820	366	0.070	—	164	
5	2000	1309-1320	1.061	417	0.146	—	341	
6	2500	1321-1331	1.236	465	0.222	0.225	526	
7	2750	1332-1342	1.320	487	0.259	0.261	610	
8	3000	1343-1353	1.356	496	0.297	0.299	699	
9	3250	1354-1404	1.366	497	0.333	0.336	785	
10	3500	1405-1415	1.372	499	0.370	0.373	872	
11	3550	1415-1425	1.371	499	0.377	0.380	888	
CSTDOE								

B24-S13 P/T

R.O. ENGEBRETSEN

OCT 09 1981

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No. 24

CASING 20" @ 782' ; 13 3/8" @ 2038' ELEV. 8740' DATE: 10-06-81

LINER DESCRIPTION: 7" LINER @ 2838' - 3580' ZERO POINT KB

DEPTH 3580 FT.

HOLE DESCRIPTION:

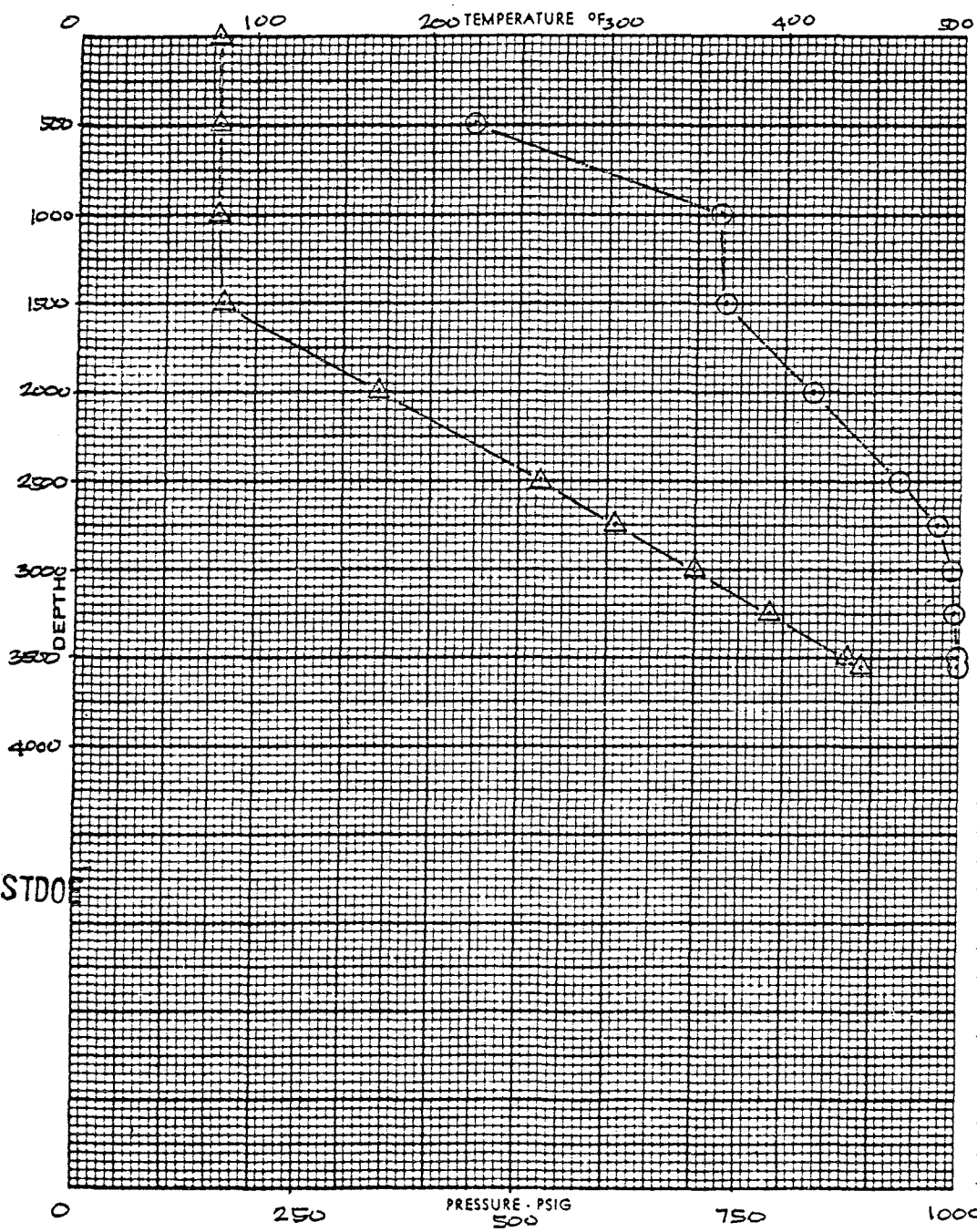
4575 PSI INSTRUMENT 03-618 FAHR.

KPG 14191 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3,550 FT.. MAX. TEMP. 409 °F @ 3500', 3550'

REMARKS:

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	—	157	
500	223	157	-
1000	363	157	-
1500	366	164	0.014
2000	417	341	0.354
2500	465	526	0.370
2750	487	610	0.336
3000	495	699	0.356
3250	497	785	0.344
3500	499	872	0.348
3550	409	888	0.320

⊙ TEMPERATURE

△ PRESSURE

BY:

Encl. 3

R.O. ENGEBRETSEN

OCT 26 1981

B24-S14 P/T

Union Geothermal Co. of New Mexico

SURVEY DATE: 10-10-81

TITLE BACA No. 24 TEMP/PRESS GRADIENT SURVEY TO 3550 FT.

TEMP. EL. S/N	: KTD 10222	PRESS. EL. S/N	: KPG 14191
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 18338	CLOCK: 12 HRS.	: S/N: 12889

WHP AT START OF SURVEY : 160 PSIG

WHP AT END OF SURVEY : 6 PSIG

OPENED WELL TO ELEMENT : 0641 HRS.

POH : 1755 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

1 MOS., 3 DAYS, ____ HRS., ____ MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0030 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	1500'	0644-0659	0.877	365	0.072	—	168	} NO CORRECTION
2	2000	0700-0715	1.108	430	0.152	—	355	
3	2500	0716-0731	1.270	474	0.228	0.230	537	
4	2750	0732-0747	1.333	490	0.263	0.265	619	
5	3000	0748-0803	1.368	498	0.301	0.303	708	
6	3250	0804-0819	1.377	500	0.338	0.341	797	
7	3500	0820-0837	1.381	501	0.375	0.378	883	
8	3550	0847	1.384	502	0.380	0.384	897	
		0922	1.384	502	0.380	0.384	897	START WATER INJECTION @ 0920 HRS. 10-19-81
		0925	1.389	505	0.381	0.385	900	
		0928	1.401	506	0.384	0.387	904	
		0931	1.385	502	0.383	0.386	925	
		0936	1.380	501	0.384	0.387	928	
CSTDOE		0941	1.373	499	0.385	0.389	932	
		0946	1.353	494	0.387	0.401	937	
		0951	1.332	489	0.387	0.401	937	
		0956	1.311	485	0.386	0.400	935	

R.O. ENGEBRETSEN

OCT 20 1981

Union Geothermal Co. of New Mexico

B24-S14 P/T

SURVEY DATE: 10-19-81

TITLE (CONT.)

