

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501

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SUNDRY NOTICES AND REPORTS
ON
GEOTHERMAL RESOURCES WELLS

5. Indicate Type of Lease
State Fee

5.a State Lease No.

Not Use This Form for Proposals to Drill or to Deepen or Plug Back to a Different Reservoir. Use "Application Permit -" (Form G-101) for Such Proposals.)

Type of well Geothermal Producer Temp. Observation
 Low-Temp Thermal Injection/Disposal

7. Unit Agreement Name

Name of Operator
Union Geothermal Company of New Mexico

8. Farm or Lease Name
Baca Location No. 1

Address of Operator
P. O. Box 15225, Rio Rancho, New Mexico 87174

9. Well No.
Baca 20

Location of Well
Unit Letter (E) 1280 Feet From The West Line and 1495 Feet From

10. Field and Pool, or Wildcat
Redondo Creek

The North Line, Section 12 Township 19N Range 3E NMPM.



15. Elevation (Show whether DF, RT, GR, etc.)
9065'GL ; 9089'KB

12. County
Sandoval

Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK PLUG AND ABANDON
 TEMPORARILY ABANDON
 REPAIR OR ALTER CASING CHANGE PLANS
 OTHER

SUBSEQUENT REPORT OF:

REMEDIAL WORK ALTERING CASING
 COMMENCE DRILLING OPNS. PLUG & ABANDONMENT
 CASING TEST AND CEMENT JOB
 OTHER

Describe Proposed or completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work) SEE RULE 203.

The original 7" slotted liner was pulled and the well plugged back to 4890'. A 7" blank casing liner was cemented 2383'-4880'. The hole was cleaned out to 5120'. A hydro-frac stimulation was performed using 57,000 lbs. 100 and 200 mesh CaCO₃ and 344,000 lbs. 12/20 and 16/20 mesh sintered bauxite mixed 2 to 12 ppg with gelled water and injected at 40-80 BPM with 3800-1800 psig. The hole was cleaned out and a 5½" pre-perforated flush joint liner was installed from 4760' to 5131'.

SEE ATTACHED DETAILED WELL HISTORY

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNED R.O. Engbretsen TITLE Area Manager DATE 11/10/81
R. O. Engbretsen

DDOE

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501

GEOHERMAL RESOURCES WELL SUMMARY REPORT

Operator Union Geothermal Co. of New Mexico Address Rio Rancho, New Mexico
 Well Name BACA Location #1 Well No. BACA #20 STIMULATION
 Section Letter E Sec. 12 Twp. 19N Rge 3E
 Reservoir Redondo Creek County Sandoval

Commenced ~~XXXX~~ remedial 09-12-81
 Completed ~~XXXX~~ remedial 10-13-81

GEOLOGICAL MARKERS DEPTH
See original history

Total depth 6374' Plugged depth 5134'
547' of drilling assembly from 5827'-6374'

Commenced producing Not produced
 (Date)

Geologic age at total depth: _____

Static test		Production Test Data								
Shut-in well head		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
<u>NOT TESTED</u>										

CASING RECORD (Present 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
20"	94#	K-55	N	S	280	Surf.	890 ft ³	Surface	Visual
13-3/8"	54.5#	K-55	N	S	1415	Surf.	2374 ft ³	Surface	Visual
9-5/8"	40#	K-55	N	S	2505	Surf.	1673 ft ³	Surface	Visual
7"	26#	K-55	N	S	4880	2383	1278 ft ³	2383'	Squeeze lap
5-1/2"	17#	K-55	N	S	5131	4760	0	--	--

PERFORATED CASING

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

8 rows, 3" centers, 1/2" drilled holes from 4891' to 5131'

Analysis of effluent made? NO Electrical log depths 5133' Temperature log depths 5130'

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.

DAE

11/1/81

NEW MEXICO OIL CONSERVATION COMMISSION
P. O. Box 2088, Santa Fe 87501

GEOHERMAL RESOURCES WELL HISTORY

Operator Union Geothermal Co. of New Mexico Address Rio Rancho, New Mexico
Well Name BACA Location #1 Well No. BACA #20 STIMULATION
Unit Letter E Sec. 12 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.)

Detailed well history attached.

CSTDOE

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.

PO [Signature]

Area Manager

11/1/74

- 09-12-81 Completed move-in and rig-up of Brinkerhoff-Signal rig #78. Rig on day rate at 0800 hours, 9/12/81. Blew down and killed well. Removed well head equipment. Drilled and set rat hole.
- 09-13-81 Nippled up BOPE on master valve. Replaced rams. Rigged up separator. Picked up 3-1/2" drill pipe.
- 09-14-81 Scraped 9-5/8" casing to 7" liner top at 2404'. POH. Made up 6-1/8" bit and scraper. RIH with 3-1/2" drill pipe. Scraped 7" casing from 2404' to 5821'. Made up Bowen 7" casing spear.
- 09-15-81 RIH with spear to 7" liner at 2404'. Unable to set spear. POH. Found grapple missing. RIH with 6-1/8" bit to check liner top. POH. RIH with ten 6-1/2" drill collars, jars, bumper sub and new Bowen 7" spear. Engaged 7" liner at 2410'. Pulled liner free. POH, laid down fishing tools. Laid down 83 joints 7" 26# K-55 LT&C 8-round casing (perforated and blank). RIH with 8-3/4" bit and ten 6-1/2" drill collars.
- 09-16-81 RIH with 8-3/4" bit to top of existing fish at 5827' with no fill or obstructions. Rigged up Schlumberger. Ran Induction and Gamma Ray from 2505' to 5845'. Ran Dipmeter from 2475' to 5842'. Ran Sonic log from 2545' to 4843'. Tool failed. Replaced tool.
- 09-17-81 Rigged down Schlumberger. Displaced sand through OEDP at various depths in 4 operations. A total of 168 cu. ft. of sand displaced with 370 cu. ft. water. Found sand, after 4th attempt to bridge hole, at 5688'. POH to 5505'. Pumped sand through OEDP at 5055, 42 cu. ft. sand displaced with 112 cu. ft. water. POH to 4998' to allow settling.
- 09-18-81 Located top of sand at 5592'. POH to 5414' with 3-1/2" drill pipe. Pumped sand plug #6, 42 cu. ft. sand, followed by 112 cu. ft. water. POH to 4763'. Found sand at 5516'. Pumped sand plug

CSTDOE

09-18-81 // Continued

#7, 42 cu. ft. sand, displaced with 112 cu. ft. water through OEDP at 5320'. Located sand top at 5511'. Displaced sand plug #8 as before. Located sand plug top at 5324'. Worked sand plug to 5400'. Hung OEDP at 5400'. HOWCO mixed and pumped 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel and 0.5% CFR-2 with 0.4% HR-7. Displaced with 359 cu. ft. water. CIP at 1800 hours. POH to 2450'. WOC.

09-19-81

WOC. RIH to cement at 5060'. Circulated and cleaned down to 5079'. displaced sand plug #9, 42 cu. ft. sand followed by 56 cu. ft. water. POH to 4293'. Displaced plug #10 on top of previous plug located at 4984', 42 cu. ft. sand followed by 56 cu. ft. water. Displaced sand plug #11 from 4914' to 4873'. Hung OEDP at 4850'. HOWCO mixed and pumped 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 387 cu. ft. water. CIP at 1400 hours. POH. WOC 8 hours. Located cement at 4835'. Unable to fill hole. HOWCO pumped plug #3, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 354 cu. ft. water. CIP at 2400 hours. POH to 2400'. WOC.

09-20-81

RIH to cement at 4618'. Unable to fill hole. POH to 3981'. HOWCO pumped plug #4, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 291 cu. ft. water. CIP at 1000 hours. POH. WOC. RIH to cement at 4361'. Filled hole with 300 barrels water. Circulated with 10% returns. POH to 3825'. HOWCO pumped plug #5, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 7.76 cu. m (274 cu. ft.) water. CIP at 2000 hours. POH to 2400'. WOC.

EST002

- 09-21-81 WOC (total 8 hours). RIH to cement at 4320'. Filled hole with 210 bbls water. Circulated with 25% returns. POH to 3825'. HOWCO pumped plug #6, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, and 0.5% CFR-2. Displaced with 274 cu. ft. water. CIP at 0615 hours. POH to 2400'. RIH to cement at 3721'. Filled hole with 100 bbls water. Circulated, losing 30 bbls/hour. POH. RIH with 8-3/4" bit to 3721'. Cleaned out cement to bottom of cement plug at 3934', losing 30 bbls/hour. Loss increased to 150 bbls/hour. RIH to 4260'. Cleaned out cement to 4280', losing 150 bbls/hour. POH.
- 09-22-81 POH. RIH with OEDP to 3950'. Cooled hole. HOWCO pumped plug #7, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, and 0.5% CFR-2. Displaced with 285 cu. ft. water. CIP at 0300 hours. POH to 2400'. WOC 6 hours. RIH to cement at 3767'. Circulated, losing 40 bbls/hr. POH. RIH with 8-3/4" bit to 3767'. Cleaned out cement, losing 40 bbls/hr, from 3767' to bottom of cement plug at 3997'. Loss increased to 180 bbls/hour. RIH to 4309'. Circulated and POH. RIH with OEDP to 4106'. Cooled hole. HOWCO pumped plug #8, 125 cu. ft. class "H" cement with 0.5% CFR-2. Displaced with 297 cu. ft. water. CIP at 2220 hours. POH to 2425'. WOC.
- 09-23-81 WOC total 6 hours. RIH to top of cement at 3850'. Filled hole with 75 bbls water. Circulated, losing 120 bbls/hour. Hung OEDP at 3825'. HOWCO pumped plug #9, 125 cu. ft. "H" cement with 0.5% CFR-2. displaced with 269 cu. ft. water. CIP at 0600 hours. WOC 6 hours. RIH with OEDP to cement at 3520'. Filled hole with 50 bbls water. Circulated, losing 50 bbls/hour. RIH with 8-3/4" bit to 3455'. Reamed to 3520'. Cleaned out cement to 4099', losing 40 bbls/hour.
- 09-24-81 Cleaned out cement from 4099' to 4643'. Lost all returns at 4643'. Cleaned out with no returns to 4650'. POH. RIH with OEDP to 4632'. filled hole. HOWCO pumped plug #10, 125 cu. ft. "H" cement with 0.5% CFR-2. Displaced with 330 cu. ft. water. CIP at 1140 hours. POH. WOC. RIH to cement at 4460. Filled hole with 210 bbls

09-24-81' Continued

bbls water. Circulated, losing 220 bbls/hour. Hung OEDP at 4415'. HOWCO pumped plug #11, 125 cu. ft. "H" cement with 0.5% CFR-2. Displaced with 325 cu. ft. water. CIP at 1940 hours.

09-25-81 WOC. RIH to cement at 4199'. Filled hole with 65 bbls water. Circulated, losing 200 bbls/hour. POH. RIH with 8-3/4" bit to 4199'. Cleaned out cement from 4199' to 4395'. POH. RIH with OEDP to 3919'. Cooled hole. HOWCO pumped plug #12: 125 cu. ft. class "H" cement with 0.5% CFR-2. Displaced with 280 cu. ft. water. CIP at 1400 hours. POH. Mixed mud. RIH with 8-3/4" bit to 2431'. Displaced water with mud. Mixed mud. RIH to 3594'. Cleaned out cement from 3594' to 3620' (losing 20 bbls/hour) at 2400 hours.

09-26-81 Cleaned out cement from 3620' to 3920', losing 20 bbls/hour. RIH to 4359'. Cleaned out cement from 4359' to bottom of cement at 4684', losing 20 bbls/hour. Loss increased to 125 bbls/hour. Reamed and cleaned out cement stringers from 4684' to 4820' with loss increasing to 230 bbls/hour. Cleaned out cement from 4820' to 4825'. Circulated clean and POH.

09-27-81 Continued POH. RIH with OEDP to 4820'. Cooled hole. HOWCO pumped plug #13 of 125 cu. ft. class "H" cement with 0.5% CFR-2. Displaced with 358 cu. ft. water. CIP at 0310 hours. POH to 2400'. WOC and mixed mud. RIH with OEDP to cement at 4632'. Circulated, losing 25 bbls/hour. POH. RIH with 8-3/4" bit to 4562'. Circulated and conditioned mud. Reamed from 4562' to 4897'. Circulated. Hole taking 300 bbls/hour. Circulated with aerated mud. Cleaned out sand and cement from 4897' to 4938'.

09-28-81 Cleaned out sand and cement from 4938' to 5120'. Circulated. POH. RIH with saw-tooth single to 4882'. Pumped plug #12, 42 cu. ft. sand, displaced with 224 cu. ft. water. Sand in place at 1045 hours. No sand build-up. Hung OEDP at

09-28-81 Continued

4882'. Repeated sand plug, #13 as before. Sand in place at 1430 hours. Hole bridged at 4892'. Cleaned out bridge. Found top of plug #13 at 4944'. Hung OEDP at 4788'. Pumped plug #14, 15 cu. ft. sand, displaced with 224 cu. ft. water, in place at 1915 hours. Waited on sand to fall. found sand top at 4908'. Hung OEDP at 4882'. HOWCO mixed and pumped 42 cu. ft. "H" cement with 0.5% CFR-2 and 0.2% HR-7. Displaced with 389 cu. ft. water. CIP at 2200 hours. POH. WOC.

09-29-81

WOC. RIH. Tagged top of cement at 4775'. Circulated. Hole took 294 bbls/hour fluid. Hung OEDP at 4757'. HOWCO mixed and pumped 125 cu. ft. "H" cement with 0.5% CFR-2 and 0.2% HR-7. Displaced with 325 cu. ft. water. CIP at 1230 hours (Plug #15.) POH to 3827'. Squeezed away 9 bbls fluid. POH. WOC. Mixed Gel and mica. RIH to 4204' with bit. Circulated with hole taking 66 bbls/hour fluid. Conditioned mud. Hole taking 25 bbls mud per hour.

09-30-81

WOC 12 hours. Tagged cement stringers at 4433'. Cleaned out to 4500'. Cleaned out firm cement from 4500' to 4890'. Hole taking 25 bbls/hour. Wiped hole. POH. Ran 59 joints 26 $\frac{1}{2}$ " K-55 8-round LT&C casing. Worked casing with circulation from 4820' to 4880'. Circulated.

10-01-81

Hung 7" casing on Midway 9-5/8" x 7" liner hanger at 2383' with shoe at 4880'. HOWCO pumped 112 cu. ft. pre-flush, 56 cu. ft. water, 133 cu. ft. Flo-Chek, 112 cu. ft. water, followed by 835 cu. ft. "H" cement with 50 lbs/sack Spherelite, with 40% SSA-1, 4% Gel, 5% Lime, 1% CFR-2 and 0.4% HR-7, plus 230 cu. ft. "H" cement with 40% SSA-1, 0.5% CFR-2 and 0.3% HR-7. Displaced with 709 cu. ft. water. CIP at 0230 hours. POH. Laid down liner tools. RIH with 3-1/2" drill pipe to 2473'. Circulated with full returns. No cement to surface. Had full returns to surface during pumping operations. Laid down excess 4-1/2" drill pipe. Picked up tubing (4-1/2" frac. string). Tested liner lap. Pressure bled off from 500 psi to 0 psi, at 100 psi per minute.

- 10-02-81 Changed 10" WKM valve. Tested BOP's and surface equipment to 500 psi. RIH with HOWCO 9-5/8" RTTS set at 2348'. Established rate 4 bbls/minute at 1000 psi. Reset RTTS at 2255'. Backed up tool with 600 psi. Squeezed away 213 cu. ft. "H" cement with 40% SSA-1, 0.5% CFR-2 and 0.2% HR-7. Final pressure = 2000 psi. Reversed out excess cement. CIP at 1000 hours. Pulled tool to 2069'. Set RTTS. Tested lap to 1400 psi. OK. POH. WOC.
- 10-03-81 WOC. RIH. Cleaned out cement from 2231' to 2383'. Circulated. POH. RIH with 6-1/8" bit to 2413'. Tested liner lap to 500 psi, OK. RIH to cement at 4665'. Cleaned out cement from 4665' to bottom of 7" casing at 4880'. Cleaned out cement and sand to 5120'.
- 10-04-81 Displaced gel mud with produced water at 5120'. Circulated hole clean. POH. Bit out of hole at 0300 hours. Rigged and ran bore hole televiewer twice with no results. Installed pipe rams. Ran temperature survey.
- 10-05-81 RIH with 4-1/2" Republic frac. string with 7" Otis high-temperature frac. packer. Hole continued to take 6-8 bbls fluid per hour. Unable to enter 7" liner hanger. POH. Cut notch in bottom joint of tubing. RIH. Entered the 7" liner. Set 7" packer at 2412'. Closed rams on 4-1/2" tubing. Pressured annulus to 500 psi. Western rigged to fracture. Began fracture at 1620 hours. Concluded fracture at 1820 hours. Maximum fracture pressure = 3800 psi. Maximum sand = 12 lbs./gallon. ISIP at conclusion of fracture = 1350 psi. Released packer. POH. Rigged up LASL to run temperature logs.
- 10-06-81 LASL ran temperature log from surface to 5090'. Minimum temperature after 7 hours = 280°F at 4730'. Re-ran log after 4 additional hours. Minimum temperature = 297°F at 4730'. Rigged down LASL. Waited on temperature build-up. Ran Republic temperature survey after 22 hours static. Temperature at 4680' = 308°F. Waited on temperature build-up.

- 10-07-81 Ran in hole with 6-1/8" bit to fill at 4990'. Rigged to clean out with air and water. Cleaned out bridge at 4990' with air and water. Reamed to 5120' with no fill. Circulated. POH. Rigged up Schlumberger. Ran FDC-CNL log from 5129' to 4882'. Ran Fracture Identification log from 5138' to 4882'. Hole took 400 bbls of fluid per hour while logging.
- 10-08-81 Ran Sonic Log from 5133' to 4882'. Attempted without success to adapt borehole televiewer to Schlumberger logging unit. Ran Dual Laterolog from 5128' to 4881'. Rigged down loggers. RIH with 6-1/8" bit to 5134'. No fill. POH. Ran 6 perforated joints 8-3-1/2" holes plus 3 blank joints on top of 5-1/2" 17# K-55 security flush joint casing (371.22'). Hung on Midway "J" slot liner hanger at 4760' with orange-peeled shoe at 5131'. POH. RIH to 3704' with drill pipe. Circulated with air and water, producing 150 bbls/hr fluid.
- 10-09-81 Circulated with air and water. Hole produced a maximum of 220 bbls/hour while circulating. Well died 30 minutes after stopping circulation.
- 10-10-81 RIH with Otis steam packer. Set same at 2966'. Tested annulus above packer to 500 psi. OK. Ran in drill pipe with coiled tubing. Flowed well through drill pipe for 2 hours with N₂. Nitrogen unit failed. Released packer. POH. Dressed packer and reset instruments. Re-ran packer. Ran in drill pipe with coiled tubing. Flowed well through drill pipe with 300 - 500 SCFM N₂ at 2400 hours.
- 10-11-81 Continued to flow well through drill pipe with 300 to 500 SCFM N₂. Discontinued N₂ and shut well in at 0235 hours. Monitored pressure build up for 8 hours. Released packer. POH. RIH with 4-1/2" frac. tubing. POH, laying down tubing. Ran sinker bar to 5120' with no fill or obstructions.

- 10-12-81 Laid down excess 3-1/2" drill pipe. Ran temperature log to 2000'. Found hole too hot to proceed. Cooled hole with 275 bbls water. Ran temperature log from 2000' to 5130'. Injected 1066 bbls water to cool hole. Ran temperature log from 3500' to 5130'. Waited 2 hours. Ran temperature log from 3500' to 5130'. Temperature log showed water exiting around 7" shoe through fracture at 4710' and through perforated liner from 4970' to 5130'. Laid down 3-1/2" and 4-1/2" drill pipe.
- 10-13-81 Nippled down BOPE. Installed second master valve and blank flow tee. Pressured well to 775 psi with air. Released rig for move to BACA #22 deepening at 1400 hours. Rig off Republic. Geothermal time at 1400 hours, 10-13-81.

WACA #20 STIMULATION

CASING DETAIL

<u>NO.</u> <u>FTS.</u>	<u>DESCRIPTION</u>	<u>LENGTH</u>	<u>FEET</u> <u>TOP</u>	<u>BOTTOM</u>
	<u>7" CASING DETAIL</u>			
	7" HOWCO Float Shoe	2.00	4878.00	4880.00
1	7" 26#/ft K-55 8-round Casing	43.76	4834.24	4878.00
	7" HOWCO Float Collar	1.85	4832.39	4878.00
8	7" 26#/ft 8-round Casing	2441.72	2390.67	4832.39
	Liner Hanger	9.00	2381.67	2390.67
		<hr/>	<hr/>	<hr/>
9	Total	2498.33		
	Hung below K.B.:	<u>2381.67</u>		
		4880 T.D.		
	<u>5-1/2" CASING DETAIL</u>			
6	5-1/2" 17#/ft K-55 Sec. Flush Joint Perforated (8-3-1/2" D.H.) Casing	239.62	4891.60	5131.22
3	5-1/2" 17#/ft, K-55 Sec. Flush Joint Casing	126.87	4764.73	4891.60
	Midway J-Slot Liner Hanger	4.73	4760.00	4764.73
		<hr/>		
	Total	371.22		
	Hung below L.B.:	<u>4760.00</u>		
		5231.22 T.D.		

UNION OIL CO. OF CALIFORNIA

GEOHERMAL DIVISION

WELL RECORD

LEASE BACA Location #1
 WELL # 20 Stimulation
 FIELD Recondo Creek
 LOCATION Unit E, Sec. 12, T19N, R3E,
Sandoval County, NM
 S.H.L. _____
 DEPTH: T.D. 5134 T.V.D. 4990 E.T.D. _____
 COMPANY ENGINEER Blackwell, Hamblin

Starting
~~START~~ DATE 9-12-81 COMP. DATE 10-13-81
 CONTRACTOR Brinkerhoff-Signal
 RIG # 78
 ELEVATIONS: GROUND 9065'
 K.B. TO GROUND 24.40
 K.B. TO LOWER CASING HEAD _____
 TYPE WELL: EXPL. _____ DEV. X
 STM _____ HOT WTR X INJ _____
 DRY HOLE _____
 APPROVED _____

CASING RECORD

SIZE	WEIGHT	GRADE	THREAD	TOP	BOTTOM	REMARKS
20"	94#/ft	K-55	Butt	Surf.	280'	
3/8"	54.5#/ft	K-55	Butt	Surf.	1415'	
5/8"	40#/ft	K-55	Butt	Surf.	2505'	Liner
5/8"	40#/ft	K-55	Butt	Surf.	1238'	Tie-back
7"	26#/ft	K-55	LT&C	2383'	4880'	Liner
1/2"	17#/ft	K-55	SFJ	4760'	5131'	Slotted Liner

WELL HEAD ASSEMBLY

	MAKE	TYPE	SIZE	PRESSURE RATING
CASING HEAD SPOOL	WKM	S.O.W.	13-3/8"x12"	900
EXPANSION SPOOL	WKM		12" x 10"	900 x 600
MASTER VALVE(S) (2)	WKM	Pow-R-Seal	10"	600
CASING HEAD VALVES (2)	WKM	Pow-R-Seal	3"	2000
EXPANSION SPOOL VALVES (2)	WKM	Pow-R-Seal	3"	2000
SWAB VALVE	WKM	Pow-R-Seal	3"	2000

STEAM ENTRIES: _____ DEPTH _____ LBS. INCREASE _____

SLOTTED LINER	SLOTS		BLANK	
	FROM	TO	FROM	TO
3 rows, 3" centers, 1/2" drilled holes	4981'	5131'		

TEST DATA _____ ORIFICE SIZE _____
RIG TEST DATE _____ WHP _____ FLP _____ TEMP _____ POUNDS/HOUR _____

REMARKS: The original hole was sidetracked. The sidetracked hole
was plugged back and recompleted for a stimulation treatment

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
7" L. @ 2389' - 5812'
9-5/8" Tie-back @ 0' - 1233'

9/12/81

(69,488)

0 Dys, 5827' ETD, 0' Drld.

Completed move-in and rig-up of Brinkerhoff-Signal rig # 78.
Rig on day rate at 0800 hours, 09-12-81. Blew down and killed
well. Removed well head equipment. Drilled and set rat hole.

9/13/81

(81,957)

1 Day, 5827' ETD.

Nippled up BOPE on master valve. Replaced rams. Rigged up
separator. Picked up 3-1/2" drill pipe.

BACA-20 STIMULATION

Rec'd LSEP 23 198
③

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
7" L. @ 2389' - 5812'
9-5/8" Tie-back @ 0' - 1233'

9/14/81

(99,708)

2 Dys, 5827' ETD, 0' Drld.

Picked up 3-1/2" drill pipe. Made up 8-3/4" scraper assembly. Scraped 9-5/8" casing to 7" liner top at 2404'. POH. Made up 6-1/8" bit and scraper. RIH with 3-1/2" drill pipe. Scraped 7" casing from 2404' to 5821'. POH. Made up Bowen 7" casing spear on bumper sub, jars and drill collars.

Rec'd SEP 23 1981

20 C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
7" L. @ 2389' - 5812'
9-5/8" Tie-back @ 0' - 1233'

9/15/81

(120,845)

3 Dys, 5827' ETD, 0' Drld.

RIH with spear to 7" liner at 2404'. Unable to set spear.
POH. Found grapple missing. RIH with 6-1/8" bit to check
liner top. POH. RIH with ten 6-1/2" drill collars, jars,
bumper sub and new Bowen 7" spear. Engaged 7" liner at 2410'.
Pulled liner free. POH, laid down fishing tools. Laid down 83
joints 7" 26#/ft K-55 LT&C 8-round casing (perforated and
blank). RIH with 8-3/4" bit and ten 6-1/2" drill collars.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
7" L. @ 2389' - 5812'
9-5/8" Tie-back @ 0' - 1233'

9/16/81

(148,730)

4 Dys, 5827' ETD, 0' Drl'd.

RIH with 8-3/4" bit to top of existing fish at 5827' with
fill or obstructions. Rigged up Schlumberger. Ran Inducti
and Gamma Ray from 2505' to 5845'. Ran Dipmeter from 2475'
5842'. Ran Sonic log from 2545' to 4843'. Tool failed.
Replaced tool.

BACA-20 STIMULATION

- 30" C. @ 54'
- 20" C. @ 280'
- 13-3/8" C. @ 1415'
- 9-5/8" L. @ 1233' - 2505'
- 7" L. @ 2389' - 5812'
- 9-5/8" Tie-back @ 0' - 1233'

9/17/81

(173,296)

5 Dys, 5827' ETD, 0' Drld.

Rigged down Schlumberger. Displaced sand through OEDP at various depths in 4 operations. A total of 168 cu. ft. of sand displaced with 370 cu. ft. water. Found sand after fourth attempt to bridge hole, at 5688'. POH to 5505'. Pumped sand through OEDP at 5055, 42 cu. ft. sand displaced with 112 cu. ft. water. POH to 4998' to allow settling.

BACA-20 STIMULATION

Kec 9/28/81 ML

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

9/18/81

(188,111)

6 Dys, 5827' ETD, 0' Drld.

Located top of sand at 5592'. POH to 5414' with 3-1/2" drill pipe. Pumped sand plug #6, 42 cu. ft. sand, followed by 112 cu. ft. water. POH to 4763'. Found sand at 5516'. Pumped sand plug #7, 42 cu. ft. sand, displaced with 112 cu. ft. water through OEDP at 5320'. Located sand top at 5511'. Displaced sand plug #8 as before. Located sand plug top at 5324'. Worked sand plug to 5400'. Hung OEDP at 5400'. HOWCO mixed and pumped 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, and 0.5% CFR-2 with 0.4% HR-7. Displaced with 359 cu. ft. water. CIP at 1800 hours. POH to 2450'. WOC.

9/19/81

(208,901)

7 Dys, 5827' ETD, 0' Drld.

WOC. RIH to cement at 5060'. Circulated and cleaned down to 5079'. Displaced sand plug #9, 42 cu. ft. sand followed by 56 cu. ft. water. POH to 4293'. Displaced plug #10 on top previous plug located at 4984', 42 cu. ft. sand followed by 56 cu. ft. water. Displaced sand plug #11 from 4914' to 4873'. Hung OEDP at 4850'. HOWCO mixed and pumped 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 387 cu. ft. water. CIP at 1400 hours. POH. WOC 8 hours. Located cement at 4835'. Unable to fill hole. HOWCO pumped plug #2, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 354 cu. ft. water. CIP at 2400 hours. POH to 2400'. WOC.

BACA-20 Stimulation (Cont'd)

9/20/81

(231,521)

8 Dys, 4361' PBTD, 0' Drld.

WOC. RIH to cement at 4618'. Unable to fill hole. POH to 3981'. HOWCO pumped plug #4, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 291 cu. ft. water. CIP at 1000 hours. POH. WOC. RIH to cement at 4361'. Filled hole with 300 bbls water. Circulated with 10% returns. POH to 3825'. HOWCO pumped plug #5, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel, 0.5% CFR-2 and 0.4% HR-7. Displaced with 274 cu. ft. water. CIP at 2000 hours. POH to 2400'. WOC.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

9/21/81

(249,431)

9 Dys, 4280' PBTD, 0' Drld.

WOC (total 8 hours). RIH to cement at 4320'. Filled hole with 210 barrels water. Circulated with 25% returns. POH to 3825'. HOWCO pumped plug #6, 125 cu. ft. "H" cement with 1-1 Perlite, 40% SSA-1, 3% Gel and 0.5% CFR-2. Displaced with 274 cu. ft. water. CIP at 0615 hours. POH to 2400'. RIH to cement at 3721'. Filled hole with 100 bbls water. Circulated. Losing 30 bbls/hours. POH. RIH with 8-3/4" bit to 3721'. Cleaned out cement, losing 30 bbls/hour, to bottom of cement plug at 3934'. Loss increased to 150 bbls/hour. RIH to 4260'. Cleaned out cement to 4280', losing 150 bbls/hour. POH.

BACA-20 STIMULATION

30" C. @ 54'

20" C. @ 280'

13-3/8" C. @ 1415'

9-5/8" L. @ 1233' - 2505'

9-5/8" Tie-back @ 0' - 1233'

9/23/81

(289,301)

11 Dys, 4099' PBTD, 0' Drld.

WOC, total 6 hours. RIH to top of cement at 3850'. Filled hole with 75 bbls mud. Circulated, losing 120 bbls/hr. Hung OEDP at 3825'. HOWCO pumped plug #9, 125 cu. ft. "H" cement with 0.5% CFR-2. Displaced with 269 cu. ft. water. CIP at 0600 hours. WOC 6 hours. RIH with OEDP to cement at 3520'. Filled hole with 50 bbls water. Circulated, losing 50 bbls/hr. RIH with 8-3/4" bit to 3455'. Reamed to 3520'. Cleaned out cement to 4900', losing 40 bbls/hr.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

9/24/81

(357,501)

12 Dys, 4460' PBTD, 0' Drld.

Cleaned out cement from 4099' to 4643'. Lost all returns at 4643'. Cleaned out with no returns to 4650'. POH. RIH with OEDP to 4632'. Filled hole. HOWCO pumped plug #10, 125 cu. ft. "H" cement with 0.5% CFR-2. Displaced with 330 cu. ft. water. CIP at 1140 hours. POH. WOC. RIH to cement at 4460'. Filled hole with 210 bbls water. Circulated, losing 220 bbls/hr. Hung OEDP at 4415'. HOWCO pumped plug #11, 125 cu. ft "H" cement with 0.5% CFR-2. Displaced with 325 cu. ft. water. CIP at 1940 hours. POH. WOC.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

9/25/81

(381,551)

13 Dys, 3620' PBTD, 0' Drld.

WOC. RIH to cement at 4199'. Filled hole with 65 bbls water. Circulated, losing 200 bbls/hr. POH. RIH with 8-3/4" bit to 4199'. Cleaned out cement from 4199' to 4393'. POH. RIH with OEDP to 3919'. Cooled hole. HOWCO pumped plug #12: 125 cu. ft. class "H" cement with 0.5% CFR-2. Displaced with 280 cu. ft. water. CIP at 1400 hours. POH. Mixed mud. RIH with 8-3/4" bit to 2431'. Displaced water with mud. Mixed mud. RIH to 3594'. Cleaned out cement at 3594' to 3620' (losing 20 bbls/hour) at 2400 hours.

9/26/81

(403,481)

14 Dys, 4825' PBTD, 0' Drld, Form Cement

Cleaned out cement from 3620' to 3920', losing 20 bbls/hour. RIH to 4359'. Cleaned out cement from 4359' to bottom of cement at 4684', losing 20 bbls/hour. Loss increased to 125 bbls/hour. Reamed and cleaned out cement stringers from 4684' to 4820' with loss increasing to 23- bbls/hour. Cleaned out cement from 4820' to 4825'. Circulated clean and POH at 2400 hours.