TEMP. EL. S/N	:	PRESS. EL. S/N	:
RANGE	:	RANGE	:
CALIBRATED	:	CALIBRATED	:
CLOCK: HRS.	S/N:	CLOCK: HRS.	S/N:

WHP AT START OF SURVEY : PSIG

WHP AT END OF SURVEY : PSIG

OPENED WELL TO ELEMENT : HRS.

POH : HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

MOS., DAYS, HRS., MINS.

DATE AND TIME OF LATEST S. I. (FT. NO.) HRS. 19

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
8	3550'	1001	1.285	478	0.396	0.400	935	
		1006	1.257	470	0.396	0.400	935	
		1011	1.224	461	0.398	0.403	942	WATER INJECTION IN PROGRESS
		1016	1.192	453	0.397	0.402	939	
		1021	1.145	440	0.396	0.401	937	
		1026	1.081	423	0.395	0.401	937	
		1031	1.010	403	0.393	0.399	932	
		1036	0.950	386	0.392	0.399	932	
		1041	0.895	371	0.392	0.399	932	
		1046	0.849	357	0.392	0.399	932	
		1051	0.808	346	0.392	0.399	932	
		1056	0.775	336	0.393	0.400	935	
CSTDOE		1101	0.744	327	0.393	0.400	935	
		1106	0.718	320	0.394	0.401	937	
		1111	0.696	314	0.394	0.401	937	
		1116	0.678	308	0.394	0.401	937	
		1121	0.661	303	0.394	0.401	937	

R.O. ENGEBRETSEN

OCT 20 1981

Union Geothermal Co. of New Mexico

B24-514 P/T

SURVEY DATE: 10-10-81

TITLE (CON'T.)

TEMP. EL. S/N	:	PRESS. EL. S/N	:
RANGE	:	RANGE	:
CALIBRATED	:	CALIBRATED	:
CLOCK:____HRS.	S/N:____	CLOCK:____HRS.	S/N:____

WHP AT START OF SURVEY : ____ PSIG

WHP AT END OF SURVEY : ____ PSIG

OPENED WELL TO ELEMENT : ____ HRS.

POH : ____ HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

____ MOS., ____ DAYS, ____ HRS., ____ MINS.

DATE AND TIME OF LATEST S. I. (FT. NO.____) ____ HRS. ____ 19__

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
8	3550'	1131	0.633	295	0.395	0.402	939	
		1141	0.610	288	0.395	0.402	939	
		1151	0.591	282	0.396	0.403	942	
		1201	0.575	277	0.396	0.403	942	
		1211	0.560	273	0.393	0.400	935	WATER
		1221	0.546	268	0.393	0.400	935	INJECTION
		1231	0.537	266	0.393	0.400	935	IN
		1246	0.524	262	0.393	0.400	935	PROGRESS
		1301	0.512	258	0.390	0.397	928	
		1316	0.506	256	0.389	0.395	923	
CSTDOE		1331	0.503	256	0.389	0.395	923	
		1401	0.496	253	0.388	0.394	921	
		1431	0.488	251	0.388	0.394	921	
		1501	0.479	248	0.389	0.395	923	
		1531	0.470	246	0.388	0.394	921	
		1601	0.461	243	0.389	0.395	923	
		1631	0.453	240	0.388	0.394	921	

Union Geothermal Co. of New Mexico

SURVEY DATE: 10-19-81

TITLE (CON'T.) B24-S14 P/T

TEMP. EL. S/N : _____ PRESS. EL. S/N : _____

RANGE : _____ RANGE : _____

CALIBRATED : _____ CALIBRATED : _____

CLOCK: _____ HRS. : S/N: _____ CLOCK: _____ HRS. : S/N: _____

WHP AT START OF SURVEY : _____ PSIG

WHP AT END OF SURVEY : _____ PSIG

OPENED WELL TO ELEMENT : _____ HRS.

POH : _____ HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

_____ MOS., _____ DAYS, _____ HRS., _____ MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. _____) _____ HRS. _____ 19___

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
8	3550'	1701	0.447	239	0.389	0.305	923	WATER INJECTION IN PROGRESS
	〃	1731	0.441	237	0.389	0.305	923	
	〃	1755	0.438	236	0.389	0.305	923	
								INJECTION RATE ≈ 250 GPM
CSTDOE								
								R.O. ENGEBRETSEN
								OCT 26 1981

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B24-S14 P/T

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No 24

CASING 20" @ 782' ; 13 3/8" @ 2938' ELEV. 8740' DATE: 10-19-81

LINER DESCRIPTION: 7" LINER @ 2838'-3580' ZERO POINT KB

DEPTH 3580 FT.

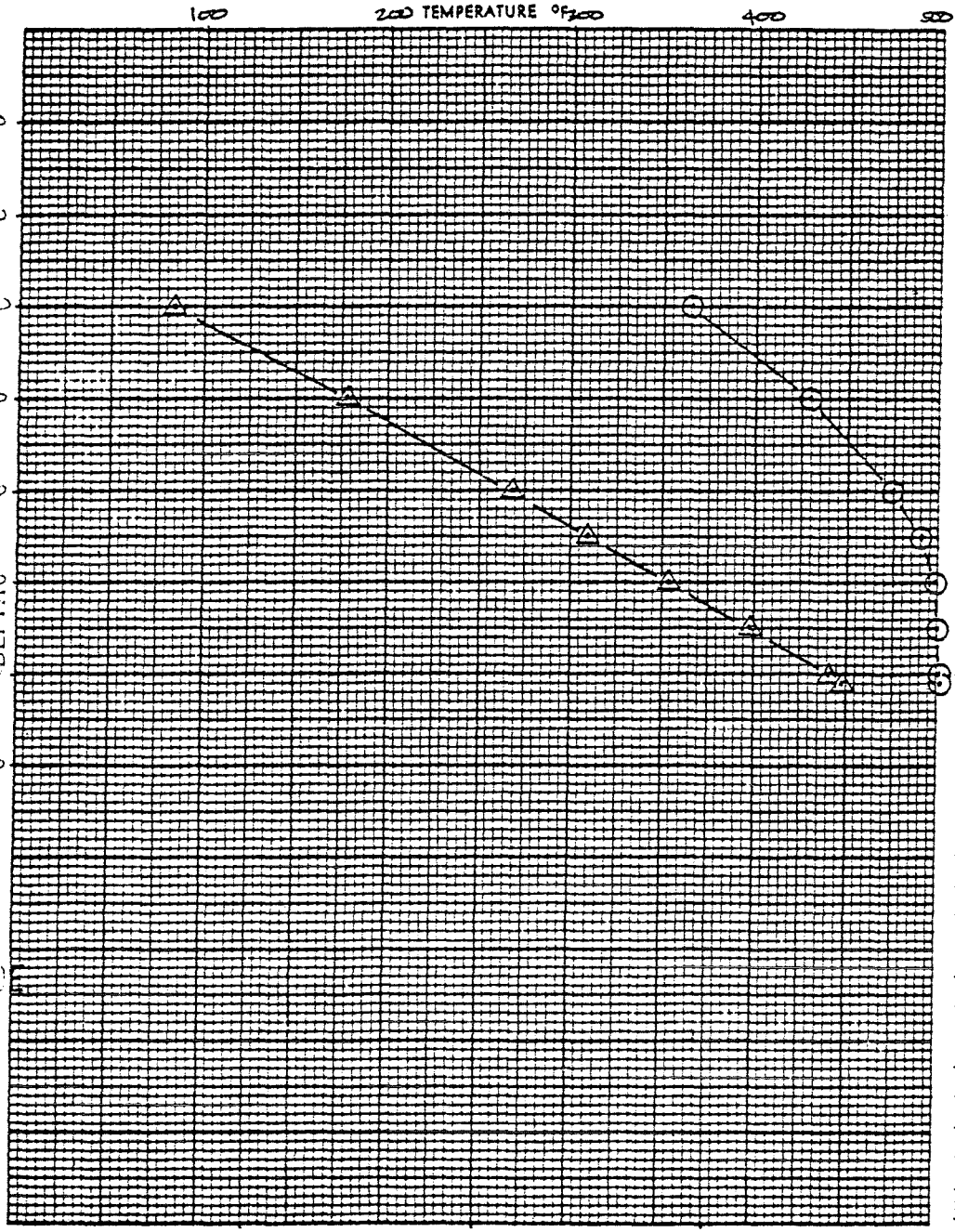
HOLE DESCRIPTION:

4575 PSI INSTRUMENT 93-618 FAHR.

KPC 14101 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550 FT. MAX. TEMP. 502 °F @ 3550'

REMARKS: PRIOR TO WATER INJECTION



STABLIZATION PERIOD

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
1500	365	168	—
2000	430	355	0.374
2500	474	537	0.364
2750	490	619	0.328
3000	498	708	0.356
3250	500	797	0.356
3500	501	883	0.344
3550	502	897	0.280

⊙ TEMPERATURE
△ PRESSURE

R.O. ENGEBRETSEN

OCT 20 1981

BY: JPR

CSTD

Union Geothermal Co. of New Mexico

B24-S15 P/T

SURVEY DATE: 10-20-81

TITLE BACA NO. 24 TEMP/PRESS GRADIENT SURVEY TO 3550 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPC 14191
RANGE	: 93-618°F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 18338	CLOCK: 12 HRS.	: S/N: 12880

WHP AT START OF SURVEY : 2 PSIG

WHP AT END OF SURVEY : 7" Hg. PSIG

OPENED WELL TO ELEMENT : 0650 HRS.

POH : 1746 HRS.

R.O. ENGEBRETSEN

OCT 22 1981

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

1 MOS., 4 DAYS, 21 HRS., 11 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0039 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	2500	0654-0709	0.286	188	0.209	0.212	405	WATER INJECTION IN PROGRESS
2	3000	0711-0722	0.318	198	0.297	0.301	703	
3	3500	0724-0735	0.341	205	0.387	0.393	918	
4	3550	0751	0.356	210	0.395	0.401	937	
		0806	0.356	210	0.395	0.401	937	@ 0940 HRS. TO 0950 HRS. INJECTION RATE DROPPED TO 205 GPM AND WATER TEMP. GOES DOWN TO 80°F, DUE TO DRILLING WATER DEMAND. CONSISTENT WATER TEMPERATURE WAS NOT REGAIN UNTIL 1225 HRS.
		0826	0.355	210	0.395	0.401	937	
		0906	0.353	209	0.395	0.401	937	
		0936	0.353	209	0.394	0.400	935	
		1006	0.352	209	0.398	0.404	944	
		1021	0.341	205	0.398	0.404	944	
		1036	0.303	193	0.398	0.404	944	
		1051	0.274	184	0398	0.404	944	
		1106	0.258	179	0.398	0.405	946	
		1121	0.248	175	0.399	0.406	949	
		1136	0.242	173	0.399	0.406	949	
		1151	0.240	173	0.398	0.405	946	
	V	1221	0.230	172	0.398	0.405	946	

Union Geothermal Co. of New Mexico

B24-S15 P/T

SURVEY DATE: 10-20-81

TITLE B24-S15 P/T (CON'T.)

TEMP. EL. S/N	:	PRESS. EL. S/N	:
RANGE	:	RANGE	:
CALIBRATED	:	CALIBRATED	:
CLOCK: HRS.	: S/N:	CLOCK: HRS.	: S/N:

WHP AT START OF SURVEY : PSIG

WHP AT END OF SURVEY : PSIG

OPENED WELL TO ELEMENT : HRS.

POH : HRS.

R.O. ENGEBRETSEN
OCT 22 1981

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

MOS., DAYS, HRS., MINS.

DATE AND TIME OF LATEST S. I. (FT. NO.) HRS. 19

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
4	3550'	1251	0.230	172	0.300	0.406	940	
		1321	0.247	175	0.300	0.406	940	
		1336	0.275	184	0.400	0.406	940	WATER
		1351	0.290	189	0.400	0.406	940	INJECTION
		1406	0.298	192	0.400	0.406	940	IN
		1421	0.303	193	0.400	0.406	940	PROGRESS
		1436	0.308	195	0.401	0.407	951	
		1506	0.313	196	0.401	0.407	951	
		1536	0.315	197	0.401	0.407	951	INJECTION RATE
CSTDOE		1606	0.318	198	0.401	0.407	951	≈ 245 GPM
		1626	0.318	198	0.402	0.408	953	
		1706	0.319	198	0.402	0.408	953	
	↓	1746	0.319	198	0.402	0.408	953	

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B24 - S1S P/T

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA № 24

CASING 20" @ 782' ; 13⅜" @ 2938' ELEV. 8740' DATE: 10-20-81

LINER DESCRIPTION: ZERO POINT KB

7" LINER @ 2838'-3589' DEPTH 3589 FT.