9/27/81

(442,341)

15 Dys, PBTD 5120', 0' Drld.

Continued POH. RIH with OEDP to 4820'. Cooled hole. HOWCO pumped plug #12 of 125 cu. ft. class "H" cement with 0.5% CFR-2. Displaced with 358 cu. ft. water. CIP at 0310 hours. POH to 2400'. WOC and mixed mud. RIH with OEDP to cement at 4632'. Circulated, losing 25 bbls/hour. POH. RIH with 8-3/4"

9/27/81 Continued

bit to 4562'. Circulated and conditioned mud. Reamed from 4562' to 4632'. Cleaned out cement and sand from 4632' to 4897'. Circulated. Hole taking 300 bbls/hour. Circulated with aerated mud. Cleaned out sand and cement from 4897' to 4938'.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

9/28/81

(462,541)

16 Dys, 5827' PBD, 0' Drld.

Cleaned out sand and cement from 4938' to 5120'. Circulated. POH. RIH with saw-tooth single to 4882'. Pumped plug #12, 42 cu. ft. sand, displaced with 224 cu. ft. water. Sand in place at 1045 hours. No sand build-up. Hung OEDP at 4882'. Repeated sand plug, #13 as above. Sand in place at 1430 hours. Hole bridged at 4892'. Cleaned out bridge. Found top of plug #13 at 4944'. Hung OEDP at 4788'. Pumped plug #14, 15 cu. ft. sand, displaced with 224 cu. ft. water. In place at 1915 hours. Waited on sand to fall. Found sand top at 4908'. Hung OEDP at 4882'. HOWCO mixed and pumped 42 cu. ft. "H" cement with 0.5% CFR-2 and 0.2% HR-7. Displaced with 389 cu. ft. water. CIP at 2200 hours. POH. WOC.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

9/29/81

(49:1,949)

17 Dys, 5827' PBTD, 0' Drld.

WOC. RIH. Tagged top of cement at 4775'. Circulated. Hole took 294 bbls/hour fluid. Hung OEDP at 4757'. HOWCO mixed and pumped 125 cu. ft. "H" cement with 0.5% CFR-2 and 0.2% HR-7. displaced with 325 cu. ft. water. CIP at 1230 hours (Plug #15). POH to 3827'. Squeezed away 9 bbls fluid. POH. WOC. Mixed Gel and mica. RIH to 4204' with bit. Circulated with hole taking 66 bbls/hour fluid. Conditioned mud. Hole taking 25 bbls mud per hour.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

9/30/81

(551,113)

18 Dys, 5827', 4840' PBTD, 0' Drld.

WOC 12 hours on cement. Tagged cement stringers at 4433'.
Cleaned out to 4500'. Cleaned out firm cement from 4500' to
4890'. Hole taking 25 bbls/hour. Wiped hole. POH. Ran 59
joints 26# K-55 8-round LT&C casing. Worked casing with
circulation from 4820' to 4880'. Circulated. Total length
casing less accessories = 2485.48'.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

10/01/81

(579,103)

19 Dys, 5827', 4890' PBTD, 0' Drld.

Hung 7" casing on Midway 9-5/8" x 7" liner hanger at 2383' with shoe at 4880'. HOWCO pumped 112 cu. ft. pre-flush, 56 cu. ft. water, 133 cu. ft. Flo-Chek, 112 cu. ft. water, followed by 835 cu. ft. "H" cement with 50# per sack Spherelite, with 40% SSA-1, 4% Gel, 5% Lime, 1% CFR-2 and 0.4% HR-7, plus 230 cu. ft. "H" cement with 40% SSA-1, 0.5% CFR-2, and 0.3% HR-7. displaced with 709 cu. ft. water. CIP at 0230 hours. POH. Laid down liner tools. RIH with 3-1/2" drill pipe to 2473'. Circulated with full returns. No cement to surface. Had full returns to surface during pumping operations. Laid down excess 4-1/2" drill pipe. Picked up tubing (4-1/2" frac. string). Tested liner lap. Pressure bled off from 500 psi at 100 psi per minute to 0 psi. Changed 10" valve.

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

10/02/81

(579,103)

20 Dys, 5827', 4890' PBTD, 0' Drld.

Changed 10" WKM valve. Tested BOP's and surface equipment to 500 psi. RIH with HOWCO 9-5/8" RTTS. Set at 2348'. Established rate 4 bbls/min at 1000 psi. Reset RTTS at 2255'. Backed up tool with 600 psi. Squeezed away 213 cu. ft. "H" cement with 40% SSA-1, 0.5% CFR-2 and 0.2% HR-7. Final pressure = 2000 psi. Reversed out excess cement. CIP at 1000 hours. Pulled tool to 2069'. Set RTTS. Tested lap to 1400 psi. OK. POH. WOC.

10/03/81

(643,618)

21 Dys, 5120' COTD, 0' Drld.

WOC. RIH. Cleaned out cement from 2231' to 2383'. Circulated. POH. RIH with 6-1/8" bit to 2413'. Tested liner lap to 500 psi, OK. RIH to cement at 4665'. Cleaned out cement from 4665' to bottom of 7" casing at 4880'. Cleaned out cement and sand to 5120'.

10/04/81

(656,328)

22 Dys, 5120', 0' Drld.

Displaced gel mud with produced water at 5120'. Circulated hole clean. POH. Bit out of hole at 0300 hours. Rigged and ran bore hole televiewer twice with no results. Installed pipe rams. Ran temperature survey. Rig on Republic Geothermal time at 1700 hours, 10/03/81.

BACA-20 STIMULATION

OCT 13 1981

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

10/05/81

(668,808)

23 Dys, 5120', 0' Drld.

RIH with 4-1/2" Republic frac. string with 7" Otis high temperature frac. packer. Hole continued to take 6-8 bbls fluid per hour. Unable to enter 7" liner hanger. POH. Cut notch in bottom joint of tubing. RIH. Entered the 7" liner. Set 7" packer at 2412'. Closed rams on 4-1/2" tubing. Pressured annulus to 500 psi. Western rigged to frac. Began frac. at 1620 hours. concluded frac. at 1820 hours. Maximum frac pressure = 3800 psi, and maximum sand = 12 lbs per gallon. ISIP at conclusion of frac. = 1350 psi. Released packer. POH. Rigged up LASL to run temperature logs.

Rec.
OCT 13 1981

BACA-20 STIMULATION

30" C. @ 54'

20" C. @ 280'

13-3/8" C. @ 1415'

9-5/8" L. @ 1233' - 2505'

9-5/8" Tie-back @ 0' - 1233'

10/06/81

(684,118)

24 Dys, 5120', 0' Drld.

LASL ran temperature log from surface to 5090'. Minimum temperature after 7 hours = 280°F at 4730'. Re-ran log after 4 additional hours. Minimum temperature = 297° F at 4730'. Rigged down LASL. Waited on temperature build-up. Ran Republic temperature survey after 22 hours static. Temperature at 4680' = 308°F. Waited on temperature buildup.

Rec'd
OCT 13 1981

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415' - 1440'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

10/07/81

(697,418)

25 Dys, 5120', 0' Drld.

Ran in hole with 6-1/8" bit to fill at 4990'. Rigged to clean out with air/water. Cleaned out bridge at 4990' with air/water. Reamed to 5120' with no fill. Circulated. POH. Rigged up Schlumberger. Ran FDC-CNL log, from 5129' to 4882'. Ran fracture identification log from 5138' to 4882'. Hole took 400 bbls fluid per hour while logging.

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

10/08/81

(761,728)

26 Dys, 5134' (14' depth correction), 0' Drld.

Ran Sonic log from 5133' to 4882'. Attempted without success to adapt borehole televiewer to Schlumberger logging unit. Ran Dual Laterolog from 5128' to 4881'. Rigged down loggers. RIH with 6-1/8" bit to 5134'. No fill. POH. Ran 6 perforated joints 8-3-1/2" holes plus three blank joints on top of 5-1/2" 17#/ft K-55 sec. flush joint casing (371.22'). Hung on Midway "J" slot liner hanger at 4760' with orange-peeled shoe at 5131'. POH. RIH to 3704' with drill pipe. Circulated with air/water, producing 150 bbls/hr fluid.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
9-5/8" Tie-back @ 0' - 1233'

10/09/81

(775,908)

27 Dys, 5134', 0' Drld.

Circulated with maximum 1800 CFM air and 204 GPM water. Hole produced maximum 220 bbls/hour while circulating. Well died 30 minutes after stopping circulation. POH. RIH with Otis steam packed at 2400 hours.

10/10/81

(789,618)

28 Dys, 5134', 0' Drld.

RIH with Otis steam packed. Set same at 2966'. Tested annulus above packer to 500 psi. OK. Rigged up NOWSCO. Ran in drill pipe with coiled tubing. Flowed well through drill pipe for 2 hours with N₂. Western Nitrogen unit failed. Rigged down N unit. Released packer. POH. Dressed packer and reset instruments. Re-ran packer. Tested annulus above packer. OK. Ran in drill pipe with coiled tubing. Flowed well through drill pipe with 300 to 5000 SCFM N₂ at 2400 hours.

10/11/81

(802,688)

29 Dys, 5134', 0' Drld.

Continued to flow well through drill pipe with 300 to 500 SCFM N₂. Discontinued N₂ and shut well in at 0235 hours. Monitored pressure build-up for 8 hours. Released packer. POH. RIH with 4-1/2" frac. tubing. Ran sinker bar on piano wire to 5120' with no fill or obstructions at 2400 hours.

IDAHO STATE 8-1

13-3/8" C. @ 14'
9-5/8" C. @ 115'
7" C. @ 907'

BACA-20 STIMULATION

30" C. @ 54'

20" C. @ 280'

13-3/8" C. @ 1415'

9-5/8" L. @ 1233' - 2505'

9-5/8" Tie-back @ 0' - 1233'

10/12/81

(828,618)

30 Dys, 5134' T.D., 0' Drld.

Laid down excess 3-1/2" drill pipe and drill collars. Waited on Schlumberger until 0730. Ran temperature log to 2,000'. Found hole too hot to proceed. Cooled hole with 275 bbls water. Ran temperature log from 2000' to 5130'. Injected 1066 bbls water to cool hole. Temperature log showed water exiting around 7" shoe through fracture at 4710' and through perforated liner from 4970' to 5130'. Laid down 3-1/2" and 4-1/2" drill pipe.

BACA-20 STIMULATION

30" C. @ 54'
20" C. @ 280'
13-3/8" C. @ 1415'
9-5/8" L. @ 1233' - 2505'
7" L. @ 2383' - 4880'
5-1/2" L. @ 4760' - 5131'
9-5/8" Tie-back @ 0' - 1233'

10/13/81

(888,358)

31 Dys, 5134'T.D., 0' Drld.

Laid down 4-1/2" drill pipe. Nippled down BOPE. Installed second master valve and blank flow tee. Cleaned mud pits. Pressured well to 775 psi with air. Released rig for move to BACA #22 for deepening at 1400 hours.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

WELL Baca #20

DATE 9-17-80 TIME 1113 TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 116 WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 108 TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	108 psig		107 psig
Δ P	3		1.5
FLOW RATE			63,800 ^{lb} / _{hr.}
MASS			
STEAM	37,500 ^{lb} / _{hr.}		38,300 ^{lb} / _{hr. flash} ^{60%}
WATER			

TOTAL MASS FLOW: _____ ENTHALPY - EFF. _____
 STEAM FRAC. _____ EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O ML.	Wt. H ₂ O Grams	Vol. Gas ML.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

WELL Baca #20

DATE 9-17-80 TIME 1133 TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 118 WHT 346 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 109 TEMP. _____ °F PRESS. _____ PSIA

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	109 psia		114
Δ P	6		2
FLOW RATE			
MASS			75,400.15 #/HR
STEAM	54,385.66 #/HR		
WATER			

TOTAL MASS FLOW: _____ ENTHALPY - EFF. _____
 STEAM FRAC. 0.60% assumed EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM./L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT

WELL Baca #20

DATE 9-17-80 TIME 1225 TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 126 WHT 3 CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 117 TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P _i	116 psig		120
Δ P	4		2.25
FLOW RATE			
MASS			81,762.51 #/HR
STEAM	45,863.61 #/HR.		
WATER			

TOTAL MASS FLOW: _____ ENTHALPY - EFF. _____

STEAM FRAC. 56.1% EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS: _____

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

WELL Baca #20

DATE 9-17-80 TIME 1500 TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 123 WHT 350°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 115 TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	115 psig	116 psig	120 psig
Δ P	6	2.63" w.c.	2.3
FLOW RATE			
MASS			81,485.6 lb
STEAM	53,232 ^{lbs} /hr.		49,706.22 lb
WATER		33,940 ^{lbs} /hr.	31,779.38

TOTAL MASS FLOW 87,172 ^{lbs}/hr. ENTHALPY-EFF. 851.14 ^{btu}/lb.
 STEAM FRAC. .61 EQUIV. TEMP. 703.31 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
_____	<u>1545 hrs.</u>	_____	<u>9000</u>	_____
_____	<u>1545 hrs.</u>	_____	<u>PH = 5.1</u>	_____
_____	_____	_____	_____	_____

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GW/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

WELL Baca # 20

DATE 9-17-80 TIME 1643 TEST NO. 3 CHOKE TYPE _____

FLOW RATE DATA

WHP 125 WHT 350°f CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 118 psig TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P _i	116 psig	118 psig	120 psig
Δ P	5 psid	1.49" w.c.	2.2 psid
FLOW RATE			
MASS			78,603.97 lb
STEAM	51,051 lb/hr		48,734.46 lb
WATER		30,538 lb/hr	29,869.51 lb

TOTAL MASS FLOW 81,589 lb/hr ENTHALPY-EFF. 864.92 Btu/lb

STEAM FRAC. .62 EQUIV. TEMP. 703.99°f

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL Baca # 20

DATE 9-24-80 line 10" orifice 7" Test No. 4

Time	WH P _(psig)	WHT of	P _(psig)	Δ P _(psig)	T _i of	F _W R _{atio}	Remarks
0940	99	-	-	-	-	-	Blew Well down
0951	100	343	97	5	342	-	
0959	152	361	130	4.5	358	-	R.O. ENGBREITSEN SEP 25 1980
1008	168	367	152	12	365	-	
1015	185	377	173	15.7	375	-	
1030	152	363	140	13.2	361	-	W _m = 365,862 W _s = 109,759 assume 30% flash
1040	148	359	133	13	357	-	
1050	134	352	120	12.4	350	-	
1110	125	347	110	11.7	344	-	
1130	116	341	103	11	338	-	
1210	104	332	102	10.5	329	-	
1250	95	327	83	9.8	325	-	W _m = 206,801 #/hr W _s = 82,720 #/hr * W _m = 175,129 #/hr W _s = 87,178 #/hr **
1320	91	325	81	9.5	322	-	
1355	87	322	77	9.3	320	-	
1430	84	320	75	9.1	318	-	W _m = 179,124 #/hr * W _s = 71,649 #/hr * W _m = 125,127 #/hr W _s = 75,076 #/hr ** Chlorides = 5200 ppm PH = 6.63
							* - assuming 40% flash

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL Bacc # 20

DATE 9-24-80 line 10" orifice 7" Test No. 4

Time	WHP (psig)	WHT of	PI (psig)	ΔP (psig)	T _i of	FM Rate	Remarks
1510	82	318	72	9	317	-	
1540	80	317	71	8.8	315	-	
1610	78	316	70	8.7	314	✓-	W _m = 179.124 gal/hr W _s = 71.649 gal/hr * W _m = 125.127 gal/hr W _s = 75.076 gal/hr **
1710	75	314	67	8.6	312	-	
1810	75	312	66	8.5	310	-	
1900	73	310	64	8.2	308	-	
2000	69	309	61	8.1	307	-	R.O. ENGBRETSEN SEP 25 1980
2100	68	308	60	7.7	306	-	
2200	67	306	59	7.6	305	-	
2300	66	305	58	7.6	303	-	

* - assuming 40% flash
 ** - assuming 60% flash

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL Baca #20

DATE 9-25-80 line 10" orifice 7" Test No. 4

Time	WHP (psig)	WHT °f	P ¹¹ (psig)	ΔP (psig)	T ₁ °f	Inj Rate	Remarks
0100	64	303	55	7.5	300	—	
0300	58	302	53	7.1	299	—	
0515	60	300	50	7.0	297	—	
0630	60	299	51	7.0	297	✓ 157 gpm	W _{in} = 142,026 gal/hr @ 40% flow W _s = 56,811 gal/hr W _{in} = 99,140 gal/hr @ 60% flow W _s = 59,484 gal/hr Chlorides = 6800 ppm pH = 5.95
1020	57	297	50	6.9	294	117	
1150	57	296	49	6.8	294	117	

PAROSCIENTIFIC RDGS.

R.O. ENGBRETSSEN
SEP 25 1980

BACA NO 13					
TIME	WHP	WHT	AMB. TEMP	PRESS.	FREQ.
1100	4.816	213°F	68°F	803.347	27.66115
BACA NO 4					
1145	13.51616	226°F	80°F	785.441	28.90034

NOTE: NO INJECTION - DUMPING BRINE AT DUAL PAD.

R.O. ENGBRETTSEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



SEP 30 1980

WELL BACA # 20

DATE 9-26-80 TIME 16 25 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 145 PSIG WHT 363 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 142 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	142 PSIG	142 PSIG	142 PSIG
Δ P	1.6 PSI	1" W.C.	0.8 PSI
FLOW RATE			
MASS			52,642.3 #/HR.
STEAM	31,808.7 #/HR.		31,585.4 #/HR.
WATER		24,940.7 #/HR.	21,056.9 #/HR.

TOTAL MASS FLOW 56,749.4 #/HR. ENTHALPY-EFF. 815.7 BTU/#
 STEAM FRAC. 56% EQUIV. TEMP. 698.62 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. WELL IS GYSERING ABOUT 20 PSI
2. ASSUMED 60% FLUSH AT 20
3. NO INJECTION

R. O. ENGBRETSSEN

SEP 30 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA 20

DATE 9-27-80 TIME 0850 TEST NO. 4 CHOKE TYPE 0

FLOW RATE DATA

WHP 165 PSIG WHT 372°F CALORIMETRIC: SEP. EFF. 98.8 %
SEPARATOR PRESSURE 161.5 PSIG. TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	<u>6"</u>	<u>4"</u>	<u>7"</u>
QUALITY			
P ₁	<u>161.5 PSIG</u>	<u>161.5 PSIG</u>	<u>162 PSIG.</u>
Δ P	<u>1.8 PSI</u>	<u>2.7" W.C.</u>	<u>1 PSI</u>
FLOW RATE			
MASS			<u>73,327.47</u>
STEAM	<u>35,713.33</u>		<u>35,930.46</u>
WATER		<u>36,928.5</u>	<u>37,397.07</u>

TOTAL MASS FLOW 72,641.88 ENTHALPY-EFF. 759.53
STEAM FRAC. 49% EQUIV. TEMP. 681.05

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

INJECTION AVERAGE = 99.2 GPM

UNIT 70 TR

WELL Block #20 LOCATION Redondo Canyon DATE 9-27-80
 PSIG 161.5 ORIFICE 1/8" ATMOSP. PRESS. 10.5
 GAL. LBS/HR 107 TIME ON 0820 TIME OFF 0850
 TEMP OF 286°F STEAM QUALITY 98.8% BTU/LB 1187

FLOW RATE DATA

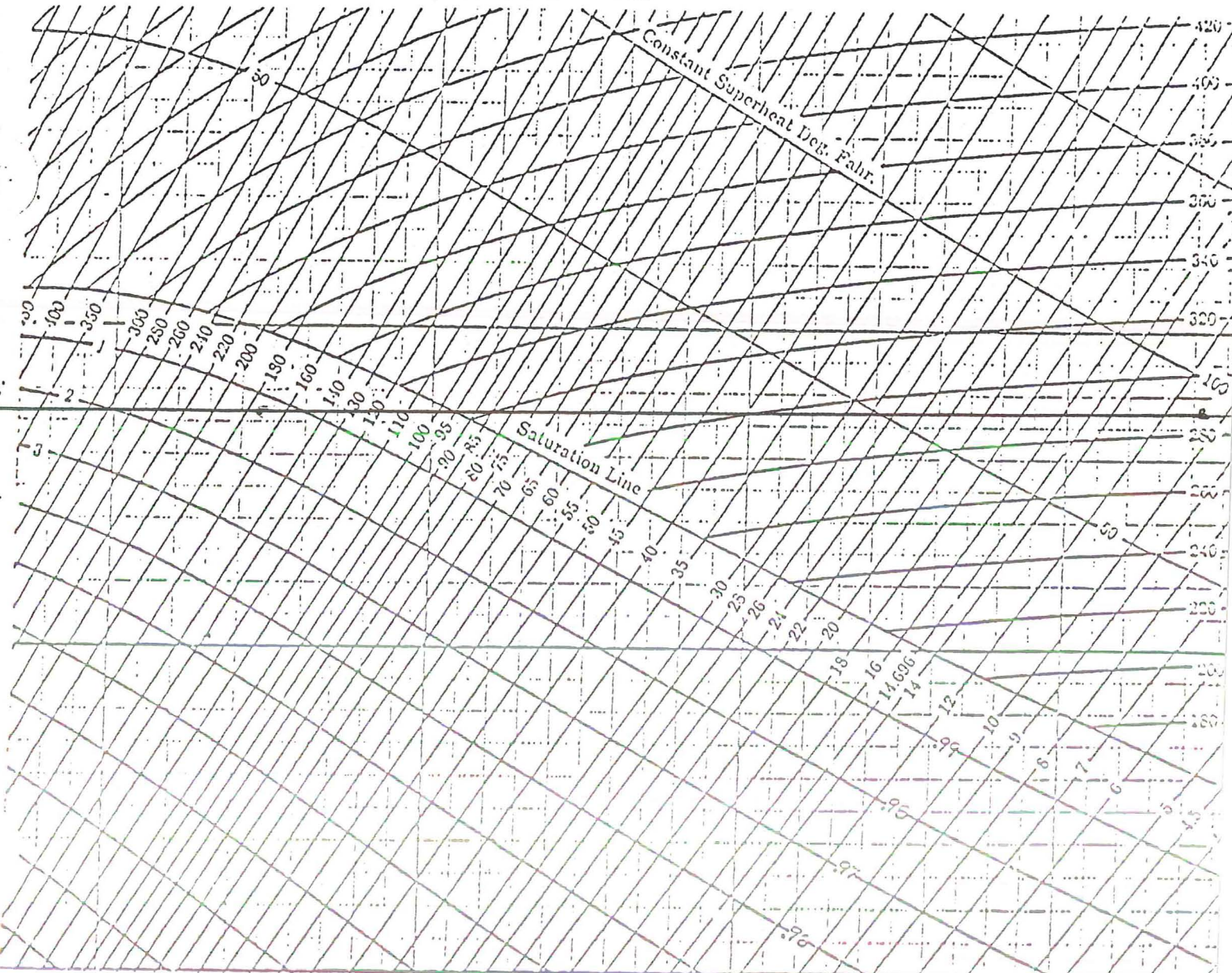
PRESS. 161.5 PSIG DELTA P 1.8 PSI LBS/HR 35713.33

PRELIMINARY DATA

WE WILL HAVE TO EXAMINE
EQUIPMENT & INSULATE

BY John M. Moore

MOLLIER CHART



Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA #20

DATE 9-22-80 TIME 0825 TEST NO. 4 CHOKE TYPE —

R.O. ENGBREITSEN
SEP 30 1980

FLOW RATE DATA

WHP 153 PSIC WHT 369°F CALORIMETRIC: SEP. EFF. 99.4 %
SEPARATOR PRESSURE 155.5 PSIC TEMP. 295 °F PRESS. 155 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY	99.4%	—	—
P ₁	155 PSIC	155 PSIC	155.5 PSIC
Δ P	2.3 PSI	AHW 0.9"	1.5 PSI
FLOW RATE	—	—	—
MASS	63,289.34 #/hr	63,289.34 #/hr	71,948.56 #/hr
STEAM	39,669.59 #/hr	—	45,111.75 #/hr
WATER	—	23,619.75 #/hr	26,836.81 #/hr

TOTAL MASS FLOW 63,289.34 ENTHALPY-EFF. 876.59

STEAM FRAC. 62.7% EQUIV. TEMP. 705°F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
—	—	NO READING. (SUSPECT METER)	6200	99.4%
—	—	5.8 Ph	5.4 Ph	—
—	—	—	—	—

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	Total Mass Wt. Grams	Non-Condensible By Wt. %
					1.3125 GM/L		
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—

REMARKS:

STEAM TEMP = 368°F ; H2O TEMP = 365°F ; 20 TEMP = 369°F

UNIT 70 M

WELL Boca #20 LOCATION Redondo Creek DATE 9/28/80

PSIG 155 PSIG ORIFICE 1/8" ATMOSP. PRESS. 10.5

CAL. LBS/HR 104 #/hr TIME ON 0825 TIME OFF 0955

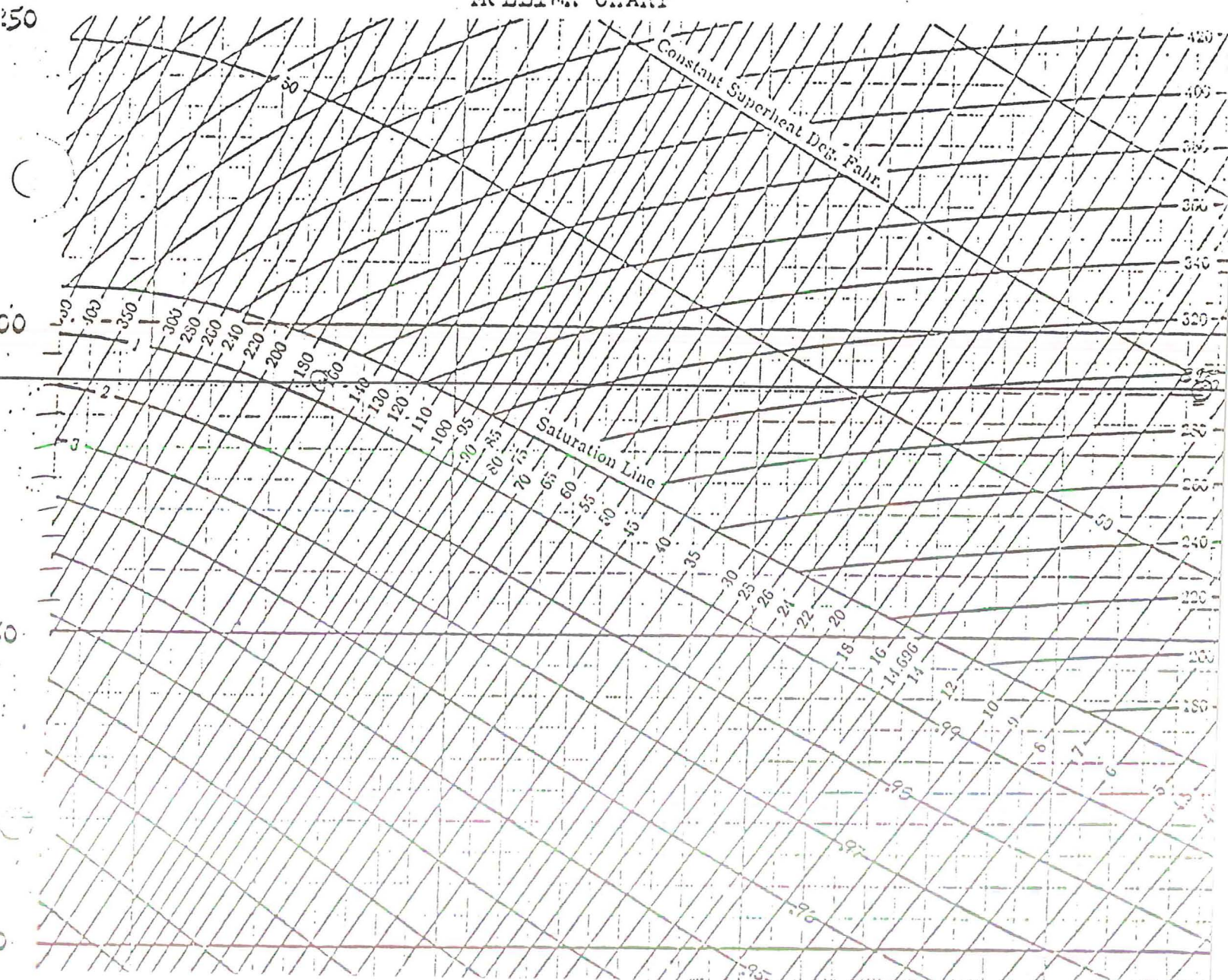
TEMP OF 295 STEAM QUALITY 99.4% BTU/LB 11.91

FLOW RATE DATA

PRESS. 155 DELTA P 2.3 LBS/HR 39669.59

BY I Eldon Parrott

MOLLIER CHART



Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA #20
 DATE 9-29-80 TIME 0750 TEST NO. 4 CHOKE TYPE —

FLOW RATE DATA

WHP 158 PSIG WHT 368 °F CALORIMETRIC: SEP. EFF. 99.4 %
 SEPARATOR PRESSURE 153 PSIG TEMP. 294 °F PRESS. 154 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY	99.4 %	—	—
P _i	153 PSIG	156 PSIG	154 PSIG
Δ P	2.3 PSI	Δ HW, 7.5"	1.0 PSI
FLOW RATE	—	—	—
MASS	60,918 #/hr	60,918 #/hr	57,015 #/hr
STEAM	39,364 #/hr	—	36,832 #/hr
WATER	—	21,554 #/hr	20,183 #/hr

TOTAL MASS FLOW 60,918 #/hr ENTHALPY-EFF. 892.52
 STEAM FRAC. 64.6 % EQUIV. TEMP. 705 °f

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
_____	_____	NO READING.	6200	99.4%
_____	_____	ph 7.6	ph 7.1	_____
_____	_____	_____	_____	_____

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

STEAM TEMP = 368 °F ; H₂O TEMP = 364 °F ; 2φ TEMP = 367 °F
AVERAGE MASS = 89 GPM

R.O. ENGBRETSSEN
SEP 30 1980

WATER

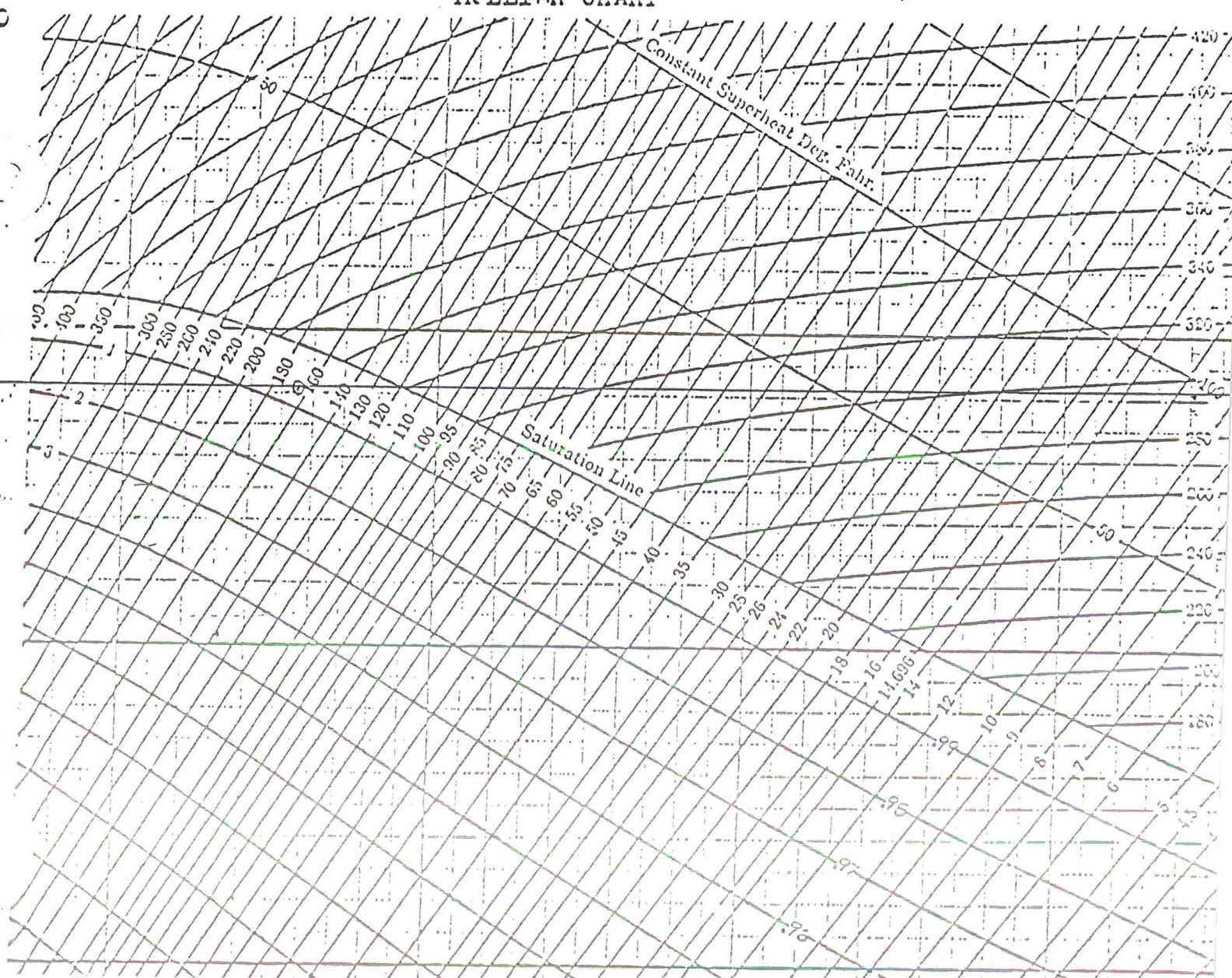
WELL RACA #20 LOCATION Redondo Canyon DATE 9-29-80
 PSIG 154 ORIFICE 1/8" ATMOSP. PRESS. 10.5
 GAL. LBS/HR 104 #/hr TIME ON 0740 TIME OFF 0810
 TEMP OF 294 STEAM QUALITY 99.4% BTU/LB 1192

FLOW RATE DATA

PRESS. 153 PSIG DELTA P 2.3 PSI LBS/HR 39,364

BY Leldon S Parrott

MOLLIER CHART



Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA #20
 DATE 9-29-80 TIME 1315 TEST NO. 4 CHOKE TYPE —

FLOW RATE DATA

WHP 160 psig WHT 368 °F CALORIMETRIC: SEP. EFF. 99.35 %
 SEPARATOR PRESSURE 155 psig TEMP. 294 °F PRESS. 155 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY	99.35%	—	—
P ₁	155 psig	156 psig	157 psig
Δ P	2.3 psi	.9" WC	1.2 psi
FLOW RATE	—	—	—
MASS	63,973.27 #/hr	63,973.27 #/hr	59,813 #/hr
STEAM	39,668.5 #/hr	—	37,084.0 #/hr
WATER	—	24,304.72 #/hr	22,729.0 #/hr

R. O. ENGETSEN
 TOBREISEN
 SEP 30 1980

STEAM MASS FLOW 63,973.27 #/hr ENTHALPY-EFF. 870.57
 STEAM FRAC. 62.70 EQUIV. TEMP. 704.5 °C

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
—	—	0	—	99.35%
—	—	pH 8.0	—	—
—	—	Concentration from AMERICAN TESTS.		—

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	DENSITY <u>1.3125</u> GM/L
						Non-Condensibile By Wt. %
<u>1310</u>	<u>93</u>	<u>93</u>	<u>1187</u>	<u>2.21</u>	<u>95.31</u>	<u>2.33%</u>
<u>1305</u>	<u>84</u>	<u>84</u>	<u>1816</u>	<u>2.38</u>	<u>86.38</u>	<u>2.75%</u>
<u>1309</u>	<u>60</u>	<u>60</u>	<u>1710</u>	<u>2.24</u>	<u>60.24</u>	<u>3.72%</u>
<u>1314</u>	<u>65</u>	<u>65</u>	<u>1475</u>	<u>1.94</u>	<u>66.94</u>	<u>2.89%</u>

REMARKS:

STEAM TEMP = 365 °F; H₂O TEMP = 364 °F; 2nd Temp = 368 °F
AVERAGE INT = 38 GPM

UNITED

WELL BACA # 20 LOCATION Redondo Canyon DATE 9-29-80

PSIG 155 ORIFICE 1/8" ATMOSP. PRESS. 10.5

GAL. LBS/HR 104 TIME ON 1315 HRS. TIME OFF 1345 HRS.

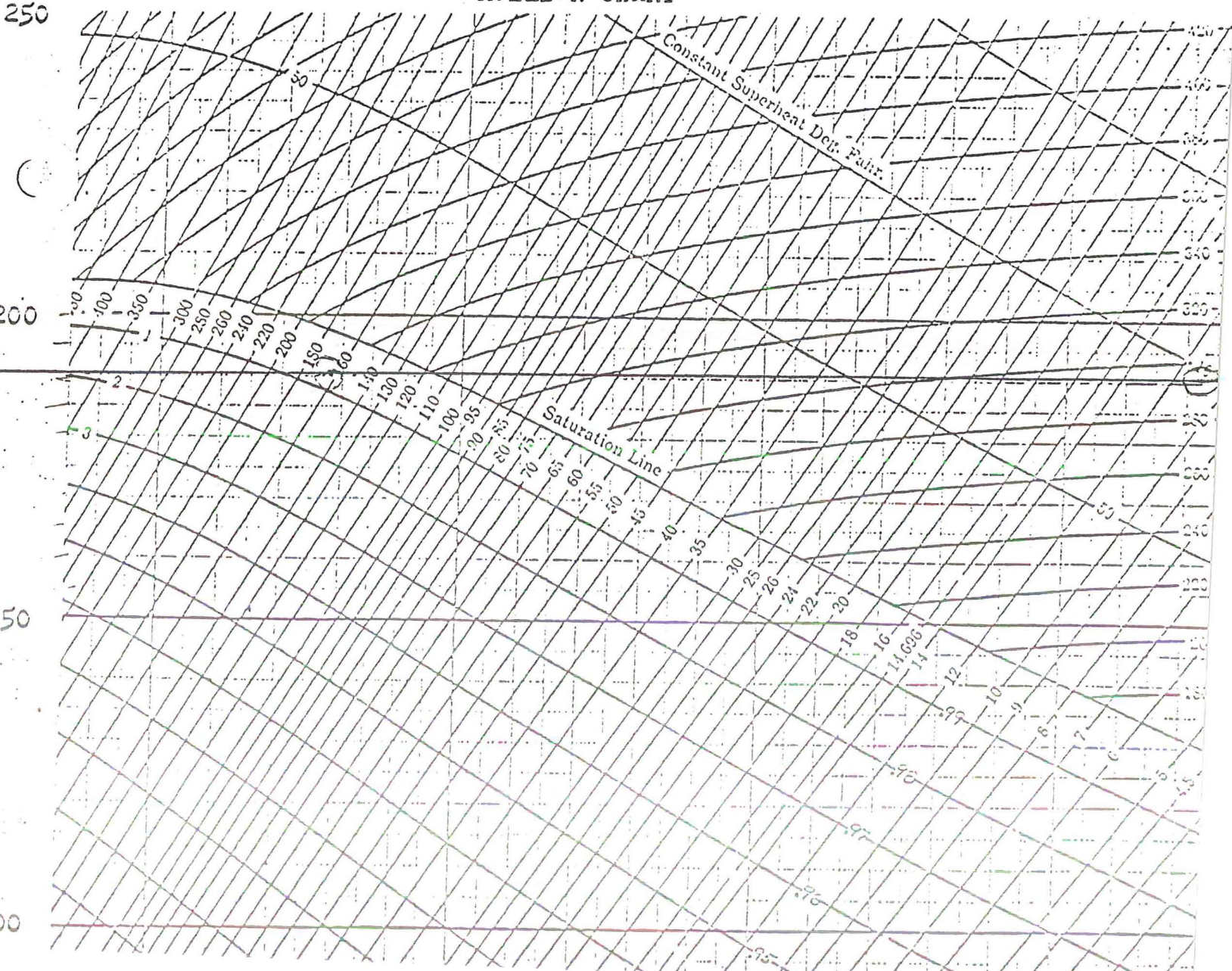
TEMP OF 294 STEAM QUALITY 99.35% BTU/LB 1191

FLOW RATE DATA

PRESS. 155 psig DELTA P 2.3 Psi LBS/HR 39,668.5

BY MIKE MAATIMEZ

MOLLIER CHART



R. O. ENGBRETSSEN
SEP 30 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA W-20
DATE 9-30-80 TIME 0615 Hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 156 PSIG WHT 367°F CALORIMETRIC: SEP. EFF. 99.4 %
SEPARATOR PRESSURE 152 PSIG TEMP. 294 °F PRESS. 152 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	151 PSIG	153 PSIG	154 PSIG
Δ P	2.2 PSI	0.72" W.C.	1 PSI
FLOW RATE			
MASS			57,280.55 #/HR.
STEAM	38,281.96 #/HR.		36,905.8 #/HR.
WATER		21,130.64 #/HR.	40,374.75 #/HR.

TOTAL MASS FLOW 59,412.6 #/HR. ENTHALPY-EFF. 891.5 BTU/#
STEAM FRAC. 64.43 % EQUIV. TEMP. 705.28°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
<u>0625 Hrs.</u>	<u>58</u>	<u>58</u>	<u>942</u>	<u>1.23</u>	<u>59.23</u>	<u>2.07</u>
<u>0631 "</u>	<u>37</u>	<u>37</u>	<u>963</u>	<u>1.26</u>	<u>38.26</u>	<u>3.2</u>
<u>0635 "</u>	<u>62</u>	<u>62</u>	<u>938</u>	<u>1.23</u>	<u>63.23</u>	<u>1.94</u>

REMARKS:

R.O. ENGBRETSSEN

OCT 1 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-1-80 TIME 0805 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 156.5 PSIG WHT 367°F CALORIMETRIC: SEP. EFF. 99.2 %
SEPARATOR PRESSURE 152 PSIG TEMP. 288 °F PRESS. 152 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	152 PSIG	152.5 PSIG	154 PSIG
Δ P	2.2 PSI	0.7" W.C.	1 PSI
FLOW RATE			
MASS			56,978.8 #/HR.
STEAM	38,395.15 #/HR.		36,939.35 #/HR.
WATER		20,829.45 #/HR.	20,039.45 #/HR.

TOTAL MASS FLOW 59,224.6 #/HR. ENTHALPY-EFF. 894.46 BTU/#

STEAM FRAC. 64.83% EQUIV. TEMP. 705.32°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN
OCT 2 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N^o 20

DATE 10-2-80 TIME 0700 Hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 155 PSIG WHT 366°F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 152 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	152 PSIG	152 PSIG	152 PSIG
Δ P	2 PSI	0.75" W.C.	1 PSI
FLOW RATE			
MASS			58,962.83 #/HR
STEAM	36,622.47 #/HR.		37,105.31 #/HR
WATER		21,569.169 #/HR.	21,857.52 #/HR

TOTAL MASS FLOW 58,191.64 #/HR. ENTHALPY-EFF. 878.66 BTU/#
STEAM FRAC. 62.93 % EQUIV. TEMP. 705.1 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



OCT 3 1980
WELL BACA No 20

DATE 10-3-80 TIME 0640 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 157 PSIG WHT 367°F CALORIMETRIC: SEP. EFF. 99.3 %
SEPARATOR PRESSURE 152 PSIG TEMP. 292 °F PRESS. 152 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	152 PSIG	152 PSIG	153 PSIG
Δ P	1.8 PSI	0.65" W.C	0.9 PSI
FLOW RATE			
MASS			54,693.36 #/hr.
STEAM	34,757.032 #/hr.		34,675.59 "
WATER		20,068.58 #/hr.	20,017.77 "

TOTAL MASS FLOW 54,825.619 #/hr. ENTHALPY-EFF. 881.16 BTU/#
STEAM FRAC. 63.4 % EQUIV. TEMP. 705.15 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-3-80

TIME 11:45 hrs

TEST NO. 4

CHOKE TYPE 3 1980

FLOW RATE DATA

WHP 159 PSIG WHT 367°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 153 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	153 PSIG	153.5 PSIG	154 PSIG
Δ P	2.5 PSI	0.65" W.C.	1 PSI
FLOW RATE			
MASS			55,556.98
STEAM	41,024.0218		37,013.61
WATER		20,541.56	18,537.36

TOTAL MASS FLOW 61,565.58 ENTHALPY-EFF. _____

STEAM FRAC. 66.63% EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:
SHIFTED SEPARATOR PRESSURE FROM 153 PSIG TO 126 PSIG
@ 1200 HRS. 10-3-80

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R.O. ENGBREITSEN
OCT 3 1980

WELL BACA NO 20

DATE 10-3-80

TIME 1400 HRS. TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 136 PSIG WHT 356 °F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 126 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	125 PSIG	125.5 PSIG	125.5 PSIG
Δ P	4.25 PSI	0.65" W.C.	2 PSI
FLOW RATE			
MASS			70,062.74
STEAM	48,722.25		49,219.07
WATER		20,638.04	20,843.67

TOTAL MASS FLOW 69,360.3

ENTHALPY-EFF. 933.6 BTU/lb

STEAM FRAC. 70.25%

EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS: Switched separator rates at 1200 hrs, from 100 gpm to 125 gpm

R.O. ENGBRETSSEN
OCT 9 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 10-4-80 TIME 1145 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 135 PSIG WHT 356 °F CALORIMETRIC: SEP. EFF. 99.6 %
SEPARATOR PRESSURE 128 PSIG TEMP. 291 °F PRESS. 127 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	127 PSIG	130 PSIG	130 PSIG
Δ P	2.5 PSI	0.8" W.C.	1.5 PSI
FLOW RATE			
MASS			66,481.73 #/HR.
STEAM	37,782.89 #/HR.		41,777.12 #/HR.
WATER		22,344.107 #/HR.	24,704.61 #/HR.

TOTAL MASS FLOW 60,126.99 #/HR. ENTHALPY-EFF. 869.8 BTU/#
STEAM FRAC. 62.84 % EQUIV. TEMP. 704.54 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. SHIFTED SEPARATOR PRESSURE FROM 153 PSIG TO 125 PSIG ± 3 PSI
@ 1200 HRS. 10-3-80

R.O. ENGBRETSSEN
OCT 9 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-5-80 TIME 0645 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 129 PSIG WHT 356 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 127 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	127 PSIG	128 PSIG	128 PSIG
Δ P	2.4 PSI	0.8" W.C.	1.2 PSI
FLOW RATE			
MASS			59,512.96 #/HR.
STEAM	37,028.25 #/HR.		37,112.0282 #/HR.
WATER		22,351.8 #/HR.	22,400.52 #/HR.

TOTAL MASS FLOW 59,380.05 #/HR. ENTHALPY-EFF. 865.34 BTU/#
STEAM FRAC. 62.36 % EQUIV. TEMP. 704.13 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

DENSITY 1.3125 GM/L

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensibile By Wt. %
<u>1107 HRS.</u>	<u>146</u>	<u>146</u>	<u>2854</u>	<u>3.7450</u>	<u>149.7450</u>	<u>2.5</u>
<u>1111 "</u>	<u>140</u>	<u>140</u>	<u>2860</u>	<u>3.7538</u>	<u>143.7538</u>	<u>2.61</u>
<u>1115 "</u>	<u>137</u>	<u>137</u>	<u>2863</u>	<u>3.7577</u>	<u>140.7577</u>	<u>2.67</u>
<u>1119 "</u>	<u>145</u>	<u>145</u>	<u>2855</u>	<u>3.7472</u>	<u>148.7472</u>	<u>2.52</u>

REMARKS:

R.O. ENGBRETSSEN

OCT 9 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-6-80 TIME 0630 Hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 134 PSIG WHT 356 °F CALORIMETRIC: SEP. EFF. 99.5 %
SEPARATOR PRESSURE 127 PSIG TEMP. 288 °F PRESS. 127 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4'	7"
QUALITY			
P ₁	127 PSIG	127 PSIG	130 PSIG
Δ P	2.4 PSI	0.8" W.C.	1.2 PSI
FLOW RATE			
MASS			59,901.71 #/HR.
STEAM	37,028.25 #/HR.		37,354.71 #/HR.
WATER		22,347.94 #/HR.	22,547.0 #/HR.

TOTAL MASS FLOW 59,376.19 #/HR. ENTHALPY-EFF. 865.37 BTU/#
STEAM FRAC. 62.36 % EQUIV. TEMP. 704.13 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	Non-Condensable By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN
OCT 9 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 10-7-80 TIME 0635 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 132 PSIG WHT 356 °F CALORIMETRIC: SEP. EFF. 99.4 %
SEPARATOR PRESSURE 128 PSIG TEMP. 291 °F PRESS. 127.5 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	127.5 PSIG	127 PSIG	127 PSIG
Δ P	2.6 PSI	1.2" W.C.	1 PSI
FLOW RATE			
MASS			57,603.014 #/HR.
STEAM	38,588.55 #/HR.		33,697.76 #/HR.
WATER		27,372.03 #/HR.	23,905.25 #/HR.

TOTAL MASS FLOW 65,960.6 #/HR. ENTHALPY-EFF. 832.13 BTU/#
STEAM FRAC. 58.5 % EQUIV. TEMP. 701.04 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN

OCT 9 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-8-80

TIME 0825 HR. TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 131 PSIG WHT 355 °F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 127 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	127 PSIG	127 PSIG	129 PSIG
Δ P	3.0 PSI	1.0" W.C.	0.9 PSI
FLOW RATE			
MASS			51,782.93 #/HR.
STEAM	41,340.87 #/HR.		32,265.95 #/HR.
WATER		25,003.95 #/HR.	19,516.98 #/HR.

TOTAL MASS FLOW 66,344.82 #/HR. ENTHALPY-EFF. 864.94 BTU/#

STEAM FRAC. 62.31 % EQUIV. TEMP. 704.1 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN
OCT 9 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-9-80 TIME 0625 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 132 PSIG WHT 355 °F CALORIMETRIC: SEP. EFF. 77.6 %
SEPARATOR PRESSURE 126 PSIG TEMP. 290 °F PRESS. 126 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	126 PSIG	126 PSIG	127 PSIG
Δ P	3.25 PSI	1.1" W.C.	1 PSI
FLOW RATE			
MASS			54,423.72 #/HR.
STEAM	42,854.85 #/HR.		33,750.03 #/HR.
WATER		26,233.12 #/HR.	20,664.7 #/HR.

TOTAL MASS FLOW 69,087.96 #/HR. ENTHALPY-EFF. 862.17 BTU/#
STEAM FRAC. 62.03 % EQUIV. TEMP. 704 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensibile By Wt. %	DENSITY _____ GM/L
_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	
_____	_____	_____	_____	_____	_____	_____	

REMARKS:

R.O. ENGBRETSSEN
OCT 10 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-10-80 TIME 0615 HR. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 133 PSIG WHT 355 °F CALORIMETRIC: SEP. EFF. 97.5 %
SEPARATOR PRESSURE 127 PSIG TEMP. 289 °F PRESS. 127 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P _i	127 PSIG	127 PSIG	127 PSIG
Δ P	3.5 PSI	1.1" W.C.	1.0 PSI
FLOW RATE			
MASS			53,722.28 #/HR. *
STEAM	44,600.12 #/HR.		33,828.92 #/HR.
WATER		26,228.51 #/HR.	10,893.36 #/HR.

TOTAL MASS FLOW 70,828.63 #/HR. ENTHALPY-EFF. 870.65 BTU/#
STEAM FRAC. 62.97 % EQUIV. TEMP. 704.63 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. SUSPECT TWO-PHASE METERING IS ~~stopped~~ ^{clogged} -up.

* Appears questionable. - To be checked in the field.

R.O. ENGBREITSEN
OCT 13 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 120

DATE 10-11-80 TIME 0945 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 131 PSIG WHT 355 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 126 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	126 PSIG	127 PSIG	128 PSIG
Δ P	2.5 PSI	1.2" W.C.	1.45 PSI
FLOW RATE			
MASS			64,728.12 #/hr.
STEAM	37,653.27 #/hr.		37,971.11 #/hr.
WATER		27,387.57 #/hr.	27,257.01 #/hr.

TOTAL MASS FLOW 65,040.85 #/hr. ENTHALPY-EFF. 826.2 BTU/#
STEAM FRAC. 57.80 % EQUIV. TEMP. 700.5 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBREISEN

OCT 13 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 10-12-80 TIME 0815 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 131 PSIG WHT 355 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 126 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P _i	126 PSIG	127 PSIG	127.5 PSIG
Δ P	2.5 PSI	1.1" W.C.	1.25 PSI
FLOW RATE			
MASS			63,533.07 #/hr
STEAM	37,653.27 #/hr		37,446.88 #/hr
WATER		26,228.37 #/hr	26,087.02 #/hr

TOTAL MASS FLOW 63,881.64 #/hr. ENTHALPY-EFF. 835.34 BTU/#
STEAM FRAC. 58.94 % EQUIV. TEMP. 701.34 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	Non-Condensibile By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN

OCT 13 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA W2 20

DATE 10-12-80 TIME 1310 H TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 120 PSIG WHT 355°F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 126 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	125 PSIG	126 PSIG	127.5 PSIG
Δ P	2.5 PSI	1.1" W.C.	1.25 PSI
FLOW RATE			
MASS			63,616.94 #/hr.
STEAM	37,522.678 #/hr.		37,438.57 #/hr.
WATER		26,233.12 #/hr.	26,178.37 #/hr.

TOTAL MASS FLOW 63,755.79 #/hr. ENTHALPY-EFF. 834.57 Btu/#

STEAM FRAC. 58.85 % EQUIV. TEMP. 701.26°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	Non-Condensibile By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. READINGS TAKEN USING A NEW CALIBRATED GAUGE.

R.O. ENGBREITSEN
OCT 13 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20
 DATE 10-13-80 TIME 0845 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 133 PSIG WHT 355°F CALORIMETRIC: SEP. EFF. 99.25 %
 SEPARATOR PRESSURE 127 PSIG TEMP. 285 °F PRESS. 127 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	127 PSIG	127 PSIG	128 PSIG
Δ P	2 PSI	1" W.C.	1 PSI
FLOW RATE			
MASS			58,265.3 #/hr.
STEAM	33,833.89 #/hr.		33,502.55 #/hr.
WATER		25,003.59 #/hr.	24,762.75 #/hr.

TOTAL MASS FLOW 58,837.48 #/hr. ENTHALPY-EFF. 823.14 BTU/#
 STEAM FRAC. 57.5 % EQUIV. TEMP. 700.0°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R. O. ENGBRETSSEN
OCT 17 1980

WELL BACA No 20

DATE 10-13-80 TIME 1700 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 129 PSIG WHT 352 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 125 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	123 PSIG	124 PSIG	126 PSIG
Δ P	2.3 PSI	1.2" W.C.	1.2 PSI
FLOW RATE			
MASS			64,224.76 #/HR.
STEAM	35,756.59 #/HR.		26,357.75 #/HR.
WATER		27,404.445 #/HR.	27,867.21 #/HR.

TOTAL MASS FLOW 63,161.04 #/HR. ENTHALPY-EFF. 814.75 BTU/#
 STEAM FRAC. 56.61 % EQUIV. TEMP. 698.22 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. CLEANED METERING LINES, MANIFOLD AND CALIBRATED ALL METERS.
2. METER READINGS ~~ARE~~ ^{ARE THE SAME} TO MANOMETER READINGS.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R.O. ENGBRETSSEN
OCT 17 1980

WELL BACA No 20
 DATE 10-14-80 TIME 0640 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 127 PSIG WHT 351°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 122 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	121 PSIG	121.5 PSIG	123 PSIG
Δ P	2.2 PSI	0.95" W.C.	1.1 PSI
FLOW RATE			
MASS			59,003.45 #/HR.
STEAM	34,731.94 #/HR.		34,652.63 #/HR.
WATER		24,401.12 #/HR.	24,344.82 #/HR.

TOTAL MASS FLOW 59,133.06 #/HR. ENTHALPY-EFF. 832.25 BTU/#
 STEAM FRAC. 58.74% EQUIV. TEMP. 701.05°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	DENSITY _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R.O. ENGBRETTSEN
OCT 17 1980

WELL BACA N^o 20
 DATE 10-14-80 TIME 0750 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 131 PSIG WHT 353°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 127 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	126 PSIG	126 PSIG	128 PSIG
Δ P	2.1 PSI	0.85" W.C.	1 PSI
FLOW RATE			
MASS			56,210.036 #/Hr.
STEAM	34,542.58 #/Hr.		33,700.16 #/Hr.
WATER		23,053.48 #/Hr.	22,500.88 #/Hr.

TOTAL MASS FLOW 57,596.06 #/Hr. ENTHALPY-EFF. 844.6 BTU/#
 STEAM FRAC. 59.97 % EQUIV. TEMP. 702.2°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R. O. ENGBREITSEN
OCT 17 1980

WELL BACA NR 20

DATE 10-15-80 TIME 1000 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 131 PSIG WHT 353 °F CALORIMETRIC: SEP. EFF. 99.5 %
SEPARATOR PRESSURE 125 PSIG TEMP. 288 °F PRESS. 125 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	125 PSIG	125 PSIG	127 PSIG
Δ P	2.1 PSI	1.1" W.C.	1.1 PSI
FLOW RATE			
MASS			61,578.17 #/hr.
STEAM	34,423.124 #/hr.		34,945.61 #/hr.
WATER		26,233.2 #/hr.	26,632.56 #/hr.

TOTAL MASS FLOW 60,656.33 #/hr. ENTHALPY-EFF. 815.96 BTU/#
STEAM FRAC. 56.75 % EQUIV. TEMP. 698.49 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R.O. ENGBRETSSEN
OCT 17 1980

WELL BACA N# 20

DATE 10-16-80 TIME 0645 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 132 PSIG WHT 353 °F CALORIMETRIC: SEP. EFF. 99.6 %
SEPARATOR PRESSURE 127 PSIG TEMP. 292 °F PRESS. 127 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	127 PSIG	127 PSIG	
Δ P	2.5 PSI	0.9 "W.C.	
FLOW RATE			
MASS			
STEAM	37,783.09 #/hr.		
WATER		23,720.614 #/hr.	

TOTAL MASS FLOW 61,503.704 #/hr. ENTHALPY-EFF. 857.29 BTU/#
STEAM FRAC. 61.43% EQUIV. TEMP. 703.4 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. TWO-PHASE METER LINES FROZZED, DATA TO BE CHECK LATER.

R.O. ENGBRETSSEN

OCT 17 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 10-17-80 TIME 0730 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 138 PSIG WHT 355 °F CALORIMETRIC: SEP. EFF. 99.4 %
SEPARATOR PRESSURE 132 PSIG TEMP. 292 °F PRESS. 132 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	131 PSIG	131 PSIG	134 PSIG
Δ P	1.75 PSI	1.0" W.C.	0.8 PSI
FLOW RATE			
MASS			54,156.54 #/HR.
STEAM	32,098.02 #/HR.		30,452.22 #/HR.
WATER		24,986.58 #/HR.	23,704.32 #/HR.

TOTAL MASS FLOW 57,084.59 #/HR. ENTHALPY-EFF. 813.34 BTU/#
STEAM FRAC. 56.23 % EQUIV. TEMP. 697.9 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
	1345	0	6100	
			6.0 PH	

NON-CONDENSIBLE GAS

DENSITY 1.3125 GM/L

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensibile By Wt. %
1328	99	99	1901	2.4951	101.4951	2.460
1330	95	95	1905	2.5003	97.5003	2.564
1333	97	97	1903	2.4977	99.4977	2.510

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



R.O. ENGBREITSEN

WELL B20

DATE 10-17-80

TIME 13:30

TEST NO. 4

OCT 24 1980
CHOKE TYPE _____

FLOW RATE DATA

WHP _____ WHT _____

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			
QUALITY			
P ₁			
Δ P			
FLOW RATE			
MASS			
STEAM			
WATER			

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____

STEAM FRAC. _____ EQUIV. TEMP. _____

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
		- 0 -	6100	
		Ph 4.3	Ph 6.0	

NON-CONDENSIBLE GAS

DENSITY 1.3125 GM/L

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensibile By Wt. %
<u>1328</u>	<u>99</u>	<u>99</u>	<u>2000</u>	<u>2.625</u>	<u>101.625</u>	<u>2.58</u>
<u>1330</u>	<u>95</u>	<u>95</u>	<u>2000</u>	<u>2.625</u>	<u>97.625</u>	<u>2.70</u>
<u>1333</u>	<u>97</u>	<u>97</u>	<u>2000</u>	<u>2.625</u>	<u>99.625</u>	<u>2.64</u>

REMARKS:

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



WELL BACA NR 20

OCT 24 1980

DATE 10-18-80 TIME 1220 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 131.5 PSIG WHT 352 °F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 126 PSIG TEMP. 292 °F PRESS. 126 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	126 PSIG	126 PSIG	127 PSIG
Δ P	2.1 PSI	1.0 "W.C.	1.1 PSI
FLOW RATE			
MASS			60,437.52 #/hr
STEAM	34,542.47 #/hr.		35,099.8 #/hr
WATER		25,008.04 #/hr.	25,377.72 #/hr.