HOLE DESCRIPTION:

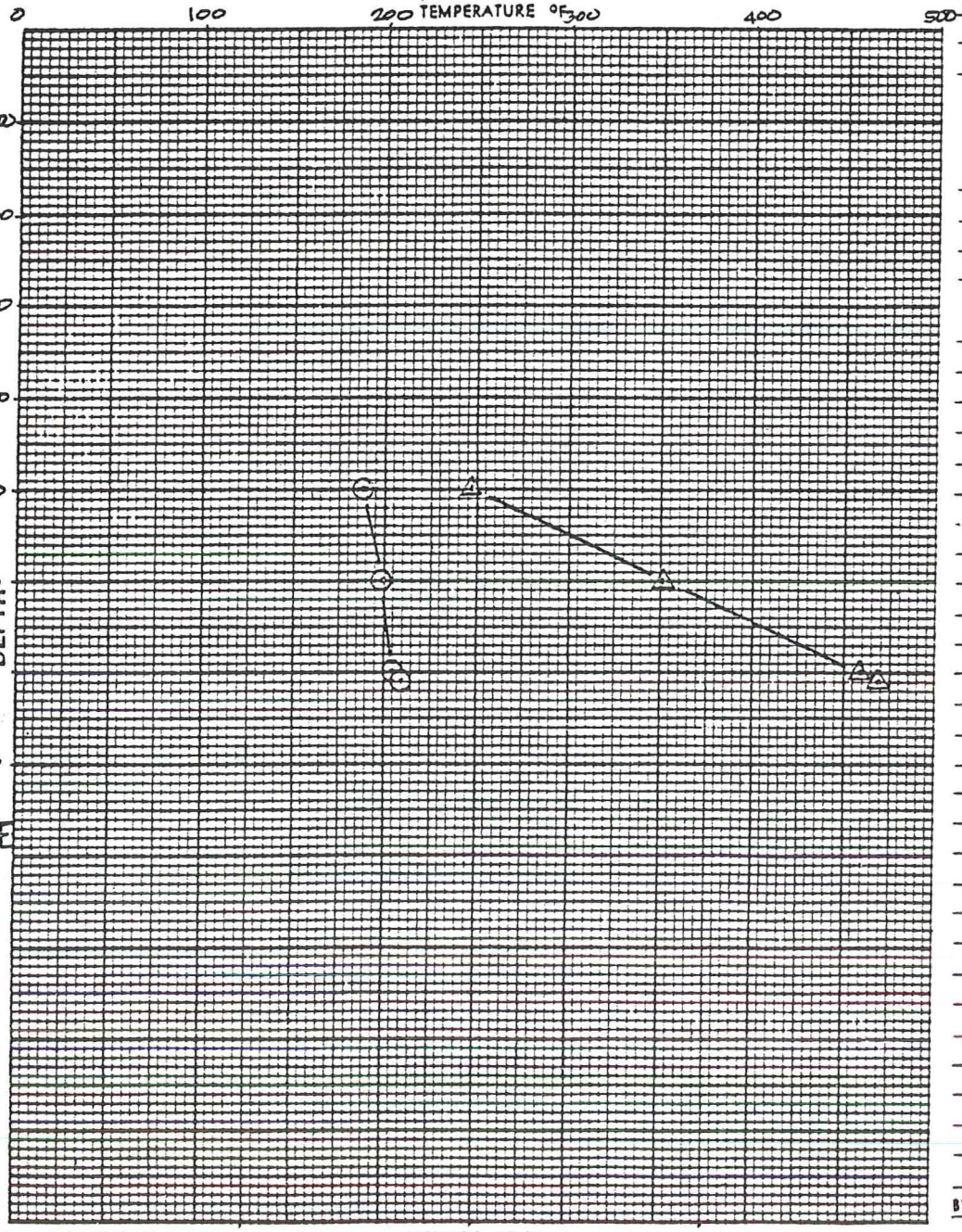
4575 PSI INSTRUMENT 93-618 FAHR.

KPC 14191 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550 FT. MAX. TEMP. 210 °F @ 3550'

REMARKS: WATER INJECTION IN PROGRESS

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
2000	188	905	—
3000	198	703	0.416
3500	205	918	0.430
3550	210	937	0.380

⊙ TEMPERATURE

△ PRESSURE

R.O. ENGEBRETSEN

OCT 2 1981

BY: JFB

CSTDOE

Union Geothermal Co. of New Mexico

B24-S16 P/T

SURVEY DATE: 10-21-81

TITLE BACA NO 24 TEMP/PRESS GRADIENT SURVEYS TO 3550 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 14191
RANGE	: 93-618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11-10-76	CALIBRATED	: 4-17-81
CLOCK: 12 HRS.	: S/N: 18338	CLOCK: 12 HRS.	: S/N: 12880

WHP AT START OF SURVEY : 8 "Hg. PSIG

WHP AT END OF SURVEY : 9 "Hg. PSIG

OPENED WELL TO ELEMENT : 1010 HRS.

POH : 1212 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

1 MOS., 6 DAYS, 0 HRS., 31 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0030 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	2500	1017-1028	0.276	184	0.216	0.219	512	
2	2750	1029-1039	0.290	189	0.261	0.265	619	
3	3000	1040-1050	0.301	192	0.305	0.310	724	WATER INJECTION IN PROGRESS
4	3250	1051-1101	0.313	196	0.349	0.354	827	
5	3500	1102-1112	0.315	197	0.392	0.398	930	
6	3550	1112-	0.315	197	0.402	0.408	953	
	"	1152	0.315	197	0.402	0.408	953	
	"	1212	0.316	197	0.402	0.408	953	
CSTDOE								