TOTAL MASS FLOW 50,550.51 #/hr. ENTHALPY-EFF. 827.18 BTU/#

STEAM FRAC. 58.01 % EQUIV. TEMP. 700.6 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

UNIT 76

WELL Baca #20 LOCATION Redondo Canyon DATE 10-18-80

PSIG 126 ORIFICE 9/64" ATMOSP. PRESS. 10.5

CAL. LBS/HR 108 TIME ON 1210 TIME OFF 1240

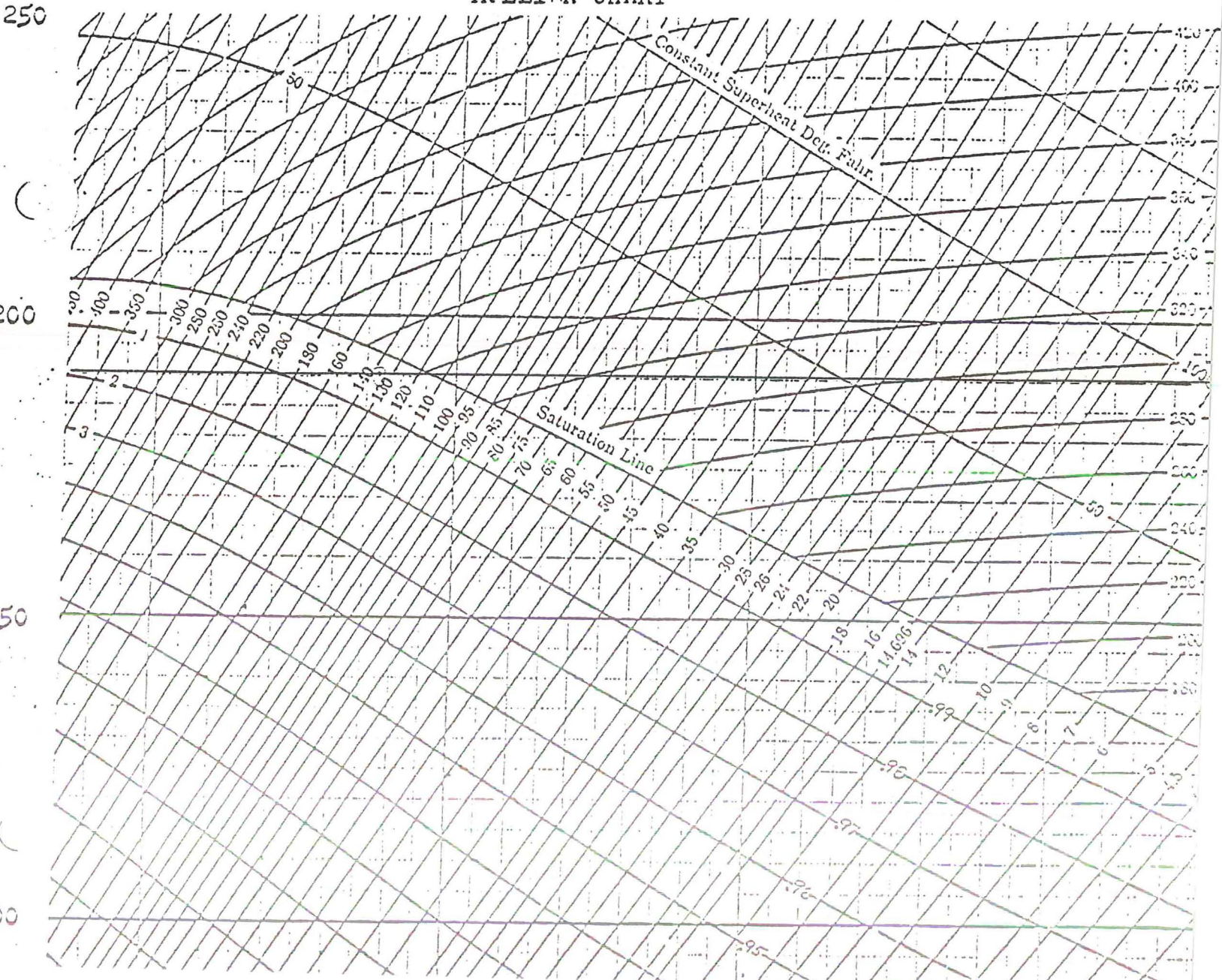
TEMP OF 292 STEAM QUALITY 99.7% BTU/LB 1191

FLOW RATE DATA

PRESS. 126 psig DELTA P 2.1 psi LBS/HR _____

BY J. Thomson

MCLLIFF CHART



Union Geothermal Co. of New Mexico DAILY TESTING REPORT



OCT 24 1980

WELL BACA NR 20

DATE 10-19-80 TIME 0900 HRS TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 130 PSIG WHT 353 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 125 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	124.5 PSIG	123 PSIG	128 PSIG
Δ P	2.2 PSI	1.0 "W.C.	1.1 PSI
FLOW RATE			
MASS			60,264.12 <i>HR</i>
STEAM	35,163.55 <i>HR</i>		35,212.32 <i>HR</i>
WATER		25,021.056 <i>HR</i>	25,051.80

TOTAL MASS FLOW 60,184.61 *HR* ENTHALPY-EFF. 830.54 BTU/#

STEAM FRAC. 58.43% EQUIV. TEMP. 700.80 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT

R.O. LINDRETT
OCT 24 1980


WELL BACA 152 20

DATE 10-20-80 TIME 0630 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 129 PSIG WHT 352 °F CALORIMETRIC: SEP. EFF. 97.4 %
 SEPARATOR PRESSURE 124 PSIG TEMP. 291 °F PRESS. 124 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	123 PSIG	123.5 PSIG	126 PSIG
Δ P	2.05 PSI	1.0" W.C.	1.2 PSI
FLOW RATE		(.07" Hg)	
MASS			62,846.56
STEAM	33,777.89 #/hr.		36,404.09
WATER		25,166.545 #/hr.	81.1 26,321.56

TOTAL MASS FLOW 58,944.43 #/hr. ENTHALPY-EFF. 820.41-Btu/#

STEAM FRAC. 57.3% EQUIV. TEMP. 609.45 °F
58.6% 700.56

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Re-test by IAR 10/24/80

UNION CARBIDE

BELL Baca # 20 LOCATION Redondo Canyon DATE 10-20-80

PSIG 124.5 ORIFICE 9/64" ATMOSP. PRESS. 10.5

CAL. LBS/HR 107 TIME ON 0620 TIME OFF 0650

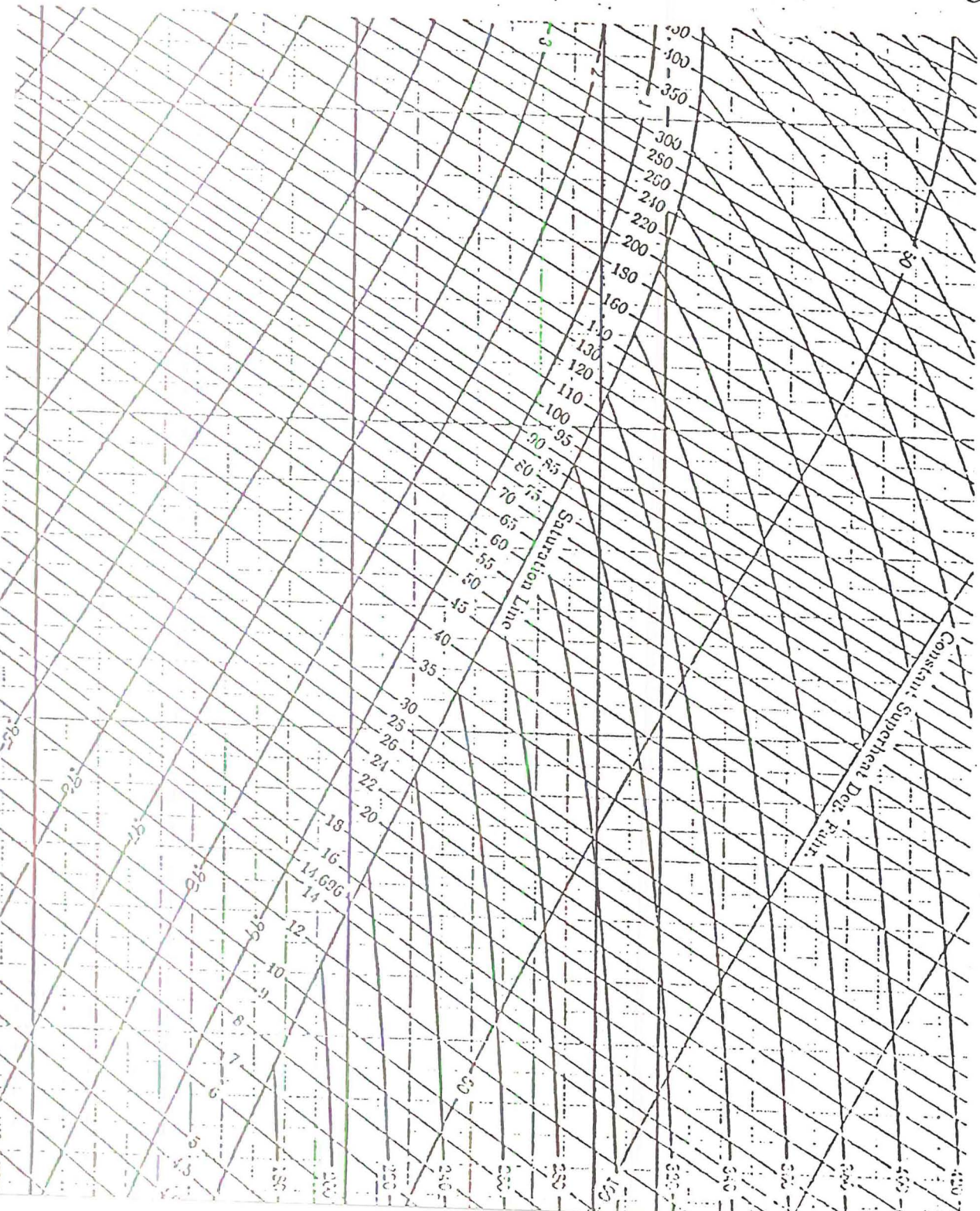
TEMP OF 291 STEAM QUALITY 99.6% BTU/LB 1190

FLOW RATE DATA

PRESS. 123 psig DELTA P 2.05 psi LBS/HR _____

BY A. Thomson

MILLIFR CLEAR



Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R.O. ENGBRETSEN
OCT 24 1980

WELL Baca # 20

DATE 10-21-80 TIME 0630 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 102 psig WHT 334 °f CALORIMETRIC: SEP. EFF. 99.5% %
SEPARATOR PRESSURE 93 psig TEMP. 277 °F PRESS. 92 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	92 psig	92 psig	96 psig
Δ P	3.5 psi	1.4" W.C.	1.8 psi
FLOW RATE		0.10" Hg.	
MASS			71,580 #/hr 69,780.3
STEAM	37,835 #/hr		30,744.7
WATER		30,848 #/hr 30,000.3	

TOTAL MASS FLOW 68,683 #/hr ENTHALPY-EFF. 789.77 BTU/lb
STEAM FRAC. 55.04% EQUIV. TEMP. 691.88 °f
57.00% 696.33 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY <u>1.3125</u> GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
<u>1400</u>	<u>90</u>	<u>90</u>	<u>1950</u>	<u>2.598</u>	<u>92.6</u>	<u>2.8</u>
<u>1410</u>	<u>96</u>	<u>96</u>	<u>2100</u>	<u>2.76</u>	<u>98.76</u>	<u>2.79</u>
<u>1420</u>	<u>94</u>	<u>94</u>	<u>1990</u>	<u>2.61</u>	<u>96.61</u>	<u>2.70</u>

REMARKS: Calculations by hand
Switched separator rates on 10-20-80 at 1100 hrs
Re-calc. Wt. No? 10/29/80.

UNIT 76 FD

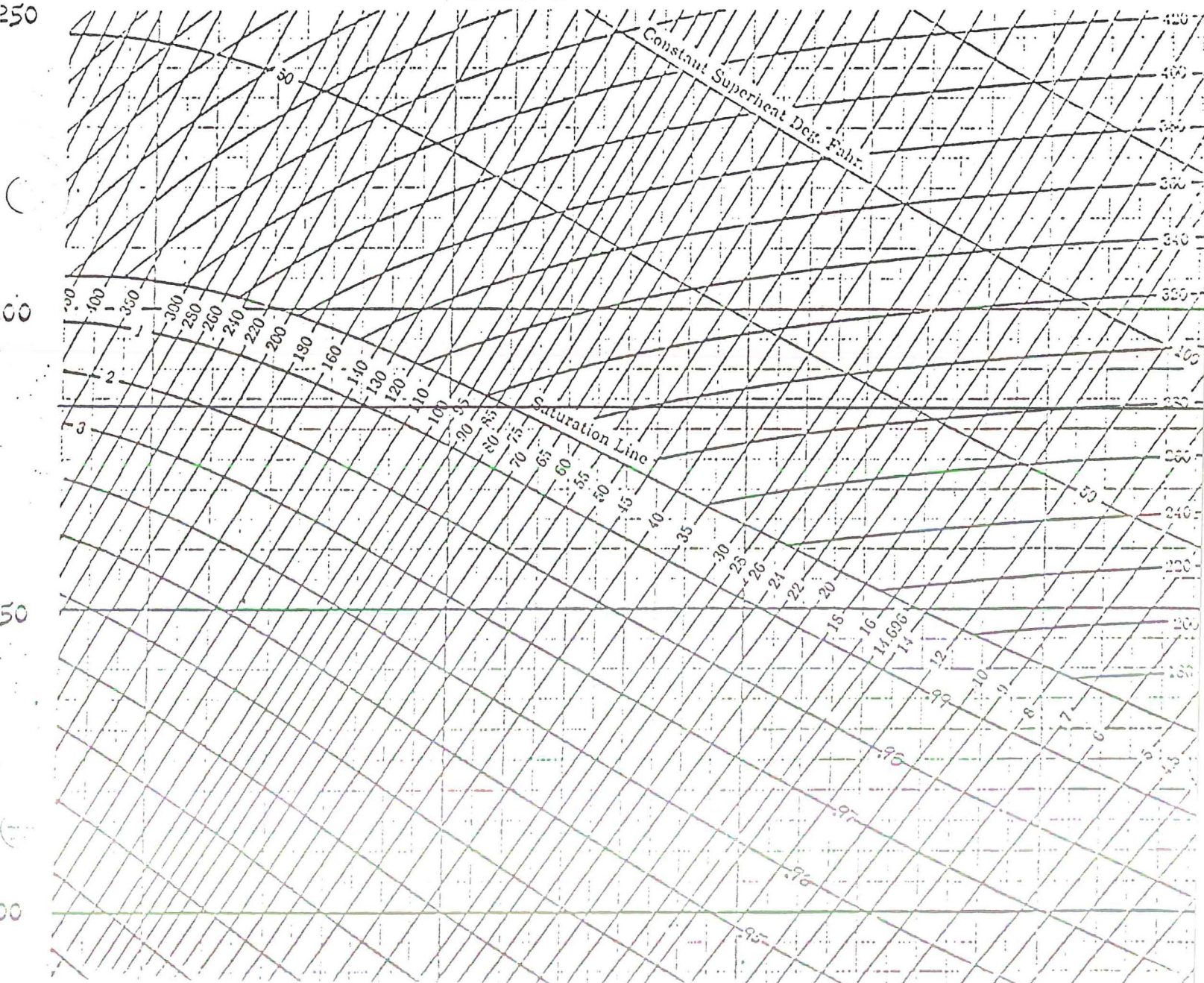
WELL Baca #20 LOCATION Redondo Canyon DATE 10-21-80
PSIG 92 ORIFICE 9/64 ATMOSP. PRESS. 10.5
CAL. LBS/HR 82 TIME ON 0620 TIME OFF 0650
TEMP OF 277 STEAM QUALITY 99.5% BTU/LB 1183

FLOW RATE DATA

PRESS. 92 psig DELTA P 3.5 psi LBS/HR 37.835

BY J. Thomson

MOLLIER CHART



Union Geothermal Co. of New Mexico

DAILY TESTING REPORT

R. O. ENGBREITSEN
OCT 24 1980

WELL Baca #20

DATE 10-22-80 TIME 0625 TEST NO. 4 CHOKE TYPE _____

D=11.875

FLOW RATE DATA

WHP 101 psig WHT 334°F CALORIMETRIC: SEP. EFF. 99.5 %
SEPARATOR PRESSURE 94 psig TEMP. 277 °F PRESS. 93 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	92.5 psig	92.5 psig	96 psig
Δ P	3.4 psi	1.2" W.C. (.09" Hg)	1.8 psi
FLOW RATE			
MASS			68 722 ^{lb} /hr
STEAM	37,802 ^{lb} /hr		30,864.65
WATER	11,239	28,551	815.50 ^{lb} /hr

TOTAL MASS FLOW ~~66,353~~ ^{lb}/hr ENTHALPY-EFF. 806.87 ^{lb}/hr

STEAM FRAC. 56.97% EQUIV. TEMP. 696.58°F
31.77 698.4°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Steam & H₂O P. also in log 10/24/80.

UNION CARBIDE

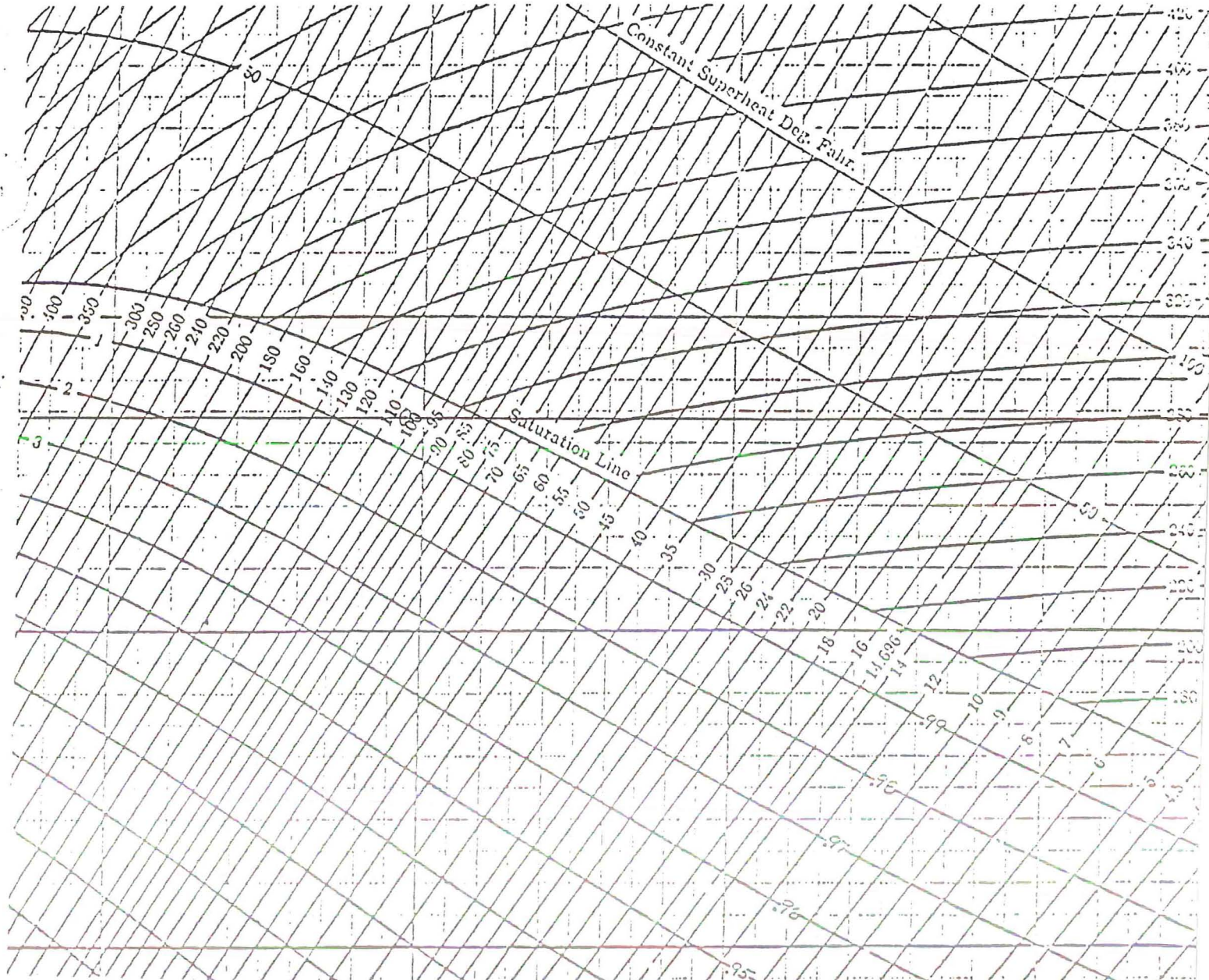
WELL BACA #20 LOCATION REDONDO CANYON DATE 10-22-80
 PSIG 93 P.S.I.G. ORIFICE 9/64" ATMOSP. PRESS. 10.5
 CAL. LBS/HR 82 TIME ON 0615 TIME OFF 0645
 TEMP OF 277 °F. STEAM QUALITY 99.5% BTU/LB 1184

FLOW RATE DATA

PRESS. 92.5 psig DELTA P 3.4 psi LBS/HR 37,802 #/hr

BY JT GD

MOLLIER CHART



R.O. ENGBRETSSEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



OCT 27 1980
WELL BACK NR 20

DATE 10-23-80 TIME 0620 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 102 PSIG WHT 334 °F CALORIMETRIC: SEP. EFF. 99.5 %
SEPARATOR PRESSURE 94 PSIG TEMP. 277 °F PRESS. 94 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	93 PSIG	92.5 PSIG	97 PSIG
Δ P	4.0 PSI	1.0 WIC.	1.7 PSI
FLOW RATE			
MASS			62,970.28 #/HR.
STEAM	41,745.1 #/HR.		39,280.86 #/HR.
WATER		25,171.23 #/HR.	23,689.42 #/HR.

TOTAL MASS FLOW 66,916.33 #/HR. ENTHALPY-EFF. 854.5 BTU/#
STEAM FRAC. 62.38 % EQUIV. TEMP. 703.12 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN
OCT 27 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N# 20
 DATE 10-24-80 TIME 0625 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 101.5 PSIG WHT 334°F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 94 PSIG TEMP. 277 °F PRESS. 94 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	94 PSIG	94 PSIG	97 PSIG
Δ P	3.2 PSI	1.1" W.C.	1.8 PSI
FLOW RATE			
MASS			68,240.84 #
STEAM	37,598.34 #/HR.		40,163.61 #
WATER		26,302.02 #/HR.	28,146.24 #

TOTAL MASS FLOW 63,990.35 #/HR. ENTHALPY-EFF. 822.32 BTU/#
 STEAM FRAC. 58.76 % EQUIV. TEMP. 609.9 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



R.O. ENGBRETSSEN

05/27 1980

BACA NR 20

DATE 10-25-80 TIME 0835 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 103.5 PSIG WHT 335 °F CALORIMETRIC: SEP. EFF. 99.6 %
 SEPARATOR PRESSURE 95.5 PSIG TEMP. 282 °F PRESS. 95 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	95 PSIG	93 PSIG	99 PSIG
Δ P	3.3 PSI	1.1 "W.C.	1.7 PSI
FLOW RATE			
MASS			66,455.10 #
STEAM	38,338.31 #/hr.		30,392.71 #
WATER		26,397.12 #/hr.	27,100.39 #

TOTAL MASS FLOW 64,735.43 #/hr. ENTHALPY-EFF. 826.79 BTU/#
 STEAM FRAC. 59.22 % EQUIV. TEMP. 700.54 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN
OCT 27 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-26-80 TIME 1130 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 105 PSIG WHT 335 °F CALORIMETRIC: SEP. EFF. 99.6 %
SEPARATOR PRESSURE 96 PSIG TEMP. 282 °F PRESS. 96 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	96 PSIG	96 PSIG	100 PSIG
Δ P	3.1 PSI	1.2" W.C.	1.6 PSI
FLOW RATE			
MASS			66,398.24 $\frac{\#}{HR}$
STEAM	37,344.004 $\frac{\#}{HR}$		38,205.55 $\frac{\#}{HR}$
WATER		27,554.96 $\frac{\#}{HR}$	28,192.70 $\frac{\#}{HR}$

TOTAL MASS FLOW 64,898.97 $\frac{\#}{HR}$ ENTHALPY-EFF. 812.36 BTU/#
STEAM FRAC. 57.54 % EQUIV. TEMP. 697.7 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN
OCT 27 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-27-80 TIME 0645 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 106 psig WHT 336 °F CALORIMETRIC: SEP. EFF. 99.6 %
SEPARATOR PRESSURE 98 psig TEMP. 282 °F PRESS. 98 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	97.5 psig	98 psig	101 psig
Δ P	2.85 psi	1.1 "W.C.	1.6 psi
FLOW RATE			
MASS			66,451.07 #/hr
STEAM	36,066.47 #/hr		38,382.14 #/hr
WATER		26,371.81 #/hr	28,068.93 #/hr

TOTAL MASS FLOW 62,438.28 #/hr ENTHALPY-EFF. 815.08 BTU/#

STEAM FRAC. 57.76 % EQUIV. TEMP. 698.3 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N2 20

DATE 10-28-80 TIME 0640 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 108 PSIG WHT 337 °F CALORIMETRIC: SEP. EFF. 99.6 %
 SEPARATOR PRESSURE 100 PSIG TEMP. 282 °F PRESS. 100 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	99 PSIG	99.5 PSIG	103 PSIG
Δ P	2.75 PSI	0.9" w.c.	1.5 PSI
FLOW RATE			
MASS			62,838.65 #/HR.
STEAM	35,665.92 #/HR.		37,659.21 #/HR.
WATER		23,847.43 #/HR.	25,179.44 #/HR.

TOTAL MASS FLOW 59,513.35 #/HR. ENTHALPY-EFF. 835.04 BTU/#
 STEAM FRAC. 59.93% EQUIV. TEMP. 701.31 °F

R.O. ENGBRETSSEN
OCT 27 1980

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	DENSITY _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-28-80 TIME 1610 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 98.5 PSIG WHT 331 °F CALORIMETRIC: SEP. EFF. 99.6 %
 SEPARATOR PRESSURE 90.5 PSIG TEMP. 280 °F PRESS. 90 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	90 PSIG	94 PSIG
Δ P	3.68 PSI	0.95" W.C.	1.7 PSI
FLOW RATE			
MASS			62,757.59 #/HR.
STEAM	39,538.12 #/HR.		38,721.43 #/HR.
WATER		24,545.72 #/HR.	24,036.16 #/HR.

R.O. ENGELBREITSEN
OCT 28 1980

TOTAL MASS FLOW 64,083.84 #/HR. ENTHALPY-EFF. 846.81 BTU/#
 STEAM FRAC. 61.7 % EQUIV. TEMP. 702.41 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-20-80 TIME 0620~~HR~~ TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 98 PSIG WHT 331 °F CALORIMETRIC: SEP. EFF. 99.4 %
 SEPARATOR PRESSURE 91 PSIG TEMP. 278 °F PRESS. 91 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	90 PSIG	93.5 PSIG
Δ P	3.5 PSI	1.3" w.c.	1.7 PSI
FLOW RATE			
MASS			66,916.5 #/HR.
STEAM	38,581.36 #/HR.		38,363.23 #/HR.
WATER		28,713.47 #/HR.	28,553.27 #/HR.

R.O. ENGBRETSER

OCT 28 1980

R.O. ENGBRETSER

TOTAL MASS FLOW 67,294.83 #/HR. ENTHALPY-EFF. 808.41 BTU/#

STEAM FRACTION 57.33% EQUIV. TEMP. 696.8 °F

CHLORIDES

OCT 29 1980

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 10-30-80 TIME 0710 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 332 °F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 91 PSIG TEMP. 279 °F PRESS. 91 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	91 PSIG	94.5 PSIG
Δ P	3.4 PSI	0.875" W.C.	1.7 PSI
FLOW RATE			
MASS			62,705.69 #/HR.
STEAM	38,038.44 #/HR.		38,727.04 #/HR.
WATER		23,552.29 #/HR.	23,978.65 #/HR.

TOTAL MASS FLOW 61590.73 #/HR. ENTHALPY-EFF. 847.73 BTU/#
 STEAM FRAC. 61.76 % EQUIV. TEMP. 702.5 °F

R.O. ENGELBACH
STEIN
OCT 29 1980

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
1	1525 hrs.	0	6200	
		P.H. - 4.25	PH - 6.3	

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY <u>1.3125</u> GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
1513 hrs.	101	101	1899	2.4924	103.4924	2.41
1516 "	100	100	1900	2.4938	102.4938	2.43
1519 "	103	103	1897	2.4898	105.4898	2.36

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 10-31-80 TIME 0630 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 100 PSIG WHT 332 °F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 92 PSIG TEMP. 279 °F PRESS. 92 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	
QUALITY			
P ₁	91 PSIG	92 PSIG	95 PSIG
Δ P	3.3 PSI	✓ 0.8" W.C.	1.7 PSI
FLOW RATE			
MASS			62,253.93 #/hr.
STEAM	37,658.67 #/hr.		28,958.51 #/hr.
WATER		22,515.91 #/hr.	23,295.42 #/hr.

TOTAL MASS FLOW 60,174.58 #/hr. ENTHALPY-EFF. 858.46 BTU/#
 STEAM FRAC. 62.58% EQUIV. TEMP. 703.5 °F

R.O. ENGBRESEN
OCT 31 1980

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-01-80 TIME 0910 hrs TEST NO. 4 CHOKE TYPE R.O. ENGBRETSSEN

FLOW RATE DATA

NOV 4 1980

WHP 99 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. 97.6 %
 SEPARATOR PRESSURE 90.5 PSIG TEMP. 270 °F PRESS. 90 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	89.5 PSIG	91 PSIG	93.5 PSIG
Δ P	3.4 PSI	✓ 0.95" W.C.	1.75 PSI
FLOW RATE			
MASS			64,272.48 #/hr.
STEAM	37,950.97 #/hr.		39,032.68 #/hr.
WATER		24,540.92 #/hr.	25,239.8 #/hr.

TOTAL MASS FLOW 62,491.89 #/hr. ENTHALPY-EFF. 838.2 BTU/#
 STEAM FRAC. 60.73% EQUIV. TEMP. 701.6°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20
 DATE 11-01-80 TIME 1435 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 99 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 91 PSIG TEMP. _____ °F PRESS. _____ PSIG

R. O. ENGBRETSSEN
 NOV 4 1980

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	/ 91 PSIG	94 PSIG
Δ P	3.5 PSI	/ 1.05 W.C.V	1.75 PSI
FLOW RATE			
MASS			65,307.83 #/hr.
STEAM	38,581.366 #/hr.		39,138.98 #/hr.
WATER		25,800.24 #/hr.	26,168.85 #/hr.

TOTAL MASS FLOW 64,381.6 #/hr. ENTHALPY-EFF. 831.44 BTU/#
 STEAM FRAC. 59.93% EQUIV. TEMP. 700.97°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 11-02-80 TIME 0945 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 100 PSIG WHT 332 °F CALORIMETRIC: SEP. EFF. 90.5 %
 SEPARATOR PRESSURE 92 PSIG TEMP. 277 °F PRESS. 92 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	92 PSIG	92 PSIG	95 PSIG
Δ P	3.5 PSI	0.8" W.C.	1.75 PSI
FLOW RATE			
MASS			62,468.04
STEAM	38,934.6 #/HR.		39,579.7 #/HR.
WATER		22,515.91 #/HR.	22,888.3

TOTAL MASS FLOW 61,450.51 #/HR. ENTHALPY-EFF. 862.3 BTU/#
 STEAM FRAC. 63.36 % EQUIV. TEMP. 704 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 11-03-80

TIME 0625 HRS.

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 90 PSIG WHT 331°F

CALORIMETRIC: SEP. EFF. 99.5 %

SEPARATOR PRESSURE 91.5 PSIG

TEMP. 278 °F PRESS. 91 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90.5 PSIG	92 PSIG	94.5 PSIG
Δ P	3.2 PSI	0.6" W.C.	1.6 PSI
FLOW RATE			
MASS			57,982.32 #/hr.
STEAM	37,010.96 #/hr.		37,072.6 #/hr.
WATER		19,499.35 #/hr.	20,000.7 #/hr.

TOTAL MASS FLOW 56,510.31 #/hr. ENTHALPY-EFF. 881 BTU/#

STEAM FRAC. 65.49% EQUIV. TEMP. 705 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-04-80 TIME 1000 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 98.5 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 91.5 PSIG TEMP. 278 °F PRESS. 91.5 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90.5 PSIG	91.8 PSIG	94 PSIG
Δ P	3.3 PSI	0.85" W.C.	1.6 PSI
FLOW RATE			
MASS			60,800.4 #/hr.
STEAM	37,572.79 #/hr.		37,586.8 #/hr.
WATER		23,209.73 #/hr.	23,213.6 #/hr.

TOTAL MASS FLOW 60,782.5 #/hr. ENTHALPY-EFF. 848.35 BTU/#
 STEAM FRAC. 61.82 % EQUIV. TEMP. 702.5 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA W 20

DATE 11-04-80

TIME 1400 hrs.

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 97.5 PSIG WHT 331°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 90 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	89 PSIG	91 PSIG	93 PSIG
Δ P	3.4 PSI	0.6" W.C.	1.6 PSI
FLOW RATE			
MASS			57,138.8 #/hr.
STEAM	37,863.28 #/hr.		37,711.62 #/hr.
WATER		10,503.15 #/hr.	10,427.2 #/hr.

TOTAL MASS FLOW 57,366.43 #/hr. ENTHALPY-EFF. 885 BTU/#

STEAM FRAC. 66% EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-09-80 TIME 0635 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 90 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	89 PSIG	90 PSIG	93.5 PSIG
Δ P	3.35 PSI	0.6" W.C.	1.6 PSI
FLOW RATE			
MASS			57,322.63 #/hr.
STEAM	37,589.94 #/hr.		37,741.22 #/hr.
WATER		19,506.96 #/hr.	19,581.4 #/hr.

TOTAL MASS FLOW 57,006.9 #/hr. ENTHALPY-EFF. 883.6 BTU/#
 STEAM FRAC. 65.84 EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-06-80

TIME 0635 HAS.

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331°F

CALORIMETRIC: SEP. EFF. 99.5 %

SEPARATOR PRESSURE 90.5 PSIG

TEMP. 276 °F PRESS. 90.5 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	90.5 PSIG	93.5 PSIG
Δ P	4 PSI	0.6" W.C.	1.6 PSI
FLOW RATE			
MASS			55,806.3
STEAM	41,178.9 #/hr.		37,870.13 #/hr.
WATER		19,505.0 #/hr.	17,936.2 #/hr.

TOTAL MASS FLOW 60,683.9 #/hr. ENTHALPY-EFF. 901.6 Btu/#

STEAM FRAC. 67.86 % EQUIV. TEMP. 705.3 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Density _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



WELL BACA No 20

DATE 11-07-80 TIME 0645 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 90.5 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	91 PSIG	94 PSIG
Δ P	4 PSI	0.6" W.C.	1.6 PSI
FLOW RATE			
MASS			55,894.4
STEAM	41,178.0 #/HR.		38,008.2 #/HR.
WATER		19,503.15 #/HR.	17,886.23 #/HR.

TOTAL MASS FLOW 60,682.05 #/HR. ENTHALPY-EFF. 901.7 BTU/#
 STEAM FRAC. 68 % EQUIV. TEMP. 705 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
_____	_____	4.4 PH	6.8 PH	_____
_____	_____	0 CHLORIDE	5700 PPM	_____
_____	_____	_____	_____	_____

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Density <u>1.3125</u> GM/L	Non-Condensable By Wt. %
<u>1515 HRS.</u>	<u>98</u>	<u>98</u>	<u>1002</u>	<u>2.4964</u>	<u>100.4964</u>		<u>2.48</u>
<u>1517 "</u>	<u>100</u>	<u>100</u>	<u>1000</u>	<u>2.4938</u>	<u>102.4938</u>		<u>2.43</u>
<u>1520 "</u>	<u>101</u>	<u>101</u>	<u>1899</u>	<u>2.4924</u>	<u>103.4924</u>		<u>2.41</u>

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N^o 20

DATE 11-08-80 TIME 1625 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 90 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	91 PSIG	93 PSIG
Δ P	3.3 PSI	0.5229" w.c.	1.6 PSI
FLOW RATE			
MASS			56,152.02 #/hr.
STEAM	37,486.92 #/hr.		37,795.9 #/hr.
WATER		18,207.0 #/hr.	18,356.1 #/hr.

TOTAL MASS FLOW 55,603.92 #/hr. ENTHALPY-EFF. 896.7 BTU/#

STEAM FRAC. 67.31% EQUIV. TEMP. 705 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. SERVICED ORIFICE FLANGE TAPS AND FOUND OUT DOWNSTREAM OF STEAM LINE AND WATER LINE ARE PLUGGED UP.
2. READINGS ABOVE WERE TAKEN AFTER SERVICING.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA 102 20

DATE 11-09-80 TIME 0900 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 93 PSIG WHT 330 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 89.5 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	89 PSIG	91 PSIG	94 PSIG
Δ P	3.5 PSI	0.4714" W.C.	1.6 PSI
FLOW RATE			
MASS			55,202.4 lb
STEAM	38,403.58 #/hr.		38,067.6 #/hr.
WATER		17,287.2 #/hr.	17,134.8 #/hr.

TOTAL MASS FLOW 55,690.8 #/hr. ENTHALPY-EFF. 911 BTU/#
 STEAM FRAC. 68.96% EQUIV. TEMP. 705 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 11-10-89

TIME 0640 hrs.

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 96 PSIG WHT 330°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 89.5 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	87.5 PSIG	89 PSIG	92.5 PSIG
Δ P	3.4 PSI	0.4714" w.c.	1.6 PSI
FLOW RATE			
MASS			55,340.13 #
STEAM	37,509.26 #/hr.		37,907.98 #/hr.
WATER		17,203.95 #/hr.	17,432.14 #/hr.

TOTAL MASS FLOW 54,803.21 #/hr. ENTHALPY-EFF. 906.9 Btu/#

STEAM FRAC. 68.5% EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	.Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-11-80 TIME 0645 #28 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 96.5 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 89.7 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	88.5 PSIG	90 PSIG	93 PSIG
Δ P	3.2 PSI	0.5143" W.C.	1.5 PSI
FLOW RATE			
MASS			54,610.7 #
STEAM	36,671.31 #/hr.		36,589.2 #/hr.
WATER		18,060.19 #/hr.	18,021.52 #/hr.

TOTAL MASS FLOW 54,731.5 #/hr. ENTHALPY-EFF. 893.7 BTU/#
 STEAM FRAC. 67% EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 11-12-80 TIME 0645 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 98 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 91.5 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90.5 PSIG	91.5 PSIG	94.5 PSIG
Δ P	3.1 PSI	0.5/43" D.C.	1.5 PSI
FLOW RATE			
MASS			55,015.12 #
STEAM	36,430.72 #/HR.		36,829.7 #/HR.
WATER		18,054.66 #/HR.	18,246.0 #/HR.

TOTAL MASS FLOW 54,494.38 #/HR. ENTHALPY-EFF. 803.2 Btu/#
 STEAM FRAC. 66.87% EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA 15-20

DATE 11-12-80 TIME 0910 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 90 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	88.5 PSIG	90 PSIG	93 PSIG
Δ P	3.35 PSI	0.45" W.C.	1.6 PSI
FLOW RATE			
MASS			54,970.7 $\frac{\#}{hr}$
STEAM	37,502.6 $\frac{\#}{hr}$		37,896.84 $\frac{\#}{hr}$
WATER		16,803.53 $\frac{\#}{hr}$	17,073.86 $\frac{\#}{hr}$

TOTAL MASS FLOW 54,396.13 $\frac{\#}{hr}$ ENTHALPY-EFF. 911.2 Btu/#
 STEAM FRAC. 68.04% EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ Total Mass Wt. Grams	GM/L Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. ABOVE DATA WERE TAKEN ONE HOUR AFTER ADJUSTING SEPARATOR PRESSURE FROM 91.5 TO 90 PSIG AND SERVICING ORIFICE TAPS.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 11-13-80 TIME 0700 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 96.5 PSIG WHT 320°F CALORIMETRIC: SEP. EFF. 99.6 %
 SEPARATOR PRESSURE 90 PSIG TEMP. 277 °F PRESS. 90 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P _i	88.5 PSIG	90 PSIG	93 PSIG
Δ P	3.15 PSI	0.5143" W.C.	1.45 PSI
FLOW RATE			
MASS			53,823.12 lb / hr
STEAM	36,389.62 lb / hr		35,969.9 lb / hr
WATER		18,060.2 lb / hr	17,853.14 lb / hr

TOTAL MASS FLOW 54,449.82 ~~lb~~ / hr ENTHALPY-EFF. 802.4 BTU/#
 STEAM FRAC. 66.83% EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ Total Mass Wt. Grams	GM/L Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-14-80 TIME 0705 #RS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331 °F CALORIMETRIC: SEP. EFF. 97.5 %
 SEPARATOR PRESSURE 90 PSIG TEMP. 276 °F PRESS. 90 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	87 PSIG	90.5 PSIG	93.5 PSIG
Δ P	3.25 PSI	0.4071 W.C.	1.6 PSI
FLOW RATE			
MASS			54,466.6 #
STEAM	37,036.66 #/hr.		37,935.03 #/hr.
WATER		16,066.5 #/hr.	16,481.6 #/hr.

TOTAL MASS FLOW 53,103.16 #/hr. ENTHALPY-EFF. 918 BTU/#
 STEAM FRAC. 69.74 % EQUIV. TEMP. 705 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 11-15-80 TIME 1440 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 90 PSIG TEMP. 276 °F PRESS. 90 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	80 PSIG	90 PSIG	93.25 PSIG
Δ P	3.2 PSI	0.5571" W.C.	1.5 PSI
FLOW RATE			
MASS			55,225.44 #/HR.
STEAM	30,756.62 #/HR.		36,537.15 #/HR.
WATER		18,706.66 #/HR.	18,688.3 #/HR.

TOTAL MASS FLOW 55,553.28 #/HR. ENTHALPY-EFF. 886.5 BTU/#
 STEAM FRAC. 66.16 % EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-16-80 TIME 0735 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 331°F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 90.5 PSIG TEMP. 276 °F PRESS. 90.5 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	90 PSIG	90 PSIG	93.5 PSIG
Δ P	3.2 PSI	0.5571" w.c.	1.5 PSI
FLOW RATE			
MASS			55,202.1 #/hr.
STEAM	36,926.43 #/hr.		36,582.4 #/hr.
WATER		18,796.66 #/hr.	18,619.67 #/hr.

TOTAL MASS FLOW 55,723.1 #/hr. ENTHALPY-EFF. 887.6 Btu/#
 STEAM FRAC. 66.27% EQUIV. TEMP. 705°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 11-17-80 TIME 0120 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 97 PSIG WHT 334 °F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 90 PSIG TEMP. 276 °F PRESS. 90 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	7"
QUALITY			
P ₁	89 PSIG	90.5 PSIG	93 PSIG
Δ P	3.05 PSI	0.4286" W.C.	1.45 PSI
FLOW RATE			
MASS			52,690.5 # / HR.
STEAM	35,902.26 # / HR.		36,108.8 # / HR.
WATER		16,485.3 # / HR.	16,581.71 # / HR.

TOTAL MASS FLOW 52,387.55 #/HR. ENTHALPY-EFF. 907.5 BTU/#
 STEAM FRAC. 68.53 EQUIV. TEMP. 705 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

INSTALLED NEW THERMOMETER AT WELL HEAD.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 11-17-80 TIME 1610 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 112 PSIG WHT 344°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 50 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	4"
QUALITY			
P ₁	48 PSIG	50 PSIG	107.5 PSIG
Δ P	5.2 PSI	0.825" W.C.	18 PSI
FLOW RATE			
MASS			60,086.4 #/hr.
STEAM	36,554.9 #/hr.		26,838.9 #/hr.
WATER		23,071.53 #/hr.	23,247.43 #/hr.

TOTAL MASS FLOW 50,626.43 #/hr. ENTHALPY-EFF. 823.4 BTU/#
 STEAM FRAC. 61.31% EQUIV. TEMP. 700°F

CHLORIDES

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

NON-CONDENSIBLE GAS

DENSITY 1.3125 GM/L

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensable By Wt. %
<u>0040 hrs.</u>	<u>103</u>	<u>103</u>	<u>1897</u>	<u>2.4898</u>	<u>105.4898</u>	<u>2.36</u>
<u>0043 "</u>	<u>100</u>	<u>100</u>	<u>1900</u>	<u>2.4938</u>	<u>102.4938</u>	<u>2.43</u>
<u>0046 "</u>	<u>97</u>	<u>97</u>	<u>1903</u>	<u>2.4977</u>	<u>99.4977</u>	<u>2.51</u>

REMARKS:

1. @ 1025 hrs. SHUT-IN WELL AND CHANGED TWO-PHASE METERS 1 TO 3 ORIFICES FROM 7" TO 4".
2. PUT BACK TO PRODUCTION @ 1145 hrs. AND MAINTAINED SEPARATOR PRESSURE OF 50 PSIG.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-18-80

TIME 0645 HRS. TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 111 PSIG WHT 343°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 50.25 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	4"	4"
QUALITY			
P ₁	49. PSIG	50.5 PSIG	106.5 PSIG
Δ P	4.95 PSI	0.9" W.C.	17.5 PSI
FLOW RATE			
MASS			60,522.45
STEAM	35,982.01 #/HR.		36,246.9 #/HR.
WATER		24,004.5 #/HR.	24,275.55 #/HR.

TOTAL MASS FLOW 60,076.51 #/HR. ENTHALPY-EFF. 810.46 BTU/#

STEAM FRAC. 59.89 % EQUIV. TEMP. 697.26°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. SHUT-IN WELL @ 1240 HRS. AND CHANGED ORIFICE PLATE AT WATERLINE FROM 4" TO 3".
2. PUT BACK TO PRODUCTION @ 1515 HRS. AND MAINTAINED SEPARATOR PRESSURE OF 50 PSIG

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 11-19-80 TIME 1000 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 114 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 50 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE	
ORIFICE	6"	3"	4"	
QUALITY			①	②
P ₁	48.5 PSIG	50 PSIG	109 PSIG	92 PSIG
Δ P	5.35 PSI	2.25" W.C.	18.25 PSI	21 PSI
FLOW RATE				
MASS			58,910.01	
STEAM	37,188.415 #/HR.		37,460.0 #/HR.	
WATER		21,295.2 #/HR.	21,449.13 #/HR.	

TOTAL MASS FLOW 58,483.62 #/HR. ENTHALPY-EFF. 844.28 BTU/#
 STEAM FRAC. 63.59% EQUIV. TEMP. 702 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 11-20-80

TIME 0700 HRS. TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 112.5 PSIG WHT 344°F
SEPARATOR PRESSURE 49.5 PSIG

CALORIMETRIC: SEP. EFF. _____ %
TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE		
ORIFICE	6"	3"	4"		
QUALITY			①	②	③
P ₁	48 PSIG	50 PSIG	108 PSIG	91.5 PSIG	73 PSIG
Δ P	5.2 PSI	2.177" W.C.	18 PSI	20.75 PSI	26 PSI
FLOW RATE					
MASS			58,314.02		
STEAM	36,554.9 #/hr.		37,070.22 #/hr.		
WATER		20,946.9 #/hr.		21,243.8 #/hr.	

TOTAL MASS FLOW 57,501.8 #/hr. ENTHALPY-EFF. 843.8 BTU/#
STEAM FRAC. 63.57% EQUIV. TEMP. 702°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA W 20

DATE 11-21-80 TIME 0650 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 109 PSIG WHT 340 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 50 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	49 PSIG	50 PSIG	① 106 PSIG ② 91 PSIG ③ 73
Δ P	5.05 PSI	2.3571" W.C.	17.5 PSI 20.5 PSI 27.
FLOW RATE			
MASS			57,915.81
STEAM	36,324.14 #/HR.		36,214.75 #/HR.
WATER		21,763.28 #/HR.	21,701.01

TOTAL MASS FLOW 58,087.42 #/HR. ENTHALPY-EFF. 834.6 BTU/#
 STEAM FRAC. 62.53 % EQUIV. TEMP. 701.3 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA Nº 20

DATE 11-22-80

TIME 0840 HRS.

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 109 PSIG WHT 339 °F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 50.5 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE	
ORIFICE	6"	3"	4"	
QUALITY			①	②
P ₁	49 PSIG	51 PSIG	106 PSIG	91 PSIG
Δ P	5.1 PSI	2.1429" W.C.	17 PSI	20 PSI
FLOW RATE				
MASS			56,223.3	
STEAM	36,493.726 #/HR.		35,825.5 #/HR.	
WATER		20,777.25 #/HR.	20,397.83 #/HR.	

TOTAL MASS FLOW 57,270.97 #/HR. ENTHALPY-EFF. 845.8 BTU/#

STEAM FRAC. 63.72 % EQUIV. TEMP. 702.3 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. ADJUSTED SEP. PRESS. FROM 50 TO 100 PSIG @ 1140 HRS.
2. STEAM CONTROL VALVE ALMOST CLOSED.
3. WELL FLOW FLUCTUATES WITH SEP. PRESS. FROM 85 PSIG TO 120 PSIG UNTIL SUNDAY 11-23-80 @ 1220 HRS. @ AN INTERVAL OF ABOUT ONE HOUR.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-23-80 TIME 1330 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 137.5 PSIG WHT 356°F CALORIMETRIC: SEP. EFF. 99.5 %

SEPARATOR PRESSURE 100 PSIG TEMP. 277 °F PRESS. 100 PSIG

	STEAM	WATER	TWO-PHASE		
ORIFICE	6"	3"	4"		
QUALITY			①	②	③
P ₁	98 PSIG	99 PSIG	134.5 PSIG	122.5 PSIG	110.5
Δ P	2.5 PSI	3.3420' W.C.	13 PSI	14 PSI	15.5
FLOW RATE					
MASS			61,078.3		
STEAM	33,887.1 #/HR.		34,747.44 #/HR.		
WATER		25,678.8 #/HR.	26,320.85 #/HR.		

TOTAL MASS FLOW 59,565.9 #/HR. ENTHALPY - EFF. 808.2 BTU/#

STEAM FRAC. 56.80 % EQUIV. TEMP. 606.76 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-24-80 TIME 0700 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 130 PSIG WHT 352 °F
SEPARATOR PRESSURE 98 PSIG

CALORIMETRIC: SEP. EFF. 99.5 %
TEMP. 277 °F PRESS. 98 PSIG

	STEAM	WATER	TWO-PHASE	
ORIFICE	6"	3"	4"	
QUALITY			①	②
P ₁	97 PSIG	98 PSIG	127 PSIG	117 PSIG
Δ P	2.1 PSI	2.8714" W.C.	11.5 PSI	12.25 PSI
FLOW RATE				
MASS			56,305.95	
STEAM	30,962.5 #/hr.		31,829.77	
WATER		23,813.95 #/hr.	24,476.21	

TOTAL MASS FLOW 54,776.45 #/hr. ENTHALPY-EFF. 804.14 BTU/l
STEAM FRAC. 56.53% EQUIV. TEMP. 606 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-19-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI	
1000	109	18.25	52,910.01	92	21		74	28.75	
1100	108.5	18		92	21		74	28.75	
1200	108.5	18		92	21.0		74.5	28.5	
1300	108.5	18		92	21.25		75	28.5	
1400	108	18		92.5	21		74.5	28.5	
1600	109	18		92.5	20.75		75	28.25	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH (2.59)
TIME HRS.	P _i PSIG	ΔP PSI	FLOWRATE #/HR.	P _i PSIG	ΔH "w.c.	FLOWRATE #/HR.		
1000	48.5	5.35	37,187.9	50	5.25	32,528.96	69,716.86	53.34
1100	48	5.35	37,048.02	50.5	5.25	32,524.96	69,572.98	53.25
1200	48.5	5.35	37,187.9	50	5.25	32,528.96	69,716.86	53.34
1300	49	5.33	37,261.5	51	5.25	32,521.22	69,782.72	53.40
1400	48.5	5.33	37,122.3	50.5	4.9	31,422.1	68,544.4	54.16
1600	49.5	5.3	37,300.55	52	5.08	31,982.8	69,283.35	53.84

REMARKS: ABOVE DATA TAKEN AT SEPARATOR PRESSURE
OF 50 PSIG.

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-20-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI	
0700	108	18		91.5	20.75		73	28	
0800	107.5	17.75		92	20.5		74.5	28	
0900	106	17.5		91	20.5		73	27.75	
1000	106	17.5		90.5	20.5		73	27.75	
1320	106	17.5		90	20.5		73	27	
1430	106	17.5		90.5	20		73	27	
1530	106	17.5		90.5	20		73.5	27.25	
1600	106	17.5		90.5	20		73.5	27	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P _i PSIG	ΔP PSI	FLOWRATE #/HR.	P _i PSIG	ΔH "w.c.	FLOWRATE #/HR.		
0700	48	5.2	36,554.9	50	5.08	31,997.96	68,552.86	53.32
0800	49.5	5.1	36,629.02	51	5.4	32,982.54	69,611.56	52.62
0900	49	5.1	36,493.73	51	5.4	32,982.54	69,476.27	52.53
1000	49	5.1	36,493.73	50	5.7	33,894.4	70,388.13	51.85
1320	48.5	5.15	36,609.31	50.5	5.7	33,890.24	70,499.55	51.93
1430	49.5	5.2	36,966.7	50.5	5.7	33,890.24	70,856.94	52.17
1530	49.5	5.15	36,798.33	50.5	5.4	32,986.34	69,784.67	52.73
1600	49.5	5.15	36,798.33	50.5	5.6	33,591.64	70,389.97	52.28

REMARKS: SEPARATOR PRESSURE MAINTAINED @ 50 PSIG

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-21-80

ATM. PRESS. @ BACA = 10 PSIA

WHP = 100 PSIG SEP. PRESS. = 50 PSIG

TWO-PHASE METERS

① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"		
TIME HRS.	P _i PSIG	ΔP PSI	P _i PSIG	ΔP PSI	P _i PSIG	ΔP PSI		
0700	106	17.5	91	20.5	73	27.5		
0830	105.5	17.5	90.5	20.25	73.5	27.25		
0930	105.5	17.5	90.5	20.5	73.5	27.25		
1025	105.5	17.5	90.5	20.5	73.5	27.25		
1130	105.5	17.5	90.5	20.25	73.5	27.5		
1230	106	17.5	91	20.5	73.5	27.		
1600	105.5	17	90.5	20.25	73.5	27		

SINGLE-PHASE METERS

STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P _i PSIG	ΔP PSI	FLOWRATE #/HR.	P _i PSIG	ΔH "w.c.	FLOWRATE #/HR.		
0700	49	5.05	36,324.14	50	5.5	33,294.45	69,618.59	52.18
0830	49	5.1	36,493.73	50.5	5.4	32,986.34	69,480.1	52.52
0930	49	5.1	36,493.73	51	5.6	33,587.8	70,081.53	52.07
1025	49.5	5.1	36,629.02	51.5	5.25	32,517.22	69,146.24	52.97
1130	49	5.1	36,493.73	51	5.25	32,521.22	69,014.95	52.88
1230	49	5.1	36,493.73	51	5.6	32,241.3	68,735.03	53.09
1600	49.5	5.15	36,798.33	50.5	5.4	32,986.34	69,784.67	52.73

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-22-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI	
0850	106	17		91	20		73.5	27	
1000	106	17		91	20		74	27.5	
1100	106	17		91	20		74	28	
1130	105.5	17		90	20		73.5	27	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P ₁ PSIG	ΔP PSI	FLOWRATE #/HR.	P ₁ PSIG	ΔH "W.C.	FLOWRATE #/HR.		
0850	49.5	5.1	36,629.02	51	5	31,737.46	68,366.48	53.58
1000	49.5	5.1	36,629.02	51	5.25	32,521.22	69,150.24	52.97
1100	49.5	5.1	36,629.02	51	5.15	32,210.91	68,839.03	53.21
1130	49.5	5.15	36,798.33	51.5	5.4	32,978.5	69,776.83	52.74

REMARKS: 1. ADJUSTED SEP. PRESS. FROM 50 TO 100 PSIG @ 1140 HRS. 11-22-80
 2. STEAM CONTROL VALVE ALMOST CLOSED.
 3. WELL BEGUN FLUCTUATING OF SEP. PRESS. FROM 85 PSIG
 TO 125 PSIG UNTIL SUNDAY 11-23-80 @ 1230 HRS. WITH INTERVAL

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-23-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI	
1330	134.5	13		122.5	14		110.5	15.5	
1430	134	13		122	14		111	15.5	
1530	132	12		122	14		110	15	
1630	131	12		120	13		109	14.5	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P ₁ PSIG	ΔP PSI	FLOWRATE #/HR.	P ₁ PSIG	ΔH "w.c.	FLOWRATE #/HR.		
1330	98	2.5	33,987.1	99	7.8	39,241.85	73,128.95	46.34
1430	99	2.45	33,694.15	99.5	7.7	38,985.8	72,679.95	46.36
1530	98	2.4	33,212.3	98.5	7.7	38,093.1	72,205.4	46.0
1630	98	2.4	33,212.3	99	7.8	39,241.85	72,454.2	45.84

REMARKS: @ 1330 HRS. WHP = 137.5 PSIG, WAT = 356°F
SEP. PRESS. = 100 PSIG
CAL. TEMP. = 277°F @ 100 PSIG

BACA № 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-24-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI	
0830	126.5	10.8		117	11.65		107	12.75	
0930	127	11		117.5	11.75		108	12.5	
1030	127	11		118	11.5		108.5	12.25	
1130	127.5	10.75		118	11.5		108.5	12.5	
1300	128	10.75		119	11.4		109	12.3	
1430	128	10.75		119	11.5		110	12.4	
1530	129	10.75		119	11.3		110	12.4	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P ₁ PSIG	ΔP PSI	FLOWRATE #/HR.	P ₁ PSIG	ΔH "W.C.	FLOWRATE #/HR.		
0830	97	1.9	29,468.9	98	2.8	23,516.01	52,984.91	55.62
0930	98	1.9	29,594.8	100	2.8	23,507.11	53,101.91	55.73
1030	98.5	1.9	29,657.5	100	2.85	23,716.1	53,373.6	55.57
1130	99	1.9	29,720.23	100	2.85	23,716.1	53,436.33	55.62
1300	100	1.85	29,454.13	101	2.85	23,711.6	53,165.73	55.4
1430	99.5	1.85	29,392.6	101	2.9	23,918.7	53,311.3	55.13
1530	100	1.9	29,845.15	101	2.9	23,918.7	53,763.85	55.51

REMARKS: _____

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 11-25-80 TIME 0800 HRS TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 133 PSIG WHT 354 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 101 PSIG TEMP. 281 °F PRESS. 100 PSIG

	STEAM	WATER	TWO-PHASE	
ORIFICE	6"	3"	4"	
QUALITY			①	②
P ₁	99 PSIG	100.5 PSIG	130 PSIG	119.5 PSIG
Δ P	2.05 PSI	3.15 "W.C.	11.25 PSI	12 PSI
FLOW RATE				
MASS			57,335.21	
STEAM	30,857.5 #/HR.		31,712.1	
WATER		24,930.7 #/HR.	25,623.11	

TOTAL MASS FLOW 55,788.16 #/HR. ENTHALPY-EFF. 774.63 BTU/#
 STEAM FRAC. 55.31 % EQUIV. TEMP. 693.12 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

BACA № 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-25-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI	
0930	130.5	11.75		120	12.75		109	14	
1245	128.5	11		118.5	12		108.5	13.5	
1345	129	11		119.5	12		109	13.5	
1500	128.5	11.25		118.5	12		108.5	13.25	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P _i PSIG	ΔP PSI	FLOWRATE #/HR.	P _i PSIG	ΔH "W.C.	FLOWRATE #/HR.		
0930	98	2.15		99.5	3.3			
1245	98	2.1		99.5	3.3			
1345	98	2.1		99.5	3.3			
1500	98	2.1		99.5	3.3			

REMARKS: _____

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 11-26-80 TIME 0700 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 131 PSIG WHT 352 °F CALORIMETRIC: SEP. EFF. 99.5 %
 SEPARATOR PRESSURE 100 PSIG TEMP. 280 °F PRESS. 100 PSIG

	STEAM	WATER	TWO-PHASE		
ORIFICE	6"	3"	4"		
QUALITY			①	②	③
P ₁	99.5 PSIG	100.5 PSIG	128 PSIG	119	109.5
Δ P	1.9 PSI	3.3" W.C.	10.9 PSI	11.7	12.6
FLOW RATE					
MASS			57,248.4 # / hr		
STEAM	29,782.8 # / hr		20,914.14 # / hr		
WATER		25,517.34 # / hr	26,334.26 # / hr		

TOTAL MASS FLOW 55,300.14 # / hr ENTHALPY-EFF. 781.41 BTU / #
 STEAM FRAC. 54 % EQUIV. TEMP. 689 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-26-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI	
0700	128	10.9		119	11.7		109.5	12.6	
0930	127.5	10.75		120	11.5		110	12.5	
1030	129	10.75		119.5	11.5		110	12	
1130	129	10.8		119.5	11.6		110	12.25	
1230	128.5	10.75		119	11.3		110	12.3	
1315	128.5	10.7		119	11.25		110	12.25	
1400	128.5	10.75		119	11.25		110	12	
1500	129	10.75		119.5	11.25		110	12.4	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P ₁ PSIG	ΔP PSI	FLOWRATE #/HR.	P ₁ PSIG	ΔH "w.c.	FLOWRATE #/HR.		
0700	99.5	1.9		100.5	3.3			
0930	100	1.9		101	3.3			
1030	100	1.85		101	3.2			
1130	100	1.9		101	3.3			
1230	100.5	1.85		102	3			
1315	100	1.85		101.5	3.2			
1400	100.5	1.9		102	3.2			
1500	100	1.9		101.5	3.4			

REMARKS: @ 1505 HRS. SHIFTED SEPARATOR PRESSURE
FROM 100 PSIG TO 75 PSIG

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



R.O. ENGBRETSSEN
WELL 44CA NR 20
DATE DEC 03 1980

DATE 11-27-80 TIME 0730 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 122 psig WHT 349°F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75.5 psig TEMP. _____ °F PRESS. _____ PSIG

	STEAM		WATER		TWO-PHASE	
					①	②
ORIFICE	6"		3"		4"	
QUALITY					①	②
P ₁	75.5 psig		76.5 psig		118 psig	105 psig
Δ P	3.4 psi		2.6 "w.c.		15 psi	16 psi
FLOW RATE						
MASS					58,610.8	
STEAM	35,417.52 #/hr.				35,225.1 #/hr.	
WATER			22,757.3 #/hr.		23,385.71 #/hr.	

TOTAL MASS FLOW 58,174.82 #/hr. ENTHALPY-EFF. 833.03 BTU/#
STEAM FRAC. 60.1% EQUIV. TEMP. 701°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-27-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI	
0830	119	14.5		106	16		91.5	19.5	
0930	119	14.75		106	16.25		92.5	19.5	
1030	118.5	14.5		106	16.25		92	19.25	
1130	118.5	14.5		106	16.5		92	19.25	
1245	118.5	14.5		106	16.5		92	19.25	
1345	118	14.5		105.5	16		92	19.25	
1500	118	14.5		105.5	16.25		92	19.5	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P ₁ PSIG	ΔP PSI	FLOWRATE #/HR.	P ₁ PSIG	ΔH "W.C.	FLOWRATE #/HR.		
0830	75.5	3.35		76.5	2.5			
0930	76	3.35		77	2.55			
1030	75.5	3.3		77	2.4			
1130	76	3.35		77	2.4			
1245	76	3.3		77	2.5			
1345	76	3.25		77	2.55			
1500	76	3.3		77	2.55			

REMARKS: _____

R.O. ENGBREISEN
DEC 01 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 11-28-80 TIME 0845 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 120 PSIG WHT 347 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE	
ORIFICE	6"	3"	4"	
QUALITY			①	②
P ₁	74.5 PSIG	76 PSIG	117 PSIG	104 PSIG
Δ P	3.3 PSI	2.8 W.C.	14.5 PSI	16.5 PSI
FLOW RATE				
MASS			58,420.36	
STEAM	34,721.1 #/HR.		34,771.8	
WATER		23,618.98 #/HR.	23,648.56	

TOTAL MASS FLOW 58,340.1 #/HR. ENTHALPY-EFF. 820.8 BTU/#
STEAM FRAC. 59.52% EQUIV. TEMP. 699.6 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-28-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI	
0945	117	14.75		104.5	16.4		91	19.25	
1015	117.5	14.7		104.5	16.3		91	19.25	
1145	117	14.75		104.5	16.3		91	19.25	
1240	117.5	14.8		104.5	16.5		91	19.25	
1345	117	14.75		104	16.4		90.5	19.3	
1500	117	14.75		104.5	16.2		91	19.2	
1525	116.5	14.8		103.5	16.3		90.5	19.2	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P _i PSIG	ΔP PSI	FLOWRATE #/HR.	P _i PSIG	ΔH "w.c.	FLOWRATE #/HR.		
0945	74.5	3.25		76	2.75			
1015	75	3.35		76	3.08			
1145	74.5	3.20		76	2.9			
1240	74.5	3.3		76	2.7			
1345	74.5	3.25		76	2.7			
1500	75	3.21		76	2.6			
1525	74.5	3.25		76	2.6			

REMARKS: _____

R.O. ENGBRETSSEN

DEC 01 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA # 20

DATE 11-29-80 TIME 1030 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 120 PSIG WHT 347 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75.5 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE		
ORIFICE	6"	3"	4"		
QUALITY			①	②	③
P ₁	75 PSIG	77 PSIG	117 PSIG	104.5 PSIG	91
Δ P	3.15 PSI	2.6" W.C.	14.4 PSI	16 PSI	18.5
FLOW RATE					
MASS			57,430.7		
STEAM	34,032.4 #/hr.		34,418.22 #/hr.		
WATER		22,755.1 #/hr.	23,012.5		

TOTAL MASS FLOW 56,787.5 #/hr. ENTHALPY-EFF. 824.6 BTU/#

STEAM FRAC. 59.93% EQUIV. TEMP. 700 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

BACA № 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-29-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI	
1130	117.5	14.25		104	15.75		91.5	18.5	
1300	116	14.5		104	16		90.5	18.85	
1400	116	14.4		104	16		91	18.75	
1440	116.5	14.5		103.5	16.1		91	18.7	
1530	116	14.35		104	15.9		90.5	18.75	
1635	116.5	14.5		104	15.8		90.5	18.75	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P ₁ PSIG	ΔP PSI	FLOWRATE #/HR.	P ₁ PSIG	ΔH "w.c.	FLOWRATE #/HR.		
1130	75.5	3.13		77.5	2.4			
1300	75	3.25		76.5	2.75			
1400	75	3.22		76	2.7			
1440	75	3.23		76	2.55			
1530	75	3.2		76	2.7			
1635	75	3.19		76.5	2.4			

REMARKS: _____

R.O. ENGBREITSEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL DECA 01 1980
DECA NO 20

DATE 11-30-80 TIME 0800 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 119 PSIG WHT 346°F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE		
ORIFICE	6"	3"	4"		
QUALITY			①	②	③
P ₁	75 PSIG	77 PSIG	116 PSIG	103 PSIG	91 PSIG
Δ P	3.1 PSI	2.7" W.C.	14.25 PSI	15 PSI	18 PSI
FLOW RATE					
MASS			58,100.85		
STEAM	33,767.56 #/HR.		34,050.4 #/HR.		
WATER		24,032.1 #/HR.	24,100.5 #/HR.		

TOTAL MASS FLOW 57,700.66 #/HR. ENTHALPY-EFF. 810.0 Btu/#
STEAM FRAC. 58.42% EQUIV. TEMP. 697.4°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 11-30-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS									
① PIPE ID = 10.02" ORIFICE = 4"			② PIPE ID = 10.02" ORIFICE = 4"			③ PIPE ID = 10.02" ORIFICE = 4"			
TIME HRS.	P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI		P _i PSIG	ΔP PSI	
0900	116	14		104	15		91	18	
1000	116	14.25		104	16.5		91	18	
1100	117	14.25		104	15.5		91	18	
1215	116	14		104	15.5		91	18	
1300	116	14		103.5	15		90.5	17.5	
1430	116	13.5		102.5	15		91	18	
1530	116	14		105	16		91	18	

SINGLE-PHASE METERS								
STEAM / PIPE ID = 11.875" LINE / ORIFICE = 6"				WATER / PIPE ID = 11.875" LINE / ORIFICE = 3"			MASS FLOWRATE #/HR.	% FLASH
TIME HRS.	P _i PSIG	ΔP PSI	FLOWRATE #/HR.	P _i PSIG	ΔH "w.c.	FLOWRATE #/HR.		
0900	76	3.1		77	2.6			
1030	76	3.1		77	3.0			
1100	76	3.1		77	2.7			
1215	76	3.25		77	2.8			
1300	76	3		77	2.5			
1430	76	3		77	2.6			
1530	76	3		77	2.6			

REMARKS: _____

R. O. ENGBREITSEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



DEC 01 1980

WELL BACA NR 20

DATE 12-1-80

TIME 0700 hrs.

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 110 PSIG WHT 346°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 75 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE	
ORIFICE	6"	3"	4"	
QUALITY			①	②
P ₁	75 PSIG	77 PSIG	116 PSIG	106 PSIG
Δ P	2.95 PSI	2.6" W.C.	13.5 PSI	16 PSI
FLOW RATE				
MASS			56,138.6	
STEAM	32,959.03 #/hr.		33,211.6 #/hr.	
WATER		22,755.1 #/hr.	22,927.01 #/hr.	