R.O. ENGEBRETSEN

OCT 22 1981

Union Geothermal Co. of New Mexico

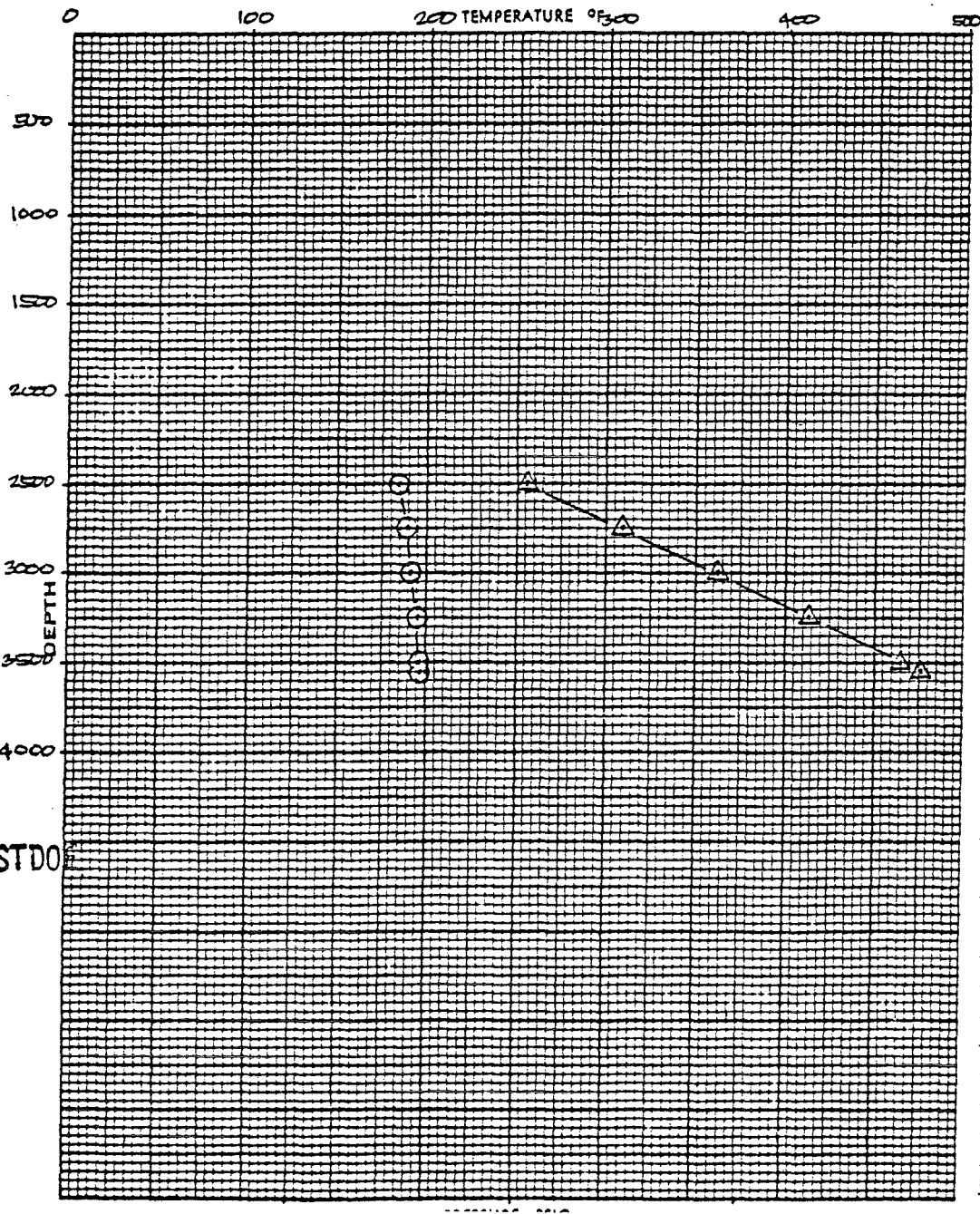
SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B24 - SIG P/T

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA NR 24
CASING 20" @ 782' ; 13 3/8" @ 2038' ELEV. 8740' DATE: 10-21-81
LINER DESCRIPTION: ZERO POINT KB
7" LINER @ 2838' - 3580' DEPTH 3580 FT.

HOLE DESCRIPTION:
4575 PSI INSTRUMENT 93-618 FAHR.
KPG 14191 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550 FT. MAX. TEMP. 107 °F @ 3550'
REMARKS: WATER INJECTION IN PROGRESS



STABLIZATION PERIOD

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
2500	184	512	—
2750	189	610	0.428
3000	192	724	0.420
3250	196	827	0.412
3500	197	930	0.412
3550	197	953	0.460

⊙ TEMPERATURE
△ PRESSURE

R.O. ENGEBRETSEN

OCT 22 1981

BY:

CSTDO

Calculation Record
Union Oil Company of California

UNION

B24-S17

Prepared by	Checked by	Date	Sheet
JPR		10/22/81	of

Title: BACA Nº 24 SPINNER SURVEY

W.O. / A.F.E. no.:

SPINNER SN: 123
CLOCK (3-HR) SN: 24304
WHP @ START/END OF SURVEY: 10" Hg. VAC.
OPENED WELL TO SPINNER: 1012 HRS.
PULL OUT OF HOLE: 1046-30 HRS.

STATION	DEPTH FT.	EXACT TIME @ STATION	Nº OF MARKS	RPM	% OF CPM	REMARKS
1	2750	1015 – 1018	* N.R.	—	—	USED 4 PINS:
2	2900	1018.10 – 1021.10	15	500	100	100 REVOLUTIONS
3	3000	1021.20 – 1024.20	11	366.7	73.34	PER MARK ON
4	3100	1024.32 – 1027.32	7	233.3	46.66	THE CHART.
5	3200	1027.45 – 1030.45	5	166.7	33.34	
6	3250	1030.52 – 1033.52	5	"	"	INJECTION RATE
7	3300	1034.02 – 1037.02	5	"	"	= 248.6 GPM
8	3400	1037.12 – 1040.12	5	"	"	
9	3500	1040.23 – 1043.23	6	200	40.0	
10	3550	1043.30 – 1046.30	8	266.7	53.34	* SPINNER COULD BE
						STUCK AT STATION
						Nº 1.

CSTDOE

R.O. ENGEBRETSEN
OCT 22 1981

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B24 - S17

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA № 24

CASING 20" @ 782' ; 13 3/8" @ 2938' ELEV. 8740' DATE: 10-22-81

LINER DESCRIPTION: 7" LINER @ 2838' - 3580' ZERO POINT KB

DEPTH 3589 FT.

HOLE DESCRIPTION:

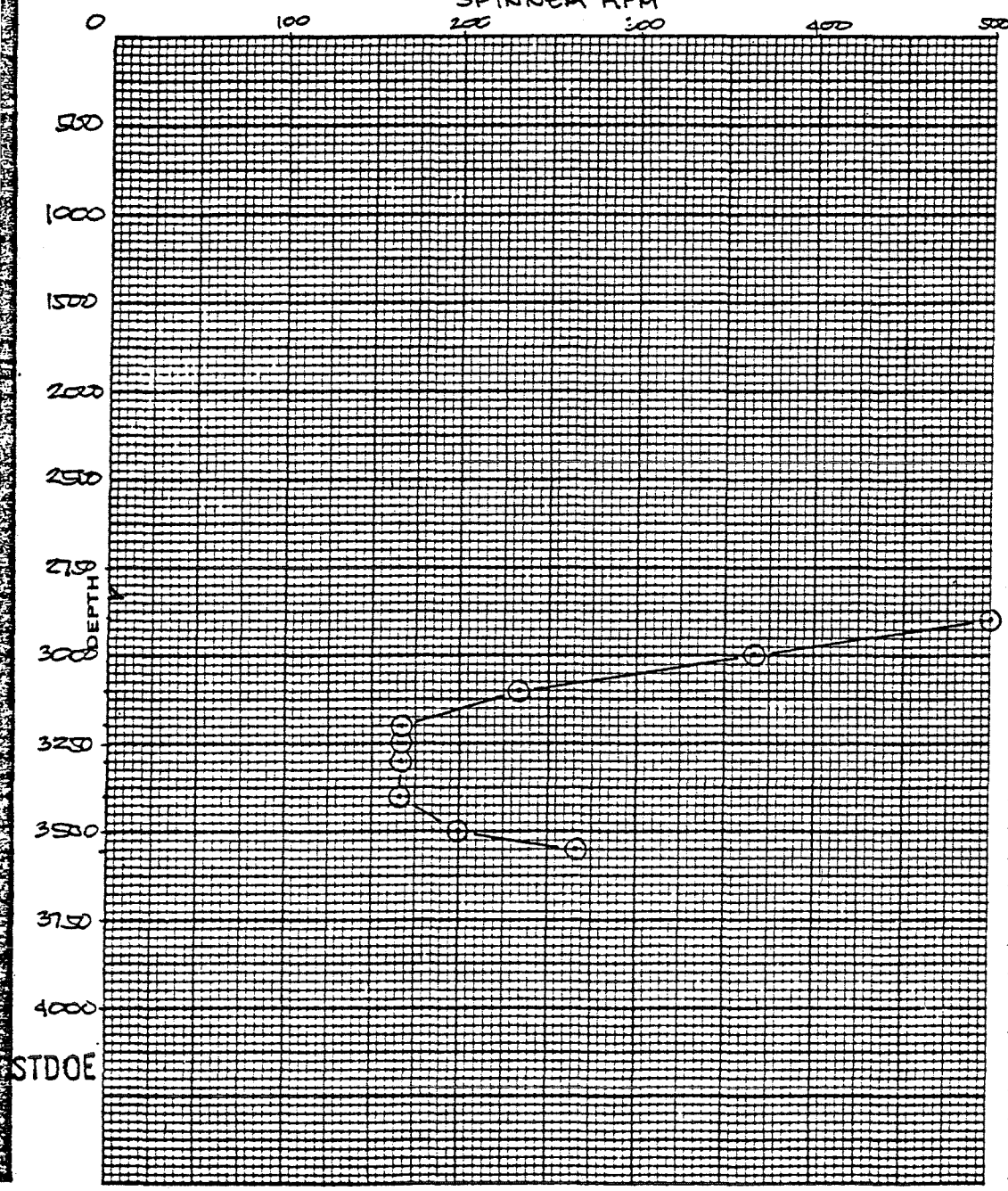
INSTRUMENT FAHR.

SERIAL NO.

PURPOSE SPINNER SURVEY DURING WATER INJECTION. MAX. TEMP. °F @

REMARKS:

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	№ of MARKS	RPM	GRAD.
2750	—	—	
2900	15	500	
3000	11	366.7	
3100	7	233.3	
3200	5	166.7	
3250	5	"	
3300	5	"	
3400	5	"	
3500	6	200	
3550	8	266.7	

INJECTION RATE = 248.6 gpm

R.O. ENGEBRETSEN

OCT 22 1981

BY:

R.O. ENGEBRETSEN

OCT 2 2 1981

Union Geothermal Co. of New Mexico

B24-S 18 P/T

SURVEY DATE: 10-22-81

TITLE BACA NO 24 TEMP/PRESS GRADIENT SURVEY TO 3550 FT.

TEMP. EL. S/N	: KTB 10222	PRESS. EL. S/N	: KPG 14101
RANGE	: 93 - 618 °F	RANGE	: 4575 PSI
CALIBRATED	: 11 - 10 - 76	CALIBRATED	: 4 - 17 - 81
CLOCK: 12 HRS.	: S/N: 18338	CLOCK: 12 HRS.	: S/N: 12889

WHP AT START OF SURVEY : 10" Hg. VAC. PSIG

WHP AT END OF SURVEY : " " " PSIG

OPENED WELL TO ELEMENT : 1347 HRS.

POH : 1540 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

1 MOS., 7 DAYS, 4 HRS., 08 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0930 HRS. 9-15-1981

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	2750'	1355-1408	0.289	189	0.258	0.262	612	
2	2900	1409-1419	0.306	194	0.280	0.284	664	WATER INJECTION IN PROGRESS
3	3000	1420-1430	0.309	195	0.298	0.302	706	
4	3100	1430-1440	0.311	196	0.315	0.320	748	
5	3200	1440-1450	0.318	198	0.333	0.338	790	
6	3250	1450-1500	0.318	"	0.341	0.346	808	
7	3300	1500-1510	0.318	"	0.350	0.355	829	
8	3400	1510-1520	0.317	"	0.369	0.374	874	
9	3500	1520-1530	0.321	199	0.386	0.392	916	
10	3550	1530-1540	0.326	201	0.395	0.401	937	
CSTDOE								

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B24-S18 P/T

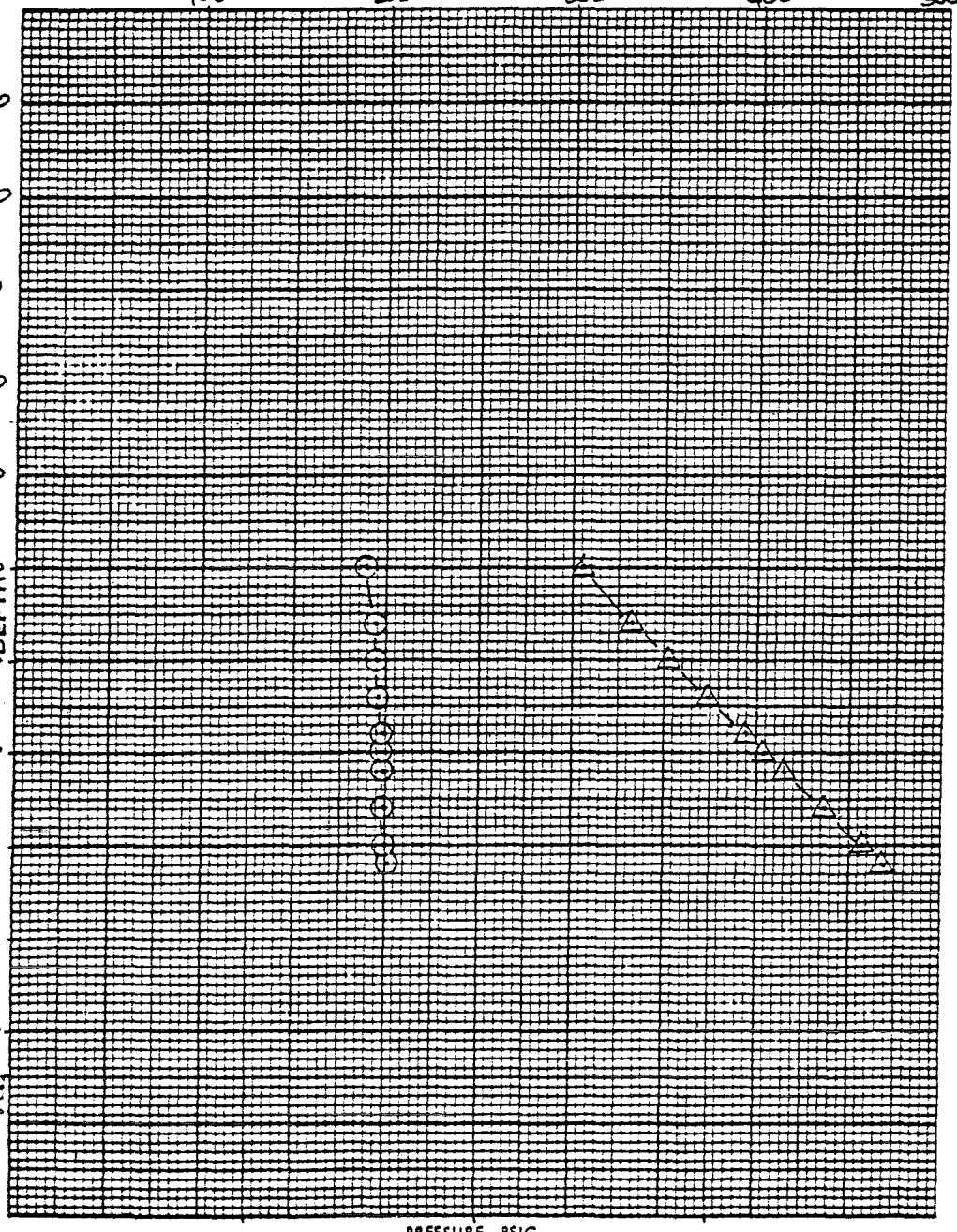
OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA No 24
CASING 20" @ 782' ; 13 3/8" @ 2038' ELEV. 8740' DATE: 10-22-81
LINER DESCRIPTION: 7" LINER @ 2838' - 3580' ZERO POINT KB
DEPTH 3580 FT.