TOTAL MASS FLOW 55,714.13 #/hr. ENTHALPY-EFF. 817.56 BTU/#

STEAM FRAC. 59.16 % EQUIV. TEMP. 698.84 °F

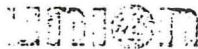
CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:



Prepared by _____ Checked by _____ Date _____

BACA NO 20 MULTIPLE ORIFICE METERING TEST

DATE: 12-01-80

ATM. PRESS. @ BACA = 10 PSIA

TWO-PHASE METERS

① PIPE ID = 10.02" ORIFICE = 4" ② PIPE ID = 10.02" ORIFICE = 4" ③ PIPE ID = 10.02" ORIFICE = 4"

TIME HRS.	P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI		P ₁ PSIG	ΔP PSI	
1340	115.5	14		103.5	16		90	18.5	
1430	116	14		103.5	16.5		90	18	
1530	115.5	14		103.5	15.5		90	18	

SINGLE-PHASE METERS

STEAM / PIPE ID = 11.875" ORIFICE = 6" WATER / PIPE ID = 11.875" ORIFICE = 3" MASS %

TIME HRS.	P ₁ PSIG	ΔP PSI	FLOWRATE #/HR.	P ₁ PSIG	ΔH "w.c.	FLOWRATE #/HR.	FLOWRATE #/HR.	FLASH
1340	74	3.2		75.5	2.7			
1430	74.5	3.2		75.5	2.7			
1530	74.5	3.2		76	2.7			

REMARKS: WHP = 119 PSIG
 SED. PRESS = 75 PSIG

R.O. ENGBRETSSEN
DEC 02 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N° 20

DATE 12-02-80 TIME 0715 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 118 PSIG WHT 245 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75 PSIG TEMP. 246 °F PRESS. 75 PSIG

	STEAM	WATER	TWO-PHASE	
ORIFICE	6"	3"	4"	
QUALITY			①	②
P ₁	74.5 PSIG	76 PSIG	115.5 PSIG	103 PSIG
Δ P	3.0 PSI	2.55 W.C.	14 PSI	15.5 PSI
FLOW RATE				
MASS			56,711.5	/
STEAM	33,142.92 #/HR.		33,754.7	/
WATER		22,539.9 #/HR.	22,956.8	/

③
90.5
17.5

TOTAL MASS FLOW 55,682.81 #/HR. ENTHALPY-EFF. 820.82 BTU/#
STEAM FRAC. 59.52% EQUIV. TEMP. 699.6 °F

CHLORIDES

TRIALS	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
_____	_____	PH 4.4	PH 6.5	_____
_____	_____	0 CHLORIDE	6200 PPM	_____
_____	_____	_____	_____	_____

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
1135 HRS.	96	96	1904	2.499	98.499	2.54
1138 "	95	95	1905	2.5003	97.5003	2.56
1141 "	95	95	1905	2.5003	97.5003	2.56

REMARKS:

R.O. ENGBRETSSEN
DEC 04 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 12-03-80 TIME 1030 HR. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 118.5 PSIG WHT 346 °F CALORIMETRIC: SEP. EFF. 99 %
 SEPARATOR PRESSURE 75.5 PSIG TEMP. 262 °F PRESS. 75.5 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75.5 PSIG	76.5 PSIG	115.5 PSIG
Δ P	3.11 PSI	2.6" W.C.	14.25 PSI
FLOW RATE			
MASS			56,972.6 #/HR.
STEAM	33,910.13 #/HR.		34,104.4 #/HR.
WATER		22,757.46 #/HR.	22,888.24 #/HR.

TOTAL MASS FLOW 56,667.6 #/HR. ENTHALPY-EFF. 823.85 BTU/#
 STEAM FRAC. 59.84 % EQUIV. TEMP. 700.25 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. SERVICE ORIFICE TAPS @ START LINE
AND COLLECTING LINES.

R.O. ENGBREITSEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



DEC 04 1980
WELL BACA No 20

DATE 12-04-80 TIME 0715 Hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 118 PSIG WHT 346 °F CALORIMETRIC: SEP. EFF. 99 %
SEPARATOR PRESSURE 76 PSIG TEMP. 264 °F PRESS. 76 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	76 PSIG	76.5 PSIG	115 PSIG
Δ P	2.95 PSI	2.5 "W.C.	14 PSI
FLOW RATE			
MASS			56,306.9 #
STEAM	33,133.02 #/Hr.		33,697.14 #
WATER		22,315.5 #/Hr.	22,699.8 #/Hr.

TOTAL MASS FLOW 55,448.52 #/Hr. ENTHALPY-EFF. 823.4 Btu/#

STEAM FRAC. 59.75% EQUIV. TEMP. 700.15 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	Non-Condensable By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGEBRETSEN
 DEC 04 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 12-05-80 TIME 0705 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 118 PSIG WHT 346°F CALORIMETRIC: SEP. EFF. 99 %
 SEPARATOR PRESSURE 75 PSIG TEMP. 265 °F PRESS. 75 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76 PSIG	115 PSIG
Δ P	3.4 PSI	2.7" W.C.	14 PSI
FLOW RATE			
MASS			58704.4 #/hr.
STEAM	35,323.9 #/hr.		33743.9 #/hr.
WATER		23,193.4 #/hr.	22,160.5 #/hr.

TOTAL MASS FLOW 58,517.3 #/hr. ENTHALPY-EFF. 828.4 BTU/#
 STEAM FRAC. 60.36% EQUIV. TEMP. 700.7°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N^o 20

DATE 12-06-80

TIME 1200 HRS TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 117.5 PSIG WHT 346 °F

CALORIMETRIC: SEP. EFF. 99.2 %

SEPARATOR PRESSURE 75.5 PSIG

TEMP. 266 °F PRESS. 75.5 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75.5 PSIG	77 PSIG	114.5 PSIG
Δ P	3.25 PSI	2.7 "W.C.	13.75 PSI
FLOW RATE			
MASS			55,683.8 #
STEAM	34,646.85 #/hr.		33,360.2 #/hr.
WATER		20188.57 #/hr.	22,323.6 #/hr.

TOTAL MASS FLOW 57,835.42 #/hr. ENTHALPY-EFF. 824.44 BTU/#

STEAM FRAC. 59.91 % EQUIV. TEMP. 700 °F

R.O. ENGBRETTSEN
DEC 08 1980

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 12-07-80

TIME 0900 hrs

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 340°F
SEPARATOR PRESSURE 75.5 PSIG

CALORIMETRIC: SEP. EFF. _____ %
TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75.5 PSIG	70 PSIG	115 PSIG
Δ P	3.0 PSI	2.8" W.C.	14.25 PSI
FLOW RATE			
MASS			57,892.15 #
STEAM	33,318.71 #/HR.		33,878.5 #
WATER		23,618.98 #/HR.	24,013.66 #/HR.

TOTAL MASS FLOW 50,937.60 #/HR. ENTHALPY-EFF. 811.9 BTU/#
 STEAM FRAC. 58.52% EQUIV. TEMP. 698°F

R.O. ENGBRESEN
DEC 08 1980

CHLORIDES

TRIAL	TIME	STEAM LINE PPM	WATER LINE PPM	SEP. EFF.
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 12-08-80 TIME 0750 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 346°F CALORIMETRIC: SEP. EFF. 99.2 %
 SEPARATOR PRESSURE 75 PSIG TEMP. 266 °F PRESS. 75 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76 PSIG	114 PSIG
Δ P	3.0 PSI	2.8" W.C.	14.25 PSI
FLOW RATE			
MASS			57,727.6 #
STEAM	33,230.93 #/hr		33,741.8 #
WATER		23,618.98 #/hr	23,985.8 #

TOTAL MASS FLOW 56,849.91 #/hr ENTHALPY-EFF. 811.24 BTU/#
 STEAM FRAC. 58.45% EQUIV. TEMP. 698°F

R.O. ENGBRESEN
DEC 08 1980

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBREISEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



DEC 09 1980

WELL BACA N2 20

DATE 12-09-80

TIME 0725 HRS. TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 346 °F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 75.5 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P _i	75 PSIG	75 PSIG	114 PSIG
Δ P	3.0 PSI	2.4" W.C.	14 PSI
FLOW RATE			
MASS			55,727.32 #
STEAM	33,230.93 #/HR.		33,609.15 #
WATER		21,871.5 #/HR.	22,118.17 #

TOTAL MASS FLOW 55,102.42 #/HR. ENTHALPY-EFF. 828 BTU/#

STEAM FRAC. 60.31% EQUIV. TEMP. 700.6 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	Non-Condensibile By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N# 20
 DATE 12-10-80 TIME 0700 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 120 PSIG WHT 347 °F CALORIMETRIC: SEP. EFF. 99.2 %
 SEPARATOR PRESSURE 75.5 PSIG TEMP. 265 °F PRESS. 75.5 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75.5 PSIG	76.5 PSIG	117 PSIG
Δ P	3 PSI	2.4 "W.C.	14.0 PSI
FLOW RATE			
MASS			56,317.1
STEAM	33,318.71 #/hr.		34,004.3 #/hr.
WATER		21,864.66 #/hr.	22,312.8 #/hr.

TOTAL MASS FLOW 55,183.4 #/hr. ENTHALPY-EFF. 828.7 BTU/#
 STEAM FRAC. 60.38% EQUIV. TEMP. 700.7 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. @ 1140 HRS. 12-09-80 SHUT-IN WELL, INSTALLED 2" SS PROBE ACROSS TWO-PHASE 10" FLOWLINE AND SERVICED 2" AUTOMATIC CONTROL VALVE @ WATERLINE.
2. PUT BACK TO PRODUCTION @ 1525 HRS. 12-09-80.

R.O. ENGBREITSEN

Union Geothermal Co. of New Mexico

DEC 12 1980

DAILY TESTING REPORT



WELL BACA No 20

DATE 12-11-80 TIME 0740 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 118 PSIG WHT 346°F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76.5 PSIG	114 PSIG
Δ P	3.7 PSI	2.8 "w.c.	14.5 PSI
FLOW RATE			
MASS			
STEAM	36,807.83 #/hr.		
WATER		23,616.5 #/hr.	

TOTAL MASS FLOW 60,424.4 #/hr. ENTHALPY-EFF. 833.34 Btu/#
STEAM FRAC. 60.92% EQUIV. TEMP. 701.2°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBREITSEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



DEC 12 1980

WELL DELA NR 20

DATE 12-12-80 TIME 0725 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 346 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76 PSIG	114 PSIG
Δ P	3.8 PSI	2.6" W.C.	14.5 PSI
FLOW RATE			
MASS			
STEAM	31,287.9 #/hr.		
WATER		22,750.8 #/hr.	

TOTAL MASS FLOW 60,047.7 #/hr. ENTHALPY-EFF. 843.9 BTU/#
STEAM FRAC. 62.1% EQUIV. TEMP. 702°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN

DEC 14 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA U2 20

DATE 12-13-80 TIME 1:50 PM TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 110 PSIG WHT 346 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 76 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	
QUALITY			
P ₁	76 PSIG	76 PSIG	117 PSIG
Δ P	3.2 PSI	2.8 "w.c.	14.6 PSI
FLOW RATE			
MASS			58,109.26
STEAM	34,476.4 #/hr.		34,482.03 #/hr.
WATER		23,618.9 #/hr.	23,627.23 #/hr.

TOTAL MASS FLOW 58,095.4 #/hr. ENTHALPY-EFF. 819.72 BTU/#

STEAM FRAC. 59.34 % EQUIV. TEMP. 649.3 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	Non-Condensibile By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



DEC 12 1980

WELL BACA NO 20

DATE 12-14-80 TIME 1220 HRS TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 118 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76 PSIG	115 PSIG
Δ P	3.1 PSI	2.78" W.C.	14 PSI
FLOW RATE			
MASS			57,056.14 #/HR
STEAM	33,767.56 #/HR		33,634.6 #/HR
WATER		23,513.3 #/HR	23,421.5 #/HR

TOTAL MASS FLOW 57,280.86 #/HR ENTHALPY-EFF. 815.7 BTU/#

STEAM FRAC. 58.95% EQUIV. TEMP. 698.43°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	Non-Condensable By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

MINI-SEPARATOR DATA @ 75 PSIG SEP. PRESS.

STEAM RATE = 985.35 #/HR.

WATER RATE = 611.92 #/HR.

MASS RATE = 1597.3 #/HR.

% FRACTION = 61.69%

ENGBRETSSEN Union Geothermal Co. of New Mexico
DAILY TESTING REPORT



WELL BACA NO 20

DATE 12-15-80 TIME 1300 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	74 PSIG	76 PSIG	114 PSIG
Δ P	3 PSI	2.78" W.C.	14 PSI
FLOW RATE			
MASS			56,800.00 #/HR
STEAM	33,054.5 #/HR		33,200.00 #/HR
WATER		23,534.5 #/HR	23,600.00 #/HR

TOTAL MASS FLOW 56,588.9 #/HR. ENTHALPY-EFF. 810.86 BTU/#
 STEAM FRAC. 58.41 % EQUIV. TEMP. 697.35 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY	Non-Condensable By Wt. %
					GM/L	
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

MINI-SEPARATOR @ 75 PSIG SEP. PRESS

STEAM RATE = 714.92 #/HR.

WATER RATE = 488.92 #/HR.

MASS RATE = 1203.8 #/HR.

% = 111 - 50.30 %

R.O. ENGBRETSSEN

DEC 18 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 12-16-80 TIME 0840 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 345 OF CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75 PSIG TEMP. _____ OF PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P _i	74 PSIG	75 PSIG	114 PSIG
Δ P	3 PSI	2.7" W.C.	14 PSI
FLOW RATE			
MASS			50,550.00
STEAM	33,054.5 #/HR.		33,200.00 #/HR.
WATER		23,198.22 #/HR.	23,300.00

TOTAL MASS FLOW 56,252.72 #/HR. ENTHALPY-EFF. 813.99 BTU/#
 STEAM FRAC. 58.76 % EQUIV. TEMP. 698.05 F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensible By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

MINI-SEPARATOR DATA @ 75 PSIG SEP. PRESS.

STEAM = 714.72 #/HR.

@ 100 HRS. - SHIFTED SEP. PRESS

WATER = 488.0 #/HR.

FROM 75 TO 100 PSIG, BUT

MASS = 1203.8 #/HR.

WELL FLOW BEGINS TO

R. O. ENGBREISEN

DEC 8 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 12-17-80 TIME 1510 HRS TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 143 PSIG WHT 360° F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 100 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	98 PSIG	100 PSIG	140 PSIG
Δ P	2.7 PSI	3.6" W.C.	15 PSI
FLOW RATE			
MASS			
STEAM	35,195.5 #/HR.		
WATER		26,654.55 #/HR.	

TOTAL MASS FLOW 61,850.1 #/HR. ENTHALPY-EFF. 808.32 BTU/#
STEAM FRAC. 57% EQUIV. TEMP. 696.8° F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

MINI-SEPARATOR @ 100 PSIG

STEAM = 805.3 #/HR.

WATER = 307.6 #/HR.

MASS = 1112.9 #/HR.

% FLESH = 72%

WELL FLOW HAD JUST STABILIZED
WHEN THESE DATA WERE TAKEN.

R.O. ENGBRETSSEN
 DEC 18 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NO 20

DATE 12-18-80 TIME 0730 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 133 PSIG WHT 354°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 100 PSIG TEMP. 272 °F PRESS. 100 PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	99 PSIG	100 PSIG	130 PSIG
Δ P	2.1 PSI	3.1 "W.C.	11.5 PSI
FLOW RATE			
MASS			57,334.14 #
STEAM	31,226.9 #/hr.		32,107.12 #/hr.
WATER		24,734.4 #/hr.	25,227.02 #/hr.

TOTAL MASS FLOW 55,961.3 #/hr. ENTHALPY-EFF. 798.6 BTU/#
 STEAM FRAC. 56% EQUIV. TEMP. 694.34°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico
DAILY TESTING REPORT



WELL BACA No 20

DATE 12-18-80 TIME 1500 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 132 PSIC WHT 354 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 100 PSIC TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	99 PSIG	100 PSIG	129 PSIG
Δ P	1.95 PSI	3" W.C.	11.25 PSI
FLOW RATE			
MASS			
STEAM	30,104.3 #/hr.		
WATER		24,332.2 #/hr.	

TOTAL MASS FLOW 54,436.5 #/hr. ENTHALPY-EFF. 794.2 BTU/#
STEAM FRAC. 55.3% EQUIV. TEMP. 693 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt.	Non-Condensable
					Grams	By Wt. %
1400 hrs.	100	100	1900	2.4938	102.4938	2.43
1410 "	98	98	1902	2.4964	100.4964	2.48
1420 "	98	98	1902	2.4964	100.4964	2.48
1430 "	98.5	98.5	1901.5	2.4957	100.9957	2.47

REMARKS:

MINI-SEPARATOR — 100 PSIC
= STEAM RATE = 231.4 #/hr.
WATER RATE = 156.1 #/hr.
MASS RATE = 387.5 #/hr.
FLASH # — 59.72 %

F.O. ENGBRETSSEN

DEC 30 1980

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 12-19-80 TIME 0705 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 120 PSIG WHT 353 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 100 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	98.5 PSIG	99.5 PSIG	126 PSIG
Δ P	1.8 PSI	3.0" W.C.	10.5 PSI
FLOW RATE			
MASS			55,622.8
STEAM	28,875.1 #/hr.		30,186.5 #/hr.
WATER		24,334.5 #/hr.	25,436.31 #/hr.

TOTAL MASS FLOW 53,209.6 #/hr. ENTHALPY-EFF. 785.03 Btu/#
STEAM FRAC. 54.27% EQUIV. TEMP. 690 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



WELL BACA ^{R.O. ENGBRETTSEN} _{DEC 3 & 1980}
 DATE 12-19-80 TIME 1315 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 120 PSIG WHT 353°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 100 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	98.5 PSIG	100 PSIG	126 PSIG
Δ P	2 PSI	3" W.C.	10 PSI
FLOW RATE			
MASS			53,273.4 #
STEAM	30,419.03 #/HR.		29,598.7 #/HR.
WATER		24,332.2 #/HR.	23,674.71 #/HR.

TOTAL MASS FLOW 54,751.2 #/HR. ENTHALPY-EFF. 796.44 BTU/#
 STEAM FRAC. 55.56% EQUIV. TEMP. 604°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Density _____ GM/L	Non-Condensable By Wt. %
	<u>MINI-SEPARATOR @ 100 PSIG</u>						
				<u>STEAM RATE = 286.23 #/HR.</u>			<u>% FLASH = 67.92%</u>
				<u>WATER RATE = 135.2 #/HR.</u>			<u>ENTHALPY = 905.61 BTU/#</u>
				<u>MASS RATE = 421.42 #/HR.</u>			

REMARKS:
VS. CHANGED SEPARATOR PRESS. FROM 100 TO 125 PSIG HOWEVER THE
PRESSURE BEGINS TO DROP WHEN IT REACH 130 PSIG SEP. PRESSURE
WITH STEAM CONTROL VALVE ALMOST CLOSED. MAINTAINED 50 PSIG
SEP. PRESS. INSTEAD.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



R.O. ENGBRESEN

DEC 30 1980

WELL BACA #20
 DATE 12-19-80 TIME 1515 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP _____ WHT _____ CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 56 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	54 PSIG	55 PSIG	
Δ P	7 PSI	3.2" W.C.	
FLOW RATE			
MASS			
STEAM	43,897.31 #/HR.		
WATER		25,366.2 #/HR.	

TOTAL MASS FLOW 69,263.51 #/HR. ENTHALPY-EFF. 845.88 BTU/#
 STEAM FRAC. 63.38 % EQUIV. TEMP. 702 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

56 PSIG SEPARATOR PRESS. WAS THE MINIMUM WHEN ADJUSTED
WITH STEAM VALVE FULLY OPEN.

MINI-SEP. @ 56 PSIG STEAM = 737.36 #/HR. WATER = 431.43 #/HR. MASS = 1168.8 #/HR.	% FLASH = 63.08 % ENTHALPY = 843.23 BTU/#
--	--

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT

R.O. ENGBRECHT



WELL BACA W2 20

DATE 12-20-80

TIME 1200 hrs.

DEC 30 1980

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 114 PSIG WHT 344°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 50 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	49 PSIG	50 PSIG	112.5 PSIG
Δ P	6.1 PSI	2.2" W.C.	18.5 PSI
FLOW RATE			
MASS			58,766.8 #
STEAM	39,697.2 #/hr.		38,308.23 #/hr.
WATER		21,057.26 #/hr.	20,368.56 #/hr.

TOTAL MASS FLOW 60,754.46 #/hr. ENTHALPY-EFF. 860.3 BTU/#

STEAM FRAC. 65.34% EQUIV. TEMP. 704°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

MINI-SEP. @ 50 PSIG

STEAM = 753.6 #/hr.

WATER = 355.8 #/hr.

MASS = 1109.4 #/hr.

% FLASH = 67.32%

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT

R.O. ENGBRESEN



WELL BACA No 20 DATE 12-21-80 TIME 1440 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 111 PSIG WHT 341 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 50 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P _i	49 PSIG	50 PSIG	107.5 PSIG
Δ P	5.45 PSI	2.3" W.C.	17.5 PSI
FLOW RATE			
MASS			57,432.8 # / hr.
STEAM	37,654.3 # / hr.		36,538.75 # / hr.
WATER		21,530.5 # / hr.	20,894.05 # / hr.

TOTAL MASS FLOW 59,184.8 # / hr. ENTHALPY-EFF. 844.6 BTU / #
 STEAM FRAC. 63.62 % EQUIV. TEMP. 702.2 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

MINI-SEP. - C 50 PSIG
STEAM = 642.5 # / hr.
WATER = 352.8 # / hr.
MASS = 995.3 # / hr.
% FLASH = 64.56 %

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



WELL BACA NR 20

R.O. ENGBRETTSEN
DEC 30 1980

DATE 12-22-80 TIME 1000 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 112 PSIG WHT 341°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 50 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	40 PSIG	50 PSIG	107 PSIG
Δ P	5.3 PSI	2.3" W.C.	18 PSI
FLOW RATE			
MASS			58,266.54
STEAM	37,162.45 #/hr.		36,804.4 #/hr.
WATER		21,530.5 #/hr.	21,372.2

TOTAL MASS FLOW 58,692.96 #/hr. ENTHALPY-EFF. 841.8 BTU/#
 STEAM FRAC. 63.32% EQUIV. TEMP. 702°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Density _____ GM/L	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

@ 1015 HRS. - TRIED TO RAISE SEP. PRESS. TO 125 PSIG, BUT
THE WELL CAN NOT BUILD-UP THIS PRESSURE.
MAINTAINED 75 PSIG SEP. PRESS. INSTEAD.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N# 20

DATE 12-22-80

TIME 1400 HRS.

R.O. EGEDOR
DEC 31 1980

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP _____ WHT _____

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 75 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	74 PSIG	75 PSIG	
Δ P	2.05 PSI	2.8 "w.c.	
FLOW RATE			
MASS			
STEAM	22,784.14 #/HR.		
WATER		23,623.91 #/HR.	

TOTAL MASS FLOW 56,408.1 #/HR.

ENTHALPY-EFF. 808.24 BTU/#

STEAM FRAC. 58.12%

EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

MINI-SEPARATOR @ 75 PSIG

STEAM = 3908 #/HR.

WATER = 248.05 #/HR.

MASS = 638.85 #/HR.

% FLASH = 61.17%

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



NO. ENG. DRES. 100
DEC 31 1980

WELL BACA No 20
 DATE 12-23-80 TIME 0740 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 115 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	74 PSIG	75 PSIG	113 PSIG
Δ P	2.7 PSI	2.4" W.C.	13.5 PSI
FLOW RATE			
MASS			53,504.2
STEAM	31,303.97 #/hr.		31,588.4 #/hr.
WATER		21,871.5 #/hr.	22,005.8 #/hr.

TOTAL MASS FLOW 53,265.5 #/hr. ENTHALPY-EFF. 815.6 BTU/#
 STEAM FRAC. 58.94 % EQUIV. TEMP. 698.41 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 12-24-80 TIME 0840 TEST NO. 4 CHOKE TYPE _____

R.O. ENGBRESEN

DEC 31 1980

WHP 116 PSIG WHT 348°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75.5 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75.5 PSIG	76 PSIG	113 PSIG
Δ P	2.7 PSI	2.8" W.C.	13 PSI
FLOW RATE			
MASS			56,075.96 #/HR.
STEAM	31,644.3 #/HR.		32,109.1 #/HR.
WATER		23,618.98 #/HR.	23,966.86 #/HR.

TOTAL MASS FLOW 55,263.3 #/HR. ENTHALPY-EFF. 801 BTU/#
 STEAM FRAC. 57.26% EQUIV. TEMP. 695°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA W# 20

DEC 31 1980

DATE 12-25-80 TIME 1025 hrs TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 76 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	77 PSIG	114 PSIG
Δ P	2.8 PSI	2.9" w.c.	14 PSI
FLOW RATE			
MASS			58,312.8 #/hr
STEAM	32,128.23 #/hr.		33,364.2 #/hr
WATER		24,032.1 #/hr.	24,954.6 #/hr

TOTAL MASS FLOW 56,160.3 #/hr. ENTHALPY-EFF. 800.55 BTU/#
 STEAM FRAC. 57.21% EQUIV. TEMP. 695 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



~~R.O. ENGBRETTEN~~

WELL BACA NE 20

DATE 12-26-87

TIME 0940 hrs.

DEC 31 1980

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 118 PSIG WHT 345°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 76 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76 PSIG	115 PSIG
Δ P	2.0 PSI	2.8" W.C.	13.6 PSI
FLOW RATE			
MASS			56,843.4 $\frac{lb}{hr}$
STEAM	32,684.65 $\frac{lb}{hr}$		32,997.6 $\frac{lb}{hr}$
WATER		23,618.98 $\frac{lb}{hr}$	23,845.8

TOTAL MASS FLOW 56,302.63 $\frac{lb}{hr}$

ENTHALPY-EFF. 808.1 BTU/lb

STEAM FRAC. 58.05 %

EQUIV. TEMP. 697 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA # 20

DATE 12-27-80

TIME 0930 hrs

DEC 31 1980

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 345 °F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 75.5 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76 PSIG	114 PSIG
Δ P	2.75 PSI	2.8 PSI	13.5 PSI
FLOW RATE			
MASS			57,157.94 #/hr
STEAM	31,846.05 #/hr		32,820.1 #/hr
WATER		23,618.98 #/hr	24,337.85 #/hr

TOTAL MASS FLOW 55,465.03 #/hr ENTHALPY-EFF. 802.1 BTU/#

STEAM FRAC. 57.42% EQUIV. TEMP. 695.4 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



R.O. ENGBREITSEN

WELL BACA N= 20

DATE 12 - 28 - 80

TIME 0920 **DEC 31 1980**

TEST NO. 4

CHOKE TYPE _____

FLOW RATE DATA

WHP 116 PSIG WHT 345°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 76 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75.5 PSIG	76.5 PSIG	113.5 PSIG
Δ P	2.6 PSI	3' w.c.	13 PSI
FLOW RATE			
MASS			57,281.51
STEAM	31,064.34 #/HR.		32,077.6 #/HR.
WATER		24,445.44 #/HR.	25,203.9 #/HR.

TOTAL MASS FLOW 55,509.8 #/HR. ENTHALPY-EFF. 787.4 BTU/#

STEAM FRAC. 56% EQUIV. TEMP. 601.5°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

R.O. ENGBREISEN

DATE 12-29-80

TIME 1125

TEST NO. DEC 31 1980

4

CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 346°F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE 74.5 PSIG

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	73.5 PSIG	75 PSIG	114.0 PSIG
Δ P	2.07 PSI	3.2" w.c.	13.25 PSI
FLOW RATE			
MASS			57,704.62
STEAM	32,424.3 #/hr.		32,435.8 #/hr.
WATER		25,255.02 #/hr.	25,268.85 #/hr.

TOTAL MASS FLOW 57,679.32 #/hr. ENTHALPY-EFF. 790.86 BTU/#

STEAM FRAC. 56.21% EQUIV. TEMP. 692°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



~~VOID AFTER USE~~

DEC 31 1980

WELL BACA No 20

DATE 12-30-80 TIME 1030 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 117 PSIG WHT 345°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	74 PSIG	75.5 PSIG	114 PSIG
Δ P	2.8 PSI	2.9" w.c.	14 PSI
FLOW RATE			
MASS			
STEAM	31,957.96 #/HR.		
WATER		24,039.5 #/HR.	

TOTAL MASS FLOW 55,997.45 #/HR. ENTHALPY-EFF. 798.8 BTU/#
 STEAM FRAC. 57.1% EQUIV. TEMP. 694.42°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



CO. LOG GREEN
DEC 31 1980

WELL BACA NR 20

DATE 12-31-80 TIME 0830 HR. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 115.5 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
R ₁	73.5 PSIG	75.5 PSIG	113 PSIG
Δ P	2.75 PSI	2.8" w.c.	13.0 PSI
FLOW RATE			
MASS			50,109.63 #/HR.
STEAM	31,592.7 #/HR.		32,105.93 #/HR.
WATER		23,621.4 #/HR.	24,003.7 #/HR.

TOTAL MASS FLOW 55,214.1 #/HR. ENTHALPY-EFF. 800.2 BTU/#
STEAM FRAC. 57.22 % EQUIV. TEMP. 695 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBREITSEN
 JAN 05 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 01-01-81 TIME 1115 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 116 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75.5 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	74 PSIG	76 PSIG	113.5 PSIG
Δ P	2.7 PSI	3" W.C.	13.5 PSI
FLOW RATE			
MASS			58,115.1 #/HR.
STEAM	31,303.00 #/HR.		32,666.5 #/HR.
WATER		24,453.35 #/HR.	25,448.6 #/HR.

TOTAL MASS FLOW 55,847.34 #/HR. ENTHALPY-EFF. 791.3 Btu/#
 STEAM FRAC. 56.21 % EQUIV. TEMP. 692 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETT
 JAN 05 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 01-02-81 TIME 1100 hr. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 116.5 PSIG WHT 344 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	74.5 PSIG	75.5 PSIG	113.5 PSIG
Δ P	2.8 PSI	3" w.c.	13.75 PSI
FLOW RATE			
MASS			
STEAM	32,043.16 #/hr.		
WATER		24,450.54 #/hr.	

TOTAL MASS FLOW 56,493.7 #/hr. ENTHALPY-EFF. 795.7 BTU/#
 STEAM FRAC. 56.72 % EQUIV. TEMP. 693.45 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETSSEN
 JAN 05 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20
 DATE 01-03-81 TIME 1800 HRS. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 116 PSIG WHT 344 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75.5 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	74 PSIG	76 PSIG	114 PSIG
Δ P	2.75 PSI	2.9" w.c.	13.75 PSI
FLOW RATE			
MASS			
STEAM	31,677.34 #/HR.		
WATER		24,037.05 #/HR.	

TOTAL MASS FLOW 55,714.4 #/HR. ENTHALPY-EFF. 797.1 BTU/#
 STEAM FRAC. 56.86% EQUIV. TEMP. 694 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	DENSITY _____ GM/L	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGEBREITSEN
 JAN 05 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA NR 20

DATE 01-04-81 TIME 1230 TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 116 PSIG WHT 345 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
R ₁	74 PSIG	76 PSIG	114 PSIG
Δ P	2.75 PSI	3" W.C.	14 PSI
FLOW RATE			
MASS			
STEAM	31,677.34 #/hr.		
WATER		24,453.35 #/hr.	

TOTAL MASS FLOW 56,130.7 #/hr. ENTHALPY-EFF. 793.12 BTU/#
 STEAM FRAC. 56.43% EQUIV. TEMP. 693 °F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBRETT
 JAN 05 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA #20
 DATE 01-05-81 TIME 12:15 hrs. TEST NO. 4 CHOKE TYPE _____

FLOW RATE DATA

WHP 116 PSIG WHT 345°F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 75°F TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	6"	3"	4"
QUALITY			
P ₁	75 PSIG	76 PSIG	113 PSIG
Δ P	2.75 PSI	3" W.C.	13 PSI
FLOW RATE			
MASS			
STEAM	31,703.1 #/hr.		
WATER		24,447.97 #/hr.	

TOTAL MASS FLOW 56,151.1 #/hr. ENTHALPY-EFF. 793.34 BTU/#
 STEAM FRAC. 56.46% EQUIV. TEMP. 693°F

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico & ENGBREITSEN

DAILY TESTING REPORT



NOV 0

WELL BACA 12 20

DATE 10-27-81 TIME 1300 HRS. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 27.5 WHT _____ CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE 20 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	1"	0.5"	6"
QUALITY			
P ₁	20 PSIG	20 PSIG	21 PSIG
Δ P	11.2 "Hg.	18.5 "Y.F.	14.5 PSI
FLOW RATE			
MASS			74,003 $\frac{\#}{HR.}$
STEAM	758 $\frac{\#}{HR.}$		36,831 $\frac{\#}{HR.}$
WATER		765 $\frac{\#}{HR.}$	37,172

TOTAL MASS FLOW 1523 $\frac{\#}{HR.}$ ENTHALPY-EFF. _____
 STEAM FRAC. 49.77 % EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. SEPARATOR DATA TAKEN @ MINI-SEPARATOR
2. TWO-PHASE RATES BASED ON MINI STEAM FRACTION.

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



NOV 02 1981

WELL DACA # 20

DATE 10-28-81 TIME 0715 TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 32.5 PSIG WHT 235 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			26 PSIG
Δ P			19 PSI
FLOW RATE			
MASS			88,434
STEAM			44,014
WATER			44,420

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____

STEAM FRAC. 49.77 % EQUIV. TEMP. _____

BASED ON MINI-SEP.

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Density _____ GM/L	Non-Condensable By Wt. %
<u>CSTDOE</u>	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



WELL BACA 12 20

NOV 02 1981

DATE 10-29-81 TIME 0720 hrs. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 30 PSIG WHT 232 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			25 PSIG
Δ P			19.75 PSI
FLOW RATE			
MASS			87.305
STEAM			43,652.5
WATER			43,652.5

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____
 STEAM FRAC. _____ EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
<u>CSTD0E</u>	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

1. TWO-PHASE RATES BASED ON MINI-SEPARATOR
STEAM FRACTION OF 50%

Union Geothermal Co. of New Mexico

DAILY TESTING REPORT



NOV 02 1981

WELL BACA No 20

DATE 10-29-81 TIME 1440 hrs. TEST NO. S CHOKE TYPE _____

FLOW RATE DATA

WHP 30 PSIG WHT 232 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			24.5 PSIG
Δ P			20 PSI
FLOW RATE			
MASS			65,100
STEAM			44,183
WATER			20,926

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____
 STEAM FRAC. 67.86% (based on mini-sep.) EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Density _____ GM/L	Non-Condensable By Wt. %
STDOE	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

REMARKS:

@ 1440 hrs. MINI-SEP. @ 23 PSIG

STM P₁ = 23 PSIG

OH = 10.9 "Hg.

WTR P₁ = 23 PSIG

OH = 4.3 "Y.F.

STM FLOW = 778

WTR " = 368

WTR " = 1,146

% FLOW = 67.86%

Union Geothermal Co. of New Mexico DAILY TESTING REPORT

R. O. ENGBRETSSEN 
NOV 02 1981
CHOKE TYPE _____

WELL BACA NR 20

DATE 10-30-81 TIME 0720 hrs. TEST NO. 5

FLOW RATE DATA

WHP 29.5 PSIG WHT 231 °F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			24 PSIG
Δ P			20.2 PSI
FLOW RATE			
MASS			64,597
STEAM			43,836 ^{lb} / _{hr.}
WATER			20,761

TOTAL MASS FLOW _____ ENTHALPY - EFF. _____

STEAM FRAC. 67.86% (BASED ON MINI-SEP.) EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
<u>CSTDOE</u>	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS: _____

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 10-31-81 TIME 1025 HRS. TEST NO. S CHOKE TYPE _____

FLOW RATE DATA

WHP 28 PSIG WHT 230 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			23.5 PSIG
Δ P			21 PSI
FLOW RATE			
MASS			64,352 #/hr
STEAM			43,759 #/hr
WATER			20,593 #/hr

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____
 STEAM FRAC. 68 % (BASED ON MIX-SEP.) EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
<u>GSTD0E</u>	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

@ 60% STEAM FRACTION

WHTS = 72,435 #/hr
STEAM = 43,461 #/hr
WATER = 28,974 #/hr

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-01-81 TIME 0910 HRS TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 28 PSIG WHT 230 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			23 PSIG
Δ P			21 PSI
FLOW RATE			
MASS			63,646
STEAM			42,287
WATER			20,367

TOTAL MASS FLOW _____ ENTHALPY - EFF. _____
 STEAM FRAC. 68% (BASED ON MINI-SEP.) EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
<u>CSTDOE</u>	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

@ 60%

MASS RATE = 71,646
STEAM RATE = 42,287 †
WATER RATE = 28,658 †

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N^o 20

DATE 11-02-81 TIME 0700 hrs. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 26 PSIG WHT 228 OF

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			22 PSIG
Δ P			20.75 PSI
FLOW RATE			
MASS			62,090
STEAM			42,188 #/hr.
WATER			19,853

TOTAL MASS FLOW _____ ENTHALPY - EFF. _____

STEAM FRAC. 68% (BASED ON MINI-SEP.) EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %
<u>ESTDOE</u>	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

60%

MASS RATE = 60,848 #/hr.
 STM RATE = 41,900 #/hr.
 WTR RATE = 27,930 #/hr.

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20

DATE 11-03-81 TIME 0730 ~~1130~~ TEST NO. 5 CHOKE TYPE _____

R. O. ENGBREITSEN

FLOW RATE DATA

NOV 03 1981

WHP 26 PSIG WHT _____ OF _____

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			22.5 PSIG
Δ P			20.5 PSI
FLOW RATE			
MASS			49,230
STEAM			43,047 # / hr
WATER			6,183

TOTAL MASS FLOW _____ ENTHALPY - EFF. _____

STEAM FRAC. 87.44 % (BASED ON MINI-SEP.) EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time						DENSITY _____ GM/L
	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	Non-Condensable By Wt. %
<u>11-02-81</u>	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

11-02-81 MINI-SEPARATOR @ 22 PSIG

STM P₁ = 22 PSIG STM RATE = 1.107 # / hr

Δ P = 25.8" H₂O WTR RATE = 159 # / hr

WTR P₁ = 22 PSIG MASS RATE = 1.266 # / hr

Δ P = 0.2" Y.F. % FLASH = 87.44

R. O. ENGBRETSSEN

NOV 06 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA #20

DATE 11-04-81 TIME 1140 HRS. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 26 PSIG WHT _____ CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE 22 PSIG TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE	1"	0.5"	6"
QUALITY			
P ₁	22 PSIG	22 PSIG	22 PSIG
Δ P	24 "Hg.	1" Y.F.	20.5 PSI
FLOW RATE			
MASS			40,547 #
STEAM	1,076 #/hr.		42,521 #
WATER		178 #/hr.	7,026 #

TOTAL MASS FLOW 1,254 #/hr. ENTHALPY-EFF. _____
STEAM FRAC. 85.82 % EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

- SEPARATOR DATA TAKEN @ MINI-SEPARATOR.
- TWO-PHASE RATES BASED ON MINI STEAM FRACTION.
- BUCKET TEST @ SUMP PIT OVERFLOW = 12 GPM @ 5,500 #/hr.

R.O. ENGBRETTSEN
NOV 06 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20
DATE 11-04-81 TIME 0725 hrs. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 26.5 PSIG WHT _____ °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			22 PSIG
Δ P			20.5 PSI
FLOW RATE			
MASS			48,686 ^{lb}
STEAM			42,552 ^{lb}
WATER			6,134 ^{lb}

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____
STEAM FRAC. 87.4% EQUIV. TEMP. _____
(BASED ON MINI-SEP.)
CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

R.O. ENGBREITSEN
NOV 06 1981

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA N° 20
 DATE 11-05-81 TIME 0745 hrs. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 26 PSIG WHT 227 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			22 PSIG
Δ P			20 PSI
FLOW RATE			
MASS			49,282 #
STEAM			42,204 #
WATER			6,988 #

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____
 STEAM FRAC. 85.82% EQUIV. TEMP. _____
 (BASED ON MINI-SEP.)

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:
CSTDOE

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



R.O. ENGBREISEN
NOV 06 1981

WELL BACA NO 20
DATE 11-06-81 TIME 0735 HRS. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 25.5 PSIG WHT 259 °F CALORIMETRIC: SEP. EFF. _____ %
SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			21.5 PSIG
Δ P			20.2 PSI
FLOW RATE			
MASS			48,803 $\frac{lb}{hr}$
STEAM			41,883 $\frac{lb}{hr}$
WATER			6,920

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____
STEAM FRAC. 85.82 % EQUIV. TEMP. _____
(BASED ON MINI-SEP.)
CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensable By Wt. %

REMARKS:
STDOE

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No. 20

DATE 11-07-81 TIME 0045 HRS TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

W. H. HENSEN
R.O. ENGBRESEN
NOV 09 1981
S.S. BIG WHT 257 °F

CALORIMETRIC: SEP. EFF. _____ %

SEPARATOR PRESSURE _____

TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			21.5 PSIG
Δ P			20.2 PSI
FLOW RATE			
MASS			48,705
STEAM			41,886 #
WATER			6,819 #

TOTAL MASS FLOW _____ ENTHALPY - EFF. _____

STEAM FRAC. 86% (BASED ON MINI-SEP.) EQUIV. TEMP. _____

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____	GM/L
					Total Mass Wt. Grams	Non-Condensibile By Wt. %
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:

Union Geothermal Co. of New Mexico DAILY TESTING REPORT



WELL BACA No 20
 DATE 11-08-81 TIME 1045 HR. TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 25 PSIG WHT 257 °F CALORIMETRIC: SEP. EFF. _____ %
 INJECTOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

R.O. ENGBRETTSEN
NOV 11 9 1981

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			21 PSIG
Δ P			20 PSI
FLOW RATE			
MASS			48,025
STEAM			41,301 #/HR.
WATER			6,723

TOTAL MASS FLOW _____ ENTHALPY - EFF. _____

STEAM FRAC. 86% EQUIV. TEMP. _____
 (BASED ON MINI-SEP.)

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	DENSITY _____ GM/L					Non-Condensable By Wt. %
	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	Total Mass Wt. Grams	
STDOF	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

MARKS:



WELL BACA No 20
 DATE 11-09-81 TIME 0835 HRS TEST NO. 5 CHOKE TYPE _____

FLOW RATE DATA

WHP 24 PSIG WHT 259 °F CALORIMETRIC: SEP. EFF. _____ %
 SEPARATOR PRESSURE _____ TEMP. _____ °F PRESS. _____ PSIG

	STEAM	WATER	TWO-PHASE
ORIFICE			6"
QUALITY			
P ₁			20.5 PSIG
Δ P			20 PSI
FLOW RATE			
MASS			47,429 #
STEAM			40,789 #
WATER			6,640 #

TOTAL MASS FLOW _____ ENTHALPY-EFF. _____
 STEAM FRAC. 84% EQUIV. TEMP. _____
 (BASED ON MINI-SEP)

CHLORIDES

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

NON-CONDENSIBLE GAS

Time	Vol. H ₂ O MI.	Wt. H ₂ O Grams	Vol. Gas MI.	Wt. Gas Grams	DENSITY _____ GM/L	
					Total Mass Wt. Grams	Non-Condensable By Wt. %
STDOE	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

REMARKS:
SHUT-IN WELL @ 0837 HRS. , 11-09-81

9-16-80

BACA NO 20 FLOW TEST NO 3

1. PRESSURIZED WELL TO 435 PSIG WHP.
2. OPENED WELL @ 1315 HRS.
3. WELL BEGIN FLOWING STEAM VERY SLOW

TWO - PHASE DATA

TIME	WHP	P _i	ΔP	ASSUMED % FLASH	MASS RATE	STM RATE
1400 HRS.	190 PSIG	180 PSIG	18 PSI	30%	468,130.77 #/HR.	140,439 #
1433 "	140	131	14	30%	368,167.8	110,450.3
1448	129	121	13	30	344,305.5	103,291.6
1512	123	116	12.5	30	338,839.7	99,251.9
1520	115	105	12	30	320,325.7	96,097.
				40	255,289.9	102,115.
9-17-80						
0745	61	50	7	30	187,000	56,000
				40	147,000	50,000

1030 HRS. ~~SHIFTER~~ ^{SHIFTED} TO SEPARATOR

NOTE: SPLASHES ON DIFFUSER PIT IS CRITICAL, DUE TO SHALLOW PIT.

@ 1655 HRS. 9-17-80 SHUT-IN WELL TO MAKE A DEEPER DIFFUSER PIT.

9-16-80 - 9-17-80

Baca # 20 Flow test # 3 2x

Time	WHP	WHT	P _i	ΔP	2x Temp	Remarks
1322	6	210 ^o F	-	-	-	
1330	21	245	-	-	-	
1338	145	357	-	-	-	
1400	190	380	179	18	380 ^o F	
1412	170	370	158	16.5	370	W _m = 468,131 W _s = 140,439*
1421	153	363	143	15	363	W _m = 388,792 W _s = 116,638*
1433	140	357	131	14	357	W _m = 368,168 W _s = 110,450*
1448	129	352	121	13	352	W _m = 344,306 W _s = 103,292*
1512	123	347	116	12.5	347	W _m = 330,840 W _s = 99,252*
1530	115	345	105	12	345	W _m = 320,726 W _s = 96,098*
1551	110	339	103	11.5	339	W _m = 255,290 W _s = 102,116**
1617	104	336	100	11.25	334	W _m = 299,059 W _s = 89,718*
1642	101	333	99	11	331	
1730	95	327	85	10	325	
1810	91	326	82	10	324	
1850	87	324	78	9.5	321	
2012	80	320	74	9.5	317	
2055	78	317	73	9	315	
2252	75	315	68	8.5	312	
0100	72	310	65	8.25	308	
0230	70	308	63	8	305	
0700	62	301	50	7	300	W _m = 187,000 W _s = 56,000*
0745	61	300	50	7	300	W _m = 177,000 W _s = 59,000**
0850	63	303	54	7.5	301	1025 hrs. began
1028	61	296	50	7.5	294	routing flow through Sep.
1050	95	329	95	2	327	1050 - full flow through Separator

Refer to Daily Testing Reports

* assuming 30% flash
 ** assuming 40% flash

Shot Well in 1655 hrs. 9-17-80



R. O. ENGBRETSSEN

Prepared by _____ Checked by _____ Date NOV 02 1981 of _____

Title BACA NO 20 FLOWTEST NO 5 (AFTER FRAC-JOB) W.O. / A.P.E. no. _____

1. OPEN WELL @ 0905 HRS. / 10-26-81
2. WELL HEAD PRESSURE PRIOR TO OPENING — 300 PSIG
3. TWO-PHASE METER:
 ORIFICE DIA. — 6"
 FLOWLINE I.D. — 10.02"

TWO-PHASE DATA

DATE	TIME HRS	WHP PSIG	P _i PSIG	ΔP PSI	% FLASH (ASSUMED)	MASSRATE LBS/HR	STM RATE LBS/HR	WTR RATE LBS/HR
10-26-81	0920	51	43	20	20	178,995	53,698	125,295
					40	139,397	53,759	83,638
					50	114,145	57,073	57,073
	0930	49	39	19.5	30	169,720	50,916	118,804
					40	131,967	52,787	79,180
					50	107,953	53,977	53,977
	0945	47.5	37.5	18.5	30	163,121	48,936	114,185
					40	126,771	50,708	76,063
					50	103,670	51,835	51,835
	1000	46	36	18.5	30	160,707	48,212	112,495
					40	124,827	49,931	74,896
					50	102,044	51,022	51,022
1015	45	34.5	18.5	30	158,033	47,410	110,623	
				40	122,675	49,070	73,605	
				50	100,246	50,123	50,123	
1035	43	33	18	30	153,118	45,935	107,182	
				40	118,783	47,513	71,270	
				50	97,027	48,513	48,513	
1200	36.5	28	16	32	129,296	41,375	87,921	
				38.71	107,385	41,529	65,856	
1300	35	27	16	38.71	107,385	41,529	65,856	
				34.73	117,092	40,666	76,426	

CSTDOE



R. O. ENGBREITSEN

AUG 18 1981

August 7, 1981

TO: Mohinder Gulati

FM: Bill Christensen ^{BC}
Paul Atkinson ^{PA}RE: BACA-20, REDONDO CREEK FIELD: SUMMARY AND ANALYSIS
OF FLOWTESTS 1 THROUGH 4; 8/80 TO 1/81

Summary

Baca-20 had a steam deliverability of 31,500 lb/hr at the end of a 105-day production test. This corresponds to a commercial wellhead pressure of 115 psig and approximately 60% flash. During the flowtest, the well exhibited an approximate 60% annual decline. The well seemed to be producing from a two-phase reservoir with possible smaller entries from a liquid reservoir below. A major entry into the wellbore near 4500 ft is suggested by the pressure buildup data and gradient surveys. Chemistry analysis of fluid from Baca-20 indicates that this well produces from the same system as other Baca wells.

Introduction

This report presents data and analysis relating to the first four flowtests conducted on Baca-20 during the period August 1980 to January 1981. The subsequent pressure buildup data gathered following flowtest no. 4 is also presented and analyzed.

Data and discussion are presented in three topic areas: production performance; reservoir characteristics and; fluid chemistry.

History

Baca-20 was spudded on June 27, 1980. The original hole was drilled to a measured depth of 6863 ft. Mud was used as the circulating medium on this hole. Full circulation throughout the drilling of the original hole would indicate no permeable features were intersected. The redrill hole reached a measured total depth of 6374 ft. When the well was completed on August 30, 1980, fish in the hole changed the effective total depth to 5827 ft. Figure 1 presents a mechanical schematic of the well indicating the 9-5/8" casing shoe at 2505 ft and the bottom of the slotted 7" liner at 5812 ft.

Production History

Four flowtests have been run on Baca-20 to date. The first two flowtests were rig tests carried out through a two-phase meter in the blooie line. Flowtests 3 and 4 were subsequently carried out through a separator. Flowtest no. 1 was run in the original hole and was characterized by no flow. Flowtest no. 2 was conducted prior to the 7" liner being put in the hole. Consequently, golfball-sized chunks of formation unloaded and plugged the surface equipment. Flowtest no. 3 was stopped after 27-1/4 hours due to the limited sump capacity. This flowtest indicated an end of test production of 50,000 lb/hr steam at 118 psig separator pressure.

The most recent flowtest conducted on Baca-20, flowtest no. 4, lasted for 105 days, starting on September 24, 1980 and concluding on January 6, 1981. Figure 2 presents the history of flowrate, pressure, steam quality, noncondensable gas content and enthalpy during the flowtest. As seen in Figure 2, the different separator pressures used during the test did not affect well behavior greatly.

Mass flowrate, steam flowrate and liquid flowrate are graphed versus time in Figure 3a. The letters in the figure correspond to days field adjustments were made and are explained in Figure 3b. The mass flowrate seemed to be most affected by the field adjustments.

Steam flowrate did not reflect these adjustments to the same degree that the mass flowrate did. Since steam flowrate, W_s , is of primary concern, the decline analysis is based on steam flowrate.

Production History (Cont'd.)

During the final days of flowtest no. 4, a multi-orifice test was conducted. During the multi-orifice test, commercial pressures were observed at the wellhead when the separator pressure was 75 psig. Figure 4 illustrates the steam flowrate during the final forty days at the commercial wellhead pressure of 115 psig.

Calculating a least squares fit for the flowrates graphed in Figure 4 for flowtest no. 4 gives:

$$W_s = (40734.)10^{-.3988t} \dots (1)$$

where t is production time in years
W_s is steam flowrate in pounds per hour

(correlation factor = .721)

This indicates that initial steam production at 115 psig wellhead pressure would be 40,734 lb/hr and in one year it would be 16,300 lb/hr. This would correspond to a 60% steam production decline per year at 115 psig wellhead pressure.

A typical well might not have the same deliverability curve at different times. The concept of a moving deliverability curve is graphically illustrated in Figure 5a. At some initial time, t₀, the well might be able to produce more than at some later time, t₁, or t₂, for a given pressure.

Using this concept, deliverability curves were found for Baca-20. The deliverability curves illustrated in Figure 5b are found by connecting the final days at the previous pressure and the third or fourth day at the new pressure. By using the third or fourth day at a new pressure, the flowrate is allowed to stabilize. The flowrates decline at any given pressure, moving from right to left. The deliverability curves at different times are essentially parallel. Using the decline rate observed in Equation 1 in conjunction with the parallel deliverability curves, flowrate can be calculated for any given time and pressure.

Pressure Buildup Analysis

Baca-20 was shut-in on January 6, 1981 at 9:22 A.M. after a 105-day flowtest. Following shut-in, a series of pressure and temperature, gradient and point surveys were run and are depicted graphically in Figures 6 & 7. The latter pressure gradient surveys in Figure 7 correspond to a liquid gradient while the surveys taken just after shut-in correspond to a two-phase gradient. This indicates that for at least a few days following shut-in, two-phase conditions existed throughout the entire wellbore.

During the entire duration of flowtest no. 4, the surface flash was 55 to 65%. Isenthalpic flash of liquid at 500 to 550°F to wellhead pressure of 75 to 150 psig will give, at most, 35% surface steam flash. Thus, Baca-20 appears to be producing from a two-phase reservoir.

Transient analysis of the data was carried out for data taken at two depths: 4500 ft and 5000 ft. Figures 8 & 9 present log-log plots of the buildup data at 4500 and 5000 ft, respectively. Both figures barely show a 1/2 slope in the data, with subsequent indications that the correct semi-log straight line was never reached. Horner graphs for 4500 ft and 5000 ft are presented in Figures 10 & 11, respectively. The final straight line had essentially the same slope for both depths.

A Horner analysis was made using this slope. The total mobility-thickness product is calculated to be approximately 100,000 md-ft/cp. This value is suspect because the extrapolated pressure at one hour of buildup, using the straight line, is negative. This suggests that a pure radial flow analysis is not valid and is probably due to the nature of the two-phase reservoir feeding the well.

A change in the pressure gradient at approximately 4500 ft is indicated in Figure 6. Also, the drilling report indicates a loss circulation zone from 4439 to 4450 ft with the well beginning to surge at 4450 ft. This would suggest that there may be a major entry at this depth.

Fluid Chemistry

During Baca-20 flowtest no. 4, samples were taken from the steam and water line and analyzed for noncondensable gas content, and condensate and brine chemistry. In general, the Baca-20 effluent was chemically similar to other wells in the Redondo Creek field. Table 1 contains a summary of average chemical properties for this well. Table 2 presents a summary of well chemistry for all Redondo Creek wells, including Baca-20.

Noncondensable gas content was sampled in the field at one to two week intervals. Table 3 summarizes the results of this sampling effort, as well as chloride and PH values determined in the field. The variation of noncondensable gas in the steam is depicted graphically in Figure 2 and on a larger scale in Figure 12. From a practical point of view, the percentage of noncondensable gas remained constant at 2.55% by weight during the 104-day test. The standard deviation was calculated to be .29%.

Fluid sampling was carried out on three dates during flowtest no. 4: September 30, 1980; October 7, 1980; and October 23, 1980. The samples were sent to Union's Science and Technology Division at Brea, California for detailed analysis. The fluid sampling and preservation were carried out according to instructions received from Brea. Appendix A contains the detailed analysis.

A summary of the primary components in the noncondensable gases is presented in Table 4. With the exception of nitrogen, the two samples show essentially the same composition. The drop in nitrogen concentration could be accounted for by the pressuring of the well prior to flowing. Compressed air depressed the fluid level to below the slotted liner on four different occasions prior to the test. This could possibly force nitrogen into the formation. Subsequent flow from the well would then tend to flush nitrogen out of the formation.

Mohinder Gulati
August 7, 1981
Page 6

Fluid Chemistry (Cont'd.)

Stiff diagrams for the three sampling dates are presented in Figure 13. These Stiff diagrams are a convenient method for comparing the different chemistries of different wells. They can also be used to observe any changes in the chemistry of a particular well with time. The anions and cations plotted are the standard ones used to "type" a geothermal well. In addition to the anions and cations, Boron and Silica are plotted on the Stiff diagrams. The scaling factor is one, except where noted below the anion or cation. The milli-equivalents per liter and concentrations are all corrected for flash.

The Baca-20 Stiff diagrams are similar to those for surrounding wells, which are presented in Hartz (1977). This leads to the conclusion that Baca-20 is drawing from the same reservoir as the other Redondo Creek wells.

BC/PA/cc
Attch.

cc: Dick Engebretsen
Steve Pye

REFERENCES

Hartz, J.D.; "Baca 15 Production Test and Reservoir Evaluation";
Union Oil Company of California, Geothermal Division,
Santa Rosa, California, May 2, 1977.

Matthew, C.S. and Russell, D.G.; Pressure Buildup and Flow Tests
in Wells, Monograph Volume 1, Henry L. Doherty Series of
the Society of Petroleum Engineers of AIME, 1967.

TABLE 1

SUMMARY OF SOLIDS AND
GAS CONTENT

AVG. TDS IN BRINE (UNCORRECTED FOR FLASH)	7,272 PPM
AVG. TDS IN CONDENSATE	21 PPM
SILICA IN BRINE (UNCORRECTED FOR FLASH)	399 PPM
N.C.G. % BY WT. STEAM PHASE	2.65
H ₂ S CONCENTRATION N.C.G. (PPM BY VOL.)	37.5
TOTAL STEAM (PPM BY VOL.)	75
AVG. FLASH	.618
AVG. MASS FLOWRATE	64,100

Table 2

AVERAGE CONCENTRATIONS OF VARIOUS CHEMICAL CONSTITUENTS IN WELL EFFLUENT,
REDONDO CREEK FIELD, BACA LOCATION NO. 1, NEW MEXICO

WELL	TOTAL DISSOLVED SOLIDS BRINE (PPM)	CONDENSATE (PPM)	SILICA BRINE (PPM)	NONCONDENSABLE GAS STEAM (WT %)	TOTAL MASS (WT %)	H ₂ S TOTAL STEAM (PPM)	FLASH (%)	MASS FLOWRATE (LB/HR)
Baca 4 ⁽¹⁾ (1981)	5100	28	302 (167-701)	3.16	.85	165 (117-213)	26.8	171400
				3.22	1.10		34.0	145000
Baca 6	6018 (5800-6230)	23 (3.65)	453 (160-600)	1.33 (1.27-1.38)	.37	99 (65-257)	27.8	163700
Baca 11	6895 (6056-7593)	59 (7-105)	740 (640-835)	3.76 (2.30-5.94)	1.5	477 (290-867)	39.7	227100
Baca 13 ⁽²⁾ (1981)	6477 (5500-8684)	13 (7-25)	786 (556-963)	2.93 (1.93-3.94)	.83	149 (86.3-205)	28.4	284600
				3.9	1.07		27.5	210000
Baca 20	7272	21	399	2.55	1.47	75	61.8	64100
Baca 15 ⁽³⁾	5970 (5390-6670)	22 (5-41)	715 (600-792)	1.35 (1.15-1.53)	.82	170 (160-198)	61.0	150000

- NOTE: 1. Some samples from Baca 4 were diluted prior to analysis. The results from these analyses are not included in the above.
2. Left out values obtained from low rate of two-rate test on Baca 13.
3. Baca 15 produces extra steam; therefore, flash from the produced brine would be much less than 61%.

TABLE 3

BACA 20

% NON-CONDENSABLE GAS AND CHLORIDE CONTENT

<u>SAMPLING DATE</u>	NCG, WT%		CHLORIDES			
	<u>AVG.</u>	<u>S.D.</u>	<u>STEAMLINE PPM</u>	<u>PH</u>	<u>WATERLINE PPM</u>	<u>PH</u>
9/29/80	2.92	.59	-	7.6	6200	7.1
9/30/80	2.40	.69				
10/05/80	2.58	.08				
10/17/80	2.51	.05	-	4.3	6100	6.0
10/21/80	2.76	.06				
10/30/80	2.40	.04	-	4.3	6200	6.3
11/07/80	2.44	.04	-	4.4	5700	6.8
11/17/80	2.43	.08				
12/02/80	2.55	.01				
12/18/80	2.47	.02				
1/06/81	2.48	.07				
AVG.	2.55					
S.D.	.29					

TABLE 4

PRIMARY COMPONENTS IN NONCONDENSABLE GAS

	<u>9/30/80</u>	<u>10/23/80</u>
METHANE	0	1.8
HYDROGEN	2.1	1.7
NITROGEN	111	0
HYDROGEN SULFIDE	140	130
CARBON DIOXIDE	27750	24900
TOTAL WT %	2.80	2.50

FIGURE 1

REVISIONS

DESCRIPTION	DATE	BY	APP'D
	11-25-80	P.	MJE

LING DETAIL

THOLOGY	DRLG. BREAK	LOGS
DERA FILL 0'-360'	3910'-3975'	TEMP. LOG 0'-4100'
BANDELIER TUFF OLITE TUFF 360'-5200'		FRAN. I. D.L.O. 2505'-3500' DUAL LATEROLOG 2505'-6853'
DESITE 00'-T.D.		CNF-DGR 2505'-6850' REDRILL CNL.-FDC. 2600'-5500'

0' TO 360'
CALDERA FILL

360' TO 5200'
BANDELIER TUFF

5200' TO 6374'
PALIZA CANYON FM.
(ANDESITE)

REMEDIALS

DATE STARTED	DATE COMPLETED

Geothermal Company of New Mexico

680
T.D.

WELL SCHEMATIC
BACA NO. 20

WELL NO. 303705	DWG NO. RC1-DR-16	REV 0
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FIGURE 2