HOLE DESCRIPTION:

4575 PSI INSTRUMENT 93-618 FAHR.
KPG 14191 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550 FT. MAX. TEMP. 201 °F @ 3550'
REMARKS: WATER INJECTION IN PROGRESS

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
2750	180	612	—
2900	194	664	0.346
3000	195	706	0.420
3100	196	748	0.420
3200	198	790	0.420
3250	"	808	0.360
3300	"	829	0.420
3400	"	874	0.450
3500	199	916	0.420
3550	201	937	0.420

⊙ TEMPERATURE
△ PRESSURE

R.O. ENGEBRETSEN
OCT 26 1981

BY: JPR

STDOE

R.O. ENGEBRETSEN

NOV 0 2 1981

RUN NO. B24-S19 P/P

Union Geothermal Co. of New Mexico

SURVEY DATE: 10-24-81

TITLE BACA NO 24 PRESS/PRESS FALL OFF SURVEY TO 3550 FT.

PRESS. EL. S/N	: KPG 14101	PRESS. EL. S/N	: KPG 17014
RANGE	: 4575 PSI	RANGE	: 2476 PSI
CALIBRATED	: 4-17-81	CALIBRATED	: 09-10-81
CLOCK: 12 HRS.: S/N:	18338	CLOCK: 12 HRS.: S/N:	12880

WHP AT START OF SURVEY : 11.5 "Hg. VAC. PSIG

WHP AT END OF SURVEY : 62 PSIG

OPENED WELL TO ELEMENT: 0850 HRS.

POH : 1028 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

_____ MOS., _____ DAYS, _____ HRS., _____ MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0030 HRS. 9-15-1981

			PRESSURE			PRESSURE			
Station	Depth	Time at Sta.	Defl.	Corr. Defl.	PSIG	Defl.	Corr. Defl.	PSIG	REMARKS
1	3550'	0900	0.396	0.401	937	0.745	0.765	954	1. STOPPED INJECTION @ 0928 HRS. 10-24-8
		0915	0.396	0.401	937	0.745	0.765	954	
		0928	0.396	0.401	937	0.745	0.765	954	
		0930	0.394	0.400	935	0.743	0.763	951	2. LOST TOOLS W/ WIRELINE ABOUT 1800 FT. DURING POH.
		0932	0.389	0.395	923	0.733	0.753	939	
		0934	0.387	0.393	918	0.720	0.740	934	
		0936	0.386	0.392	916	0.727	0.747	931	3. RECOVERED TOOLS @ 1325 HRS. 10-27-8
		0941	0.385	0.391	914	0.726	0.746	930	
		0946	0.385	0.391	914	0.725	0.745	929	4. BUILD-UP WHP BEFORE FISHING = 144 PSIG
		1001	0.384	0.390	909	0.724	0.744	928	
		1016	0.384	0.390	909	0.723	0.743	926	5. KILLED WELL DURING RECOVERY BY INJECTING 310 GPM FORMATION WATER FOR 2.5 HRS.
		1031	0.383	0.388	907	0.723	0.743	926	
		1101	0.383	0.388	907	0.722	0.742	925	
		1131	0.382	0.387	904	0.722	0.742	925	
		1201	0.382	0.387	904	0.721	0.741	924	
		1231	0.382	0.387	904	0.721	0.741	924	6. CORRECTIONS BASED ON B24-S18 TEMP.
		1301	0.382	0.387	904	0.721	0.741	924	

ESTDOE

RUN NO. B24-S10 P/P

Union Geothermal Co. of New Mexico

SURVEY DATE: 10-24-81

R.O. ENGEBRETSEN

NOV 02 1981

TITLE B24-S10 P/P (CON'T.)

PRESS. EL. S/N	:	PRESS. EL. S/N	:
RANGE	:	RANGE	:
CALIBRATED	:	CALIBRATED	:
CLOCK: HRS.:	S/N:	CLOCK: HRS.:	S/N:

WHP AT START OF SURVEY : PSIG

WHP AT END OF SURVEY : PSIG

OPENED WELL TO ELEMENT: HRS.

POH : HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

MOS., DAYS, HRS., MINS.

DATE AND TIME OF LATEST S. I. (FT. NO.) HRS. 19

			PRESSURE			PRESSURE			
Station	Depth	Time at Sta.	Defl.	Corr. Defl.	PSIG	Defl.	Corr. Defl.	PSIG	REMARKS
1	3550'	1331	0.382	0.387	904	0.720	0.740	923	
		1401	0.382	0.387	904	0.720	0.740	923	
		1431	0.382	0.387	904	0.719	0.739	921	
		1501	0.383	0.388	907	0.719	0.739	921	
		1531	0.382	0.387	904	0.719	0.739	921	
		1601	0.382	0.387	904	0.719	0.739	921	
		1631	0.382	0.387	904	0.718	0.738	920	
		1701	0.382	0.387	904	0.718	0.738	920	
		1731	0.382	0.387	904	0.718	0.738	920	
		1801	0.382	0.387	904	0.718	0.738	920	
CSTDOE		1831	0.382	0.387	904	0.717	0.737	919	
		1901	0.382	0.387	904	0.717	0.737	919	
	V	1928	0.382	0.387	904	0.717	0.737	919	

R.O. ENGEBRETSEN

FEB 1 1 1982

B-24-S 20 P/T

Union Geothermal Co. of New Mexico

SURVEY DATE: 1-20-82

TITLE BACA No 24 TEMP/PRESS GRADIENT SURVEY TO 3550 FT.