BACA 20 FLOWTEST NO. 4 9/26/80 TO 1/06/81

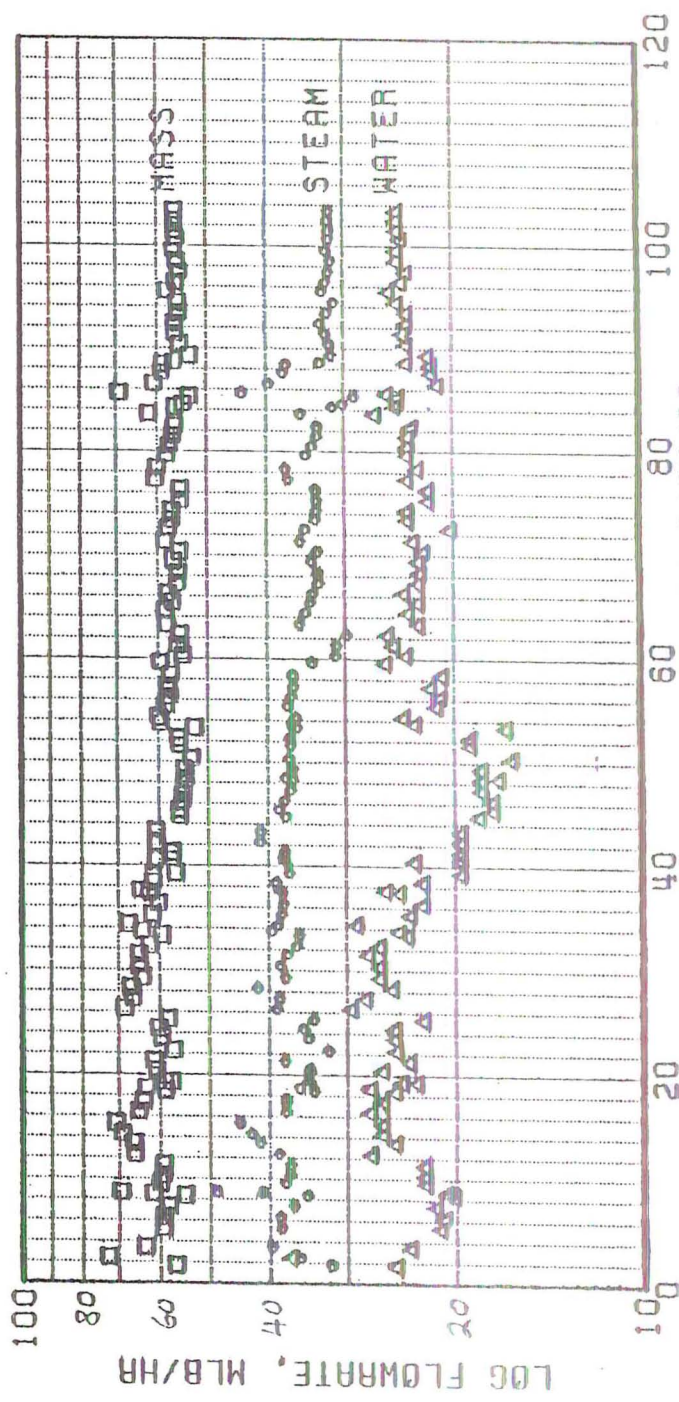
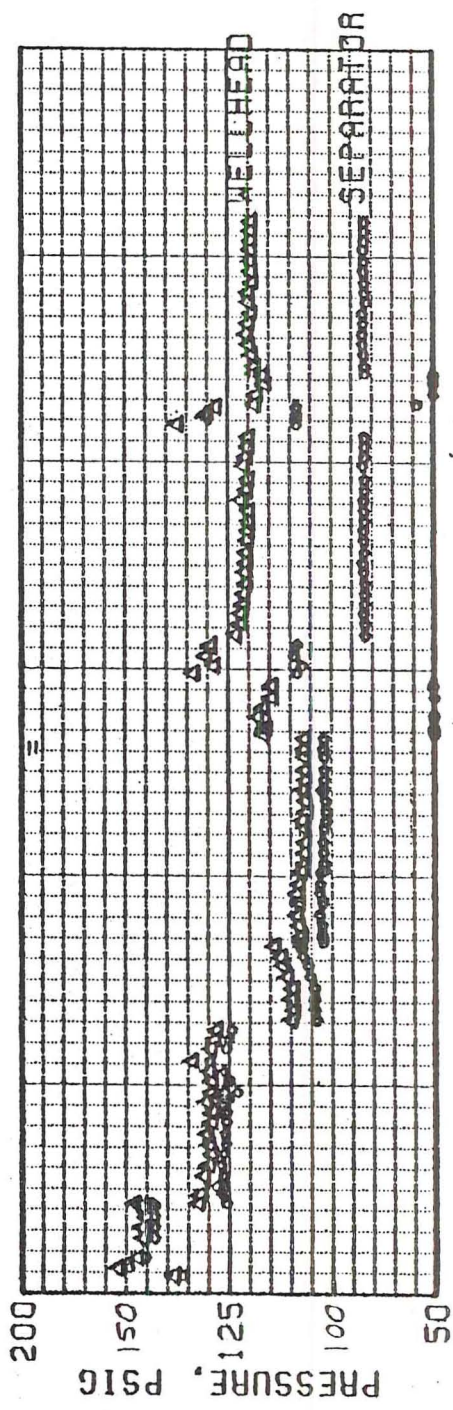
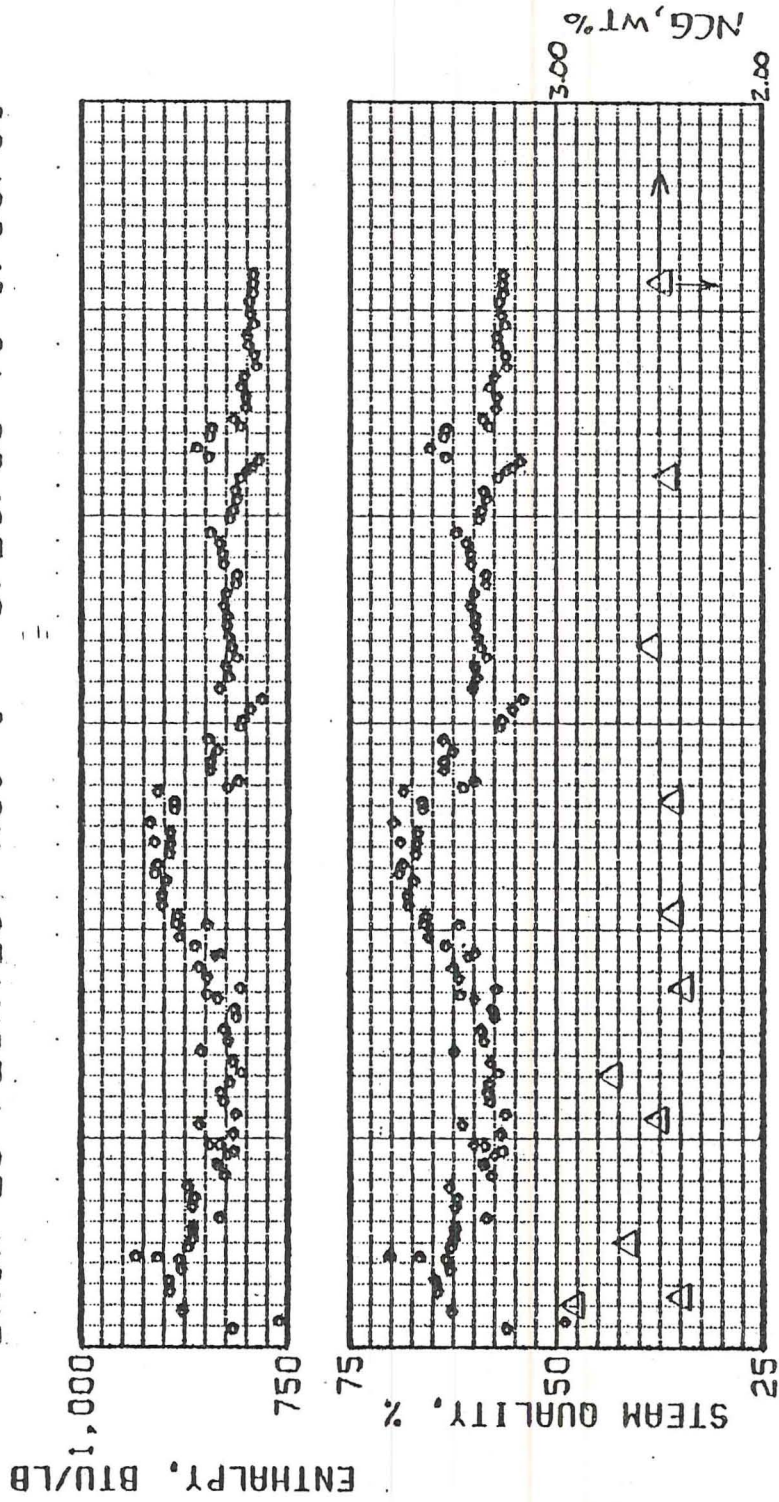


FIGURE 3A

BACA 20 FLOWTEST NO. 4 9/26/80 TO 1/06/81
PRODUCTION DECLINE CURVE

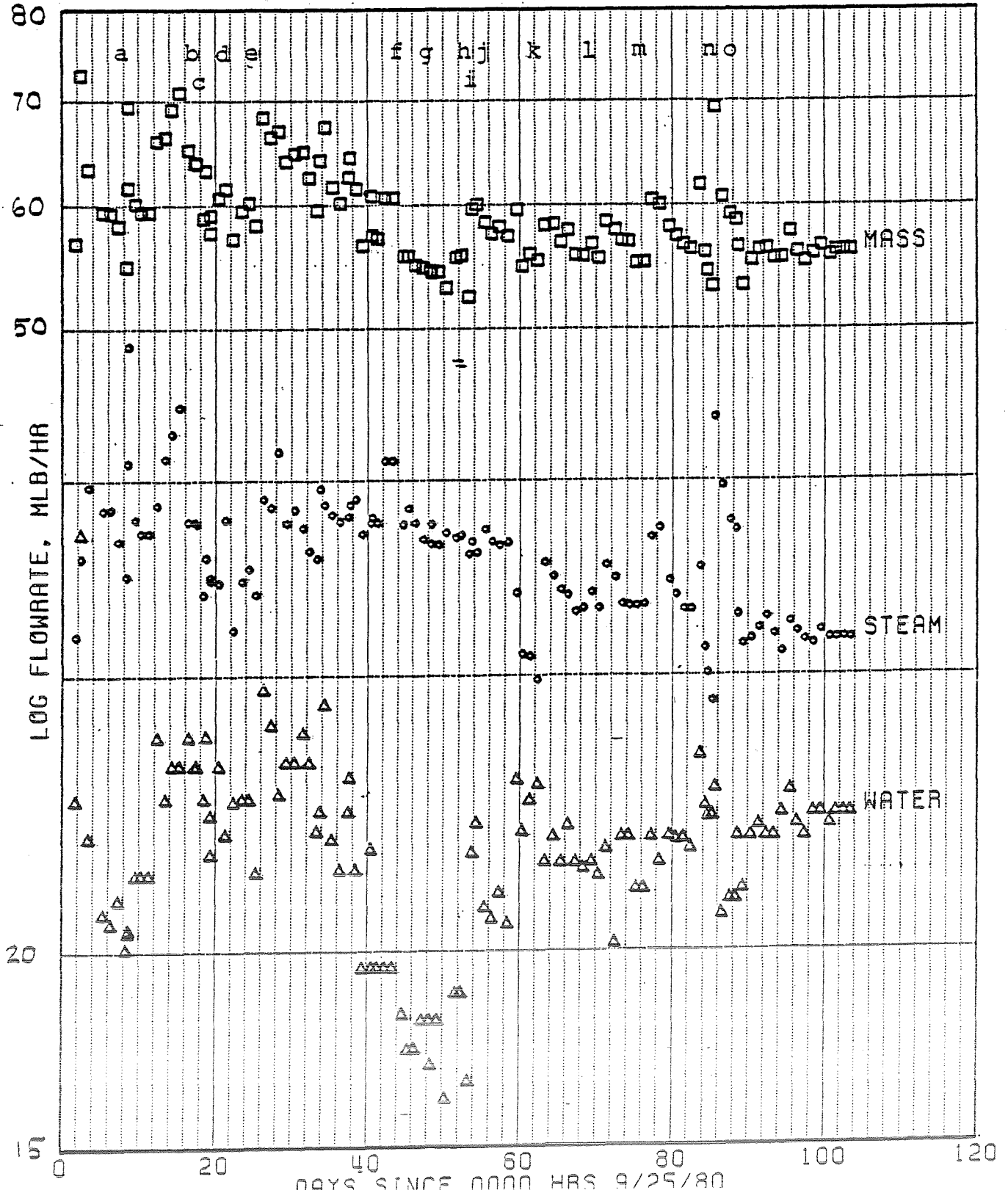


FIGURE 3B

BACA-20

FLOWTEST NO. 4

FIELD ADJUSTMENTS

NOTE	DATE	DAYS SINCE 9/25/80	REMARK
	9/26/80	1	Separator pressure set
a	10/03/80	8	Separator pressure adjusted
b	10/12/80	17	New gauge installed
c	10/13/80	18	Recalibrated gauges
d	10/16/80	21	2-phase meter frozen
e	10/20/80	25	Separator pressure adjusted Recalibrated gauges
f	11/08/80	44	Downstream flanges plugged
g	11/12/80	48	Separator pressure adjusted Taps serviced
h	11/17/80	53	Separator pressure adjusted 2-phase meter and orifice changed
i	11/18/80	54	Water orifice changed
j	11/22/80	55	Separator pressure adjusted Well fluctuates until 11/23/80
k	11/26/80	62	Separator pressure adjusted
l	12/03/80	69	Taps serviced
m	12/10/80	76	Well shutin for 3-3/4 hours
n	12/19/80	85	Separator pressure adjusted, twice
o	12/22/80	88	Separator pressure adjusted

FIGURE 4

BACA 20, STEAMFLOW DECLINE CURVE, FLOWTEST NO. 4, 75 PSIG SEPARATOR PRES

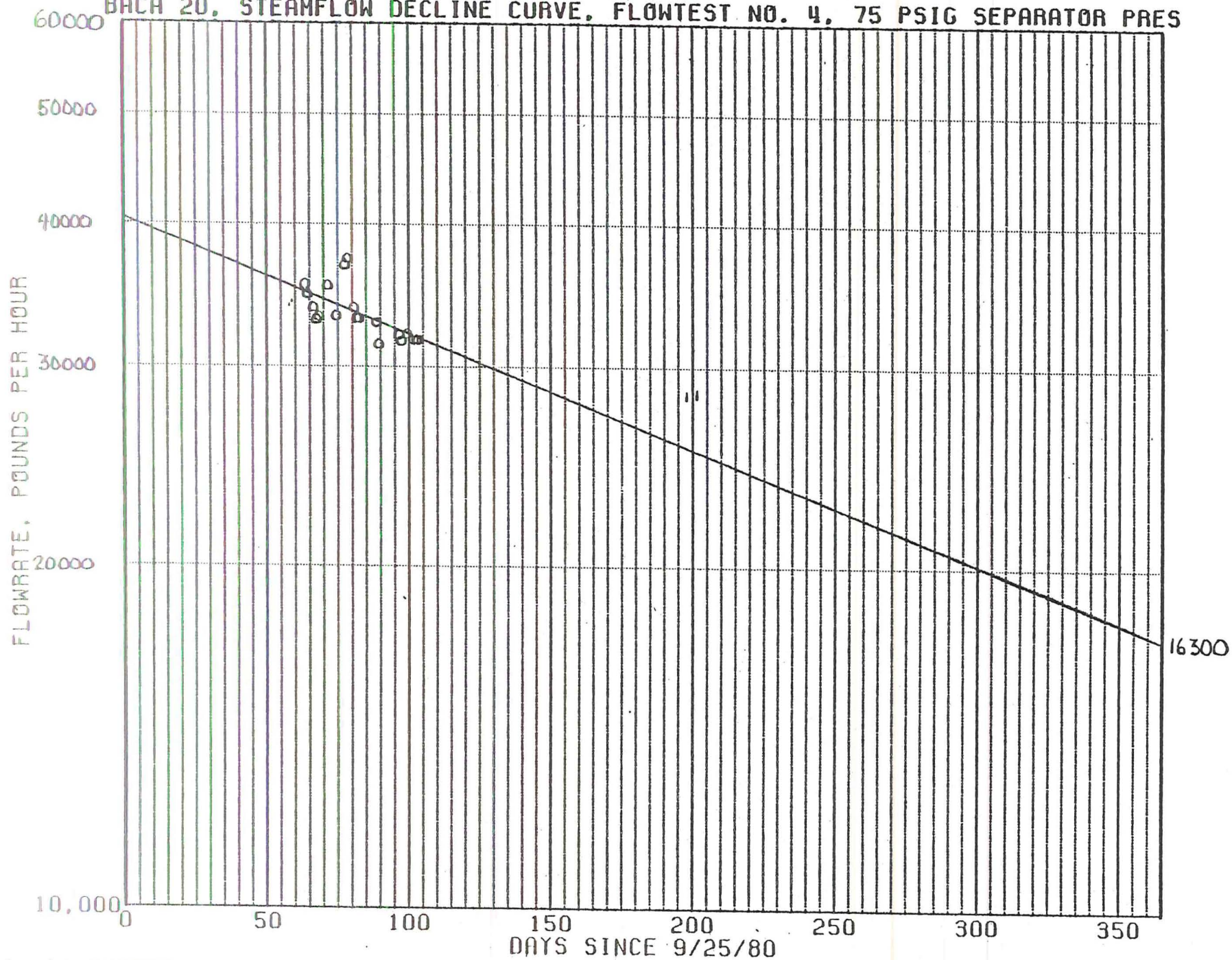
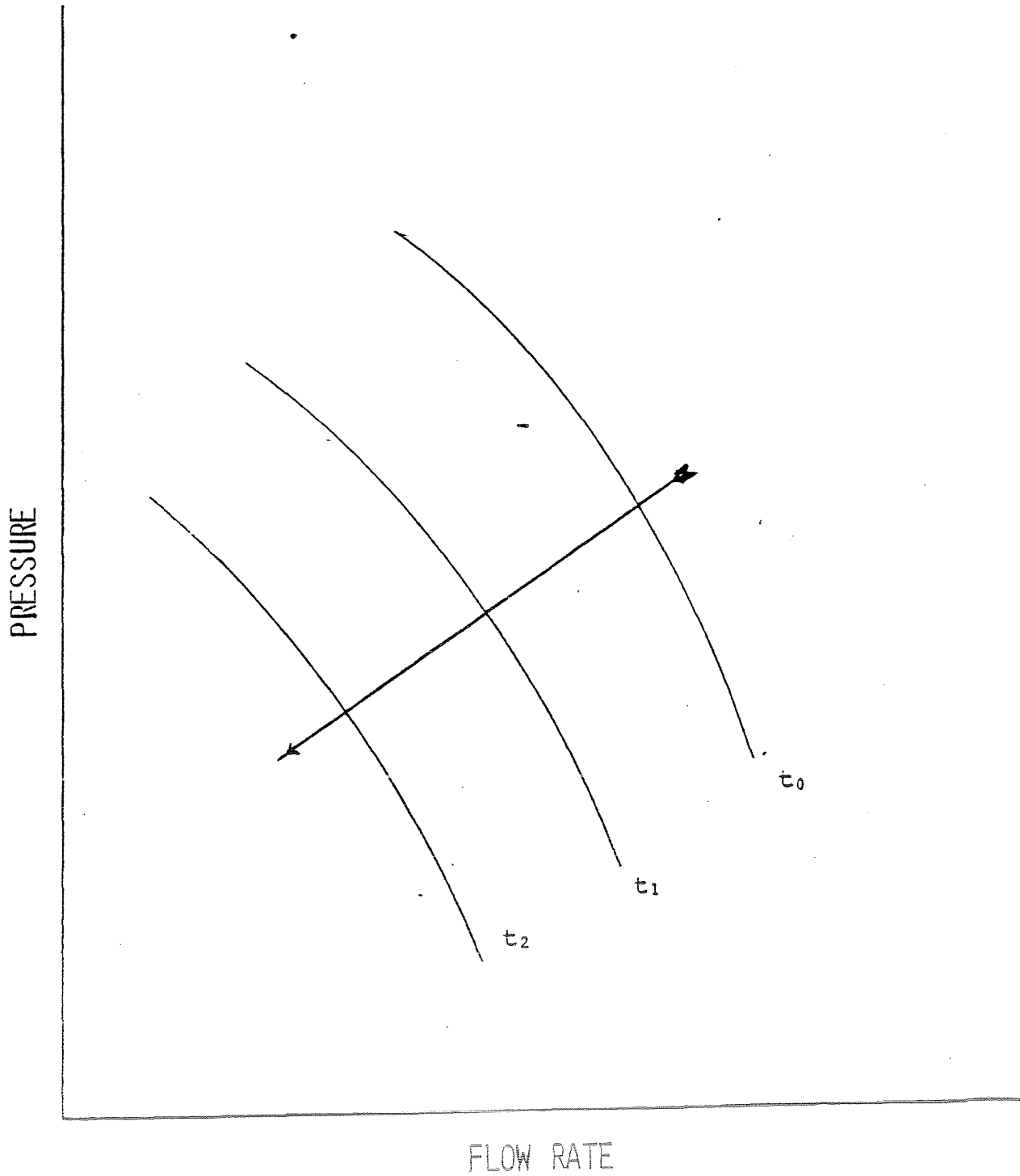


FIGURE 5A

TYPICAL WELL'S DELIVERABILITY CURVE



BACA 20 FLOWTEST NO. 4 9/26/80 TO 1/06/81

OBSERVED STEAM AND TOTAL MASS DELIVERABILITY CURVE

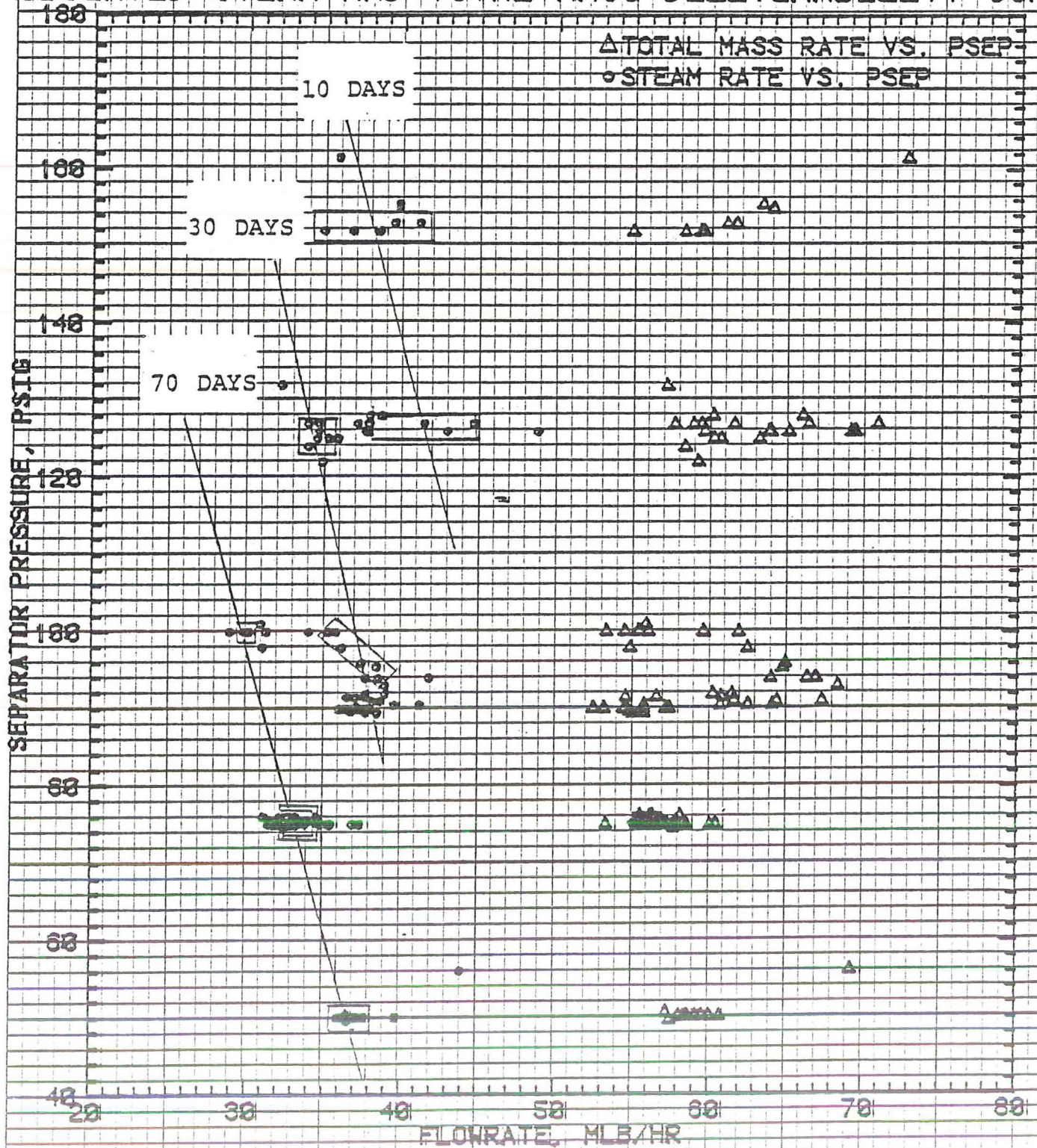


FIGURE 6

BACA 20
TEMPERATURE GRADIENTS

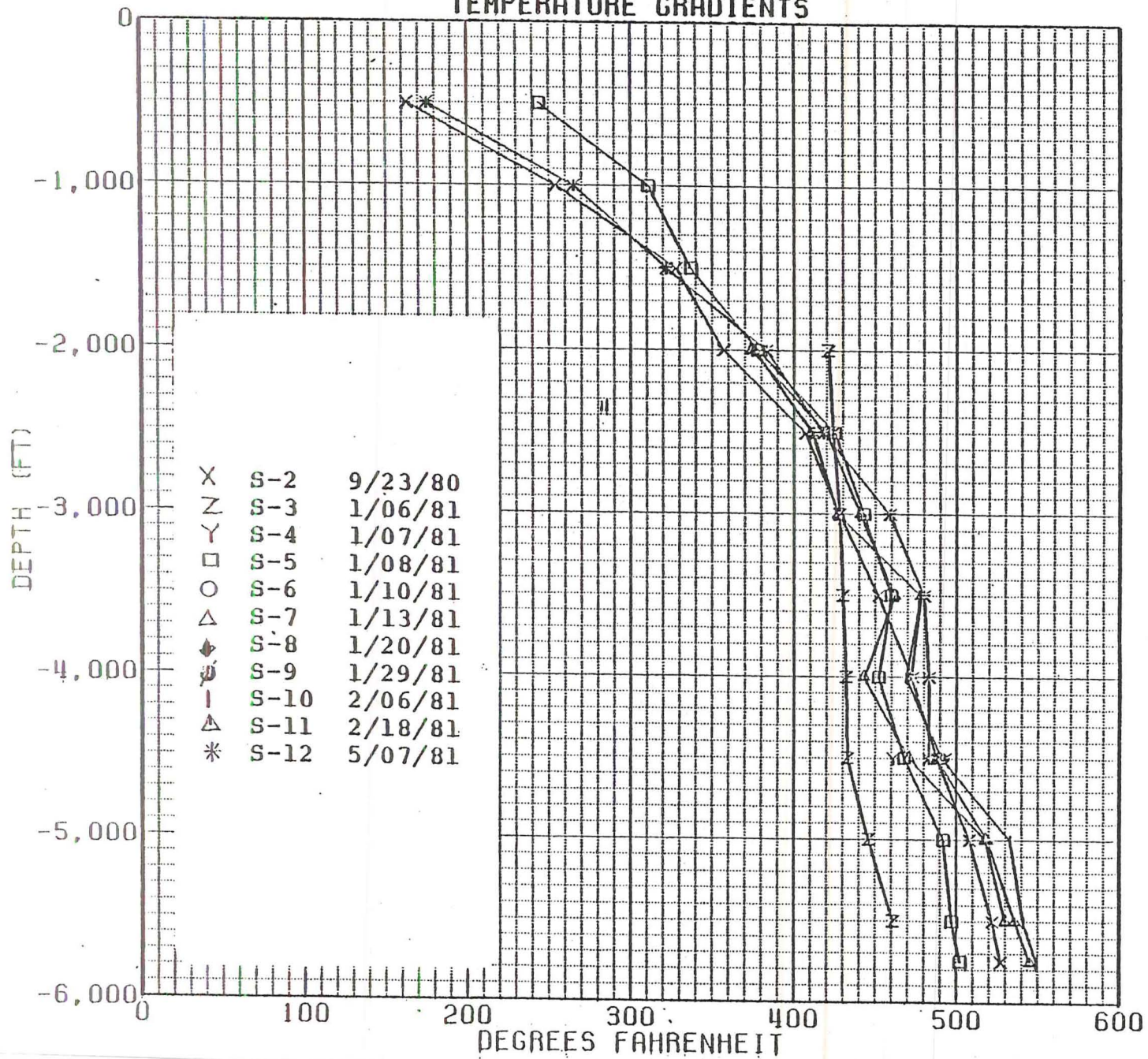


FIGURE 7

BACA 20
PRESSURE GRADIENTS

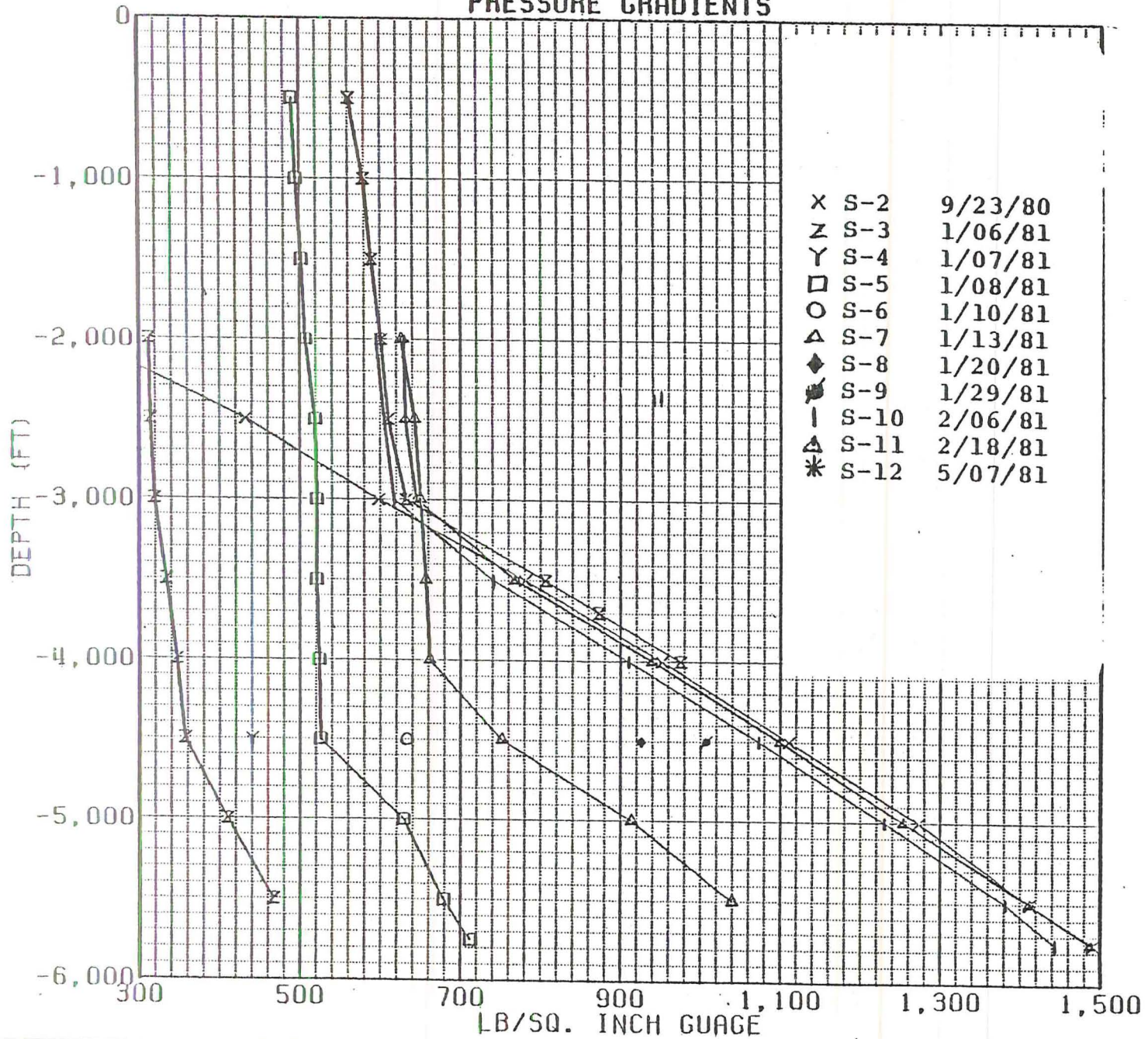
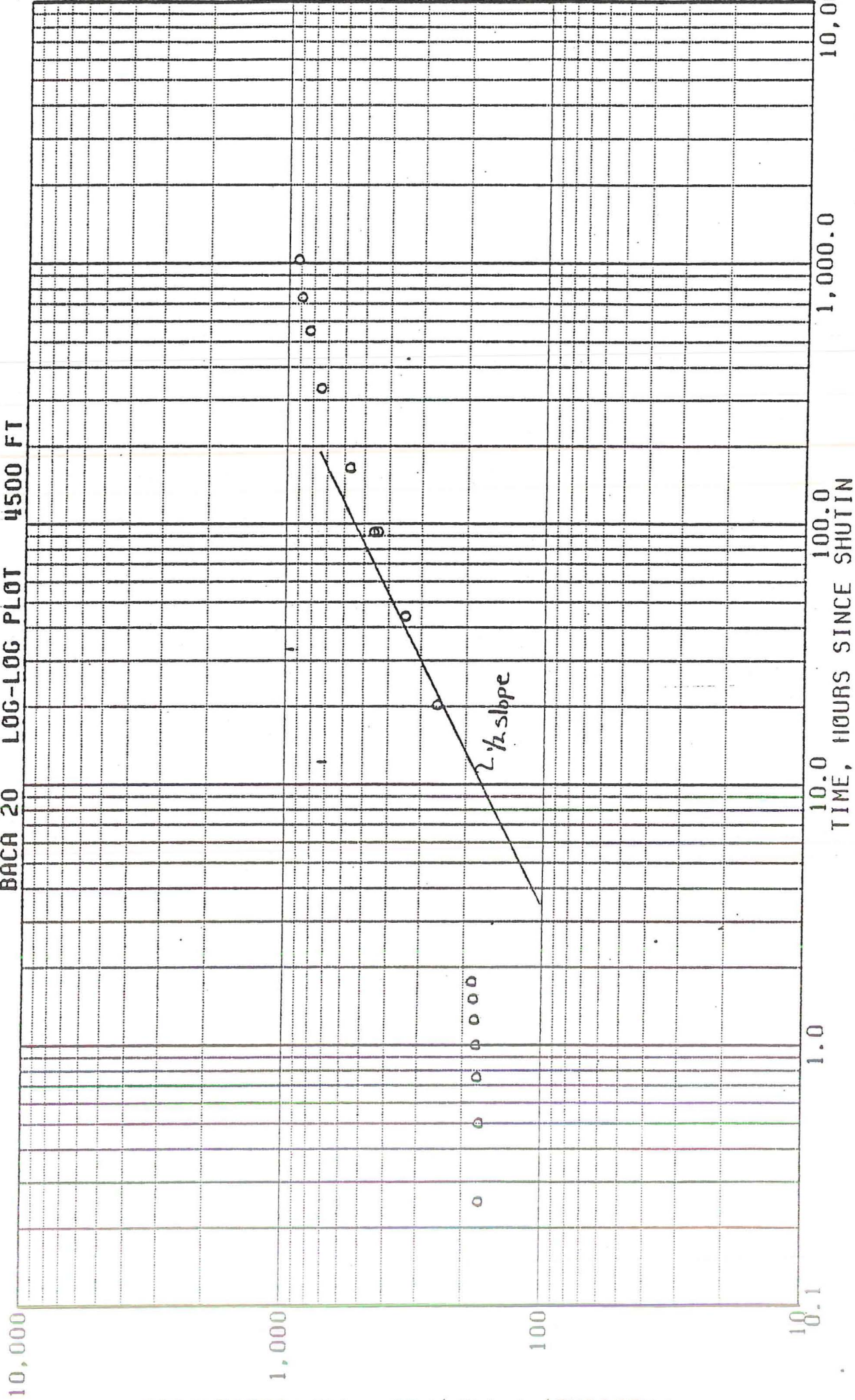


FIGURE 8

BACA 20 LOG-LOG PLOT 4500 FT



PRESSURE, P-RWF, PSI PWF=182.2 PSIG

FIGURE 9

BACA 20 LOG-LOG PLOT 5000 FT