TEMP. EL. S/N	: KTB 23338	PRESS. EL. S/N	: KPG 22390
RANGE	: 1 - 680 °F	RANGE	: 3,250 PSI
CALIBRATED	: 10-16-81	CALIBRATED	: 9-1-81
CLOCK: 12 HRS.	: S/N: 14087	CLOCK: 12 HRS.	: S/N: 12890

WHP AT START OF SURVEY : 156 PSIG

WHP AT END OF SURVEY : 156 PSIG

OPENED WELL TO ELEMENT : 1306 HRS.

POH : 1513 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY

4 MOS., _____ DAYS, _____ HRS., _____ MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 3) 0930 HRS. 9-15-1981

SHUT-IN WATER INJECTION - @ 0928 HRS, 10-24-81

			TEMPERATURE		PRESSURE			
Station	Depth	Time at Sta.	Defl.	°F	Defl.	Corr. Defl.	PSIG	REMARKS
1	0	1306-1316	0.106	47	0.091	—	148	
2	500	1318-1328	0.507	182	0.092	—	150	
3	1000	1329-1339	1.030	358	0.092	—	150	
4	1500	1340-1350	1.046	363	0.108	—	176	
5	2000	1352-1402	1.221	421	0.221	—	360	
6	2500	1404-1414	1.364	468	0.329	0.331	539	
7	2750	1416-1426	1.418	486	0.382	0.385	625	
8	3100	1428-1438	1.441	494	0.434	0.437	709	
9	3450	1440-1450	1.453	498	0.486	0.489	793	
10	3500	1452-1502	1.455	499	0.539	0.543	879	
11	3550	1503-1513	1.458	500	0.540	0.553	896	

R.O. E BRETSEN

FEB 1 1 1982

Union Geothermal Co. of New Mexico

B24-S20 P/T

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CREEK WELL NAME BACA No. 24

CASING 20" @ 782' ; 13 3/8" @ 2938' ELEV. 8740' DATE: 1-29-82

LINER DESCRIPTION: 7" LINER @ 2838' - 3589' ZERO POINT GL + 12'

DEPTH 3589 FT.

HOLE DESCRIPTION:

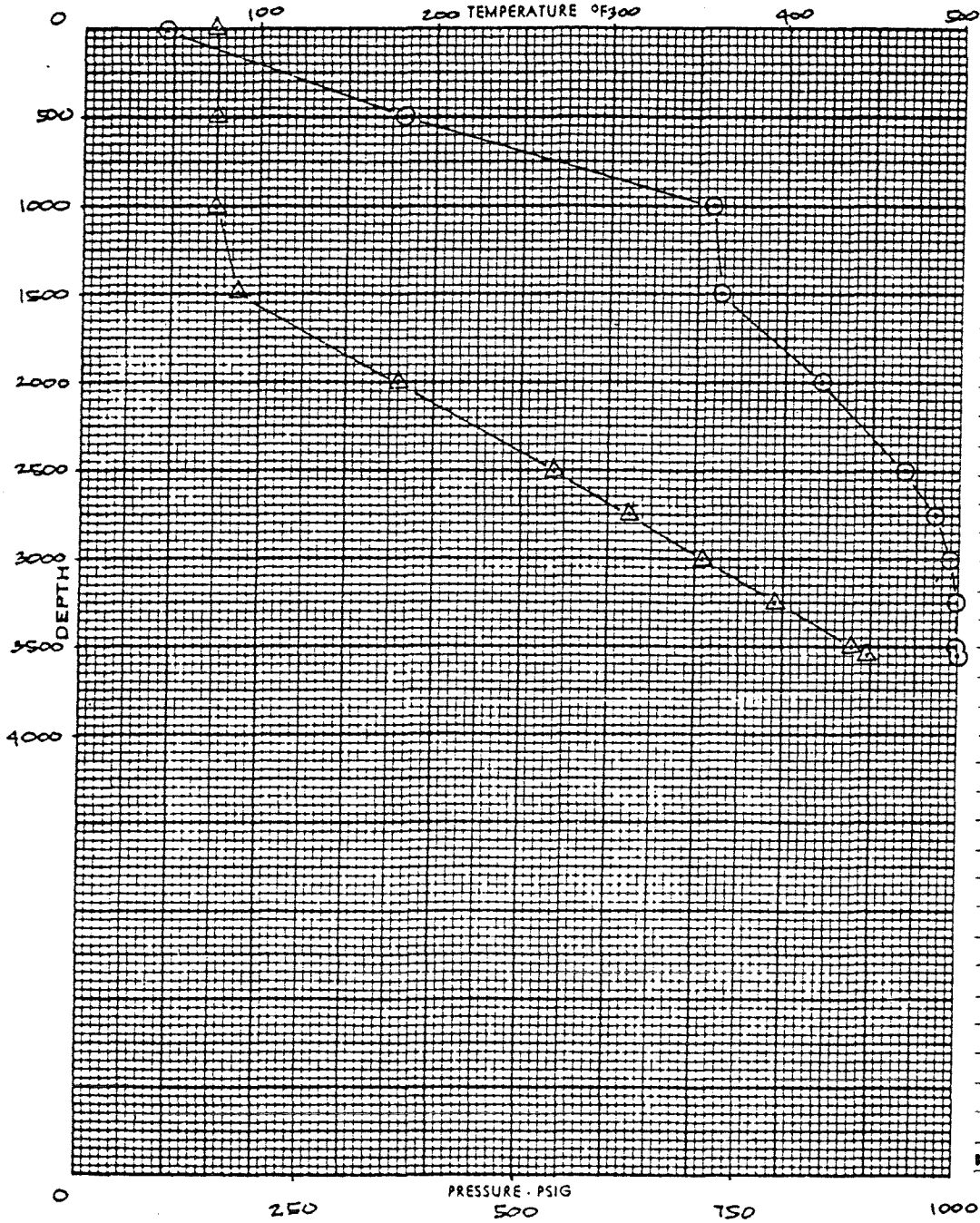
3250 PSI INSTRUMENT 1-680 FAHR.

KPC 22390 SERIAL NO. KTB 23338

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 3550 FT. MAX. TEMP. 98 °F @ 3550'

REMARKS: PRIOR TO SPERRY-SUN INSTALLATION

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI	156	148

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	47	148	—
500	182	150	—
1000	358	150	—
1500	363	176	0.052
2000	421	360	0.368
2500	468	539	0.358
2700	486	625	0.344
3000	494	709	0.336
3050	498	793	0.336
3500	499	879	0.344
3550	500	896	0.340

○ TEMPERATURE

△ PRESSURE

BY: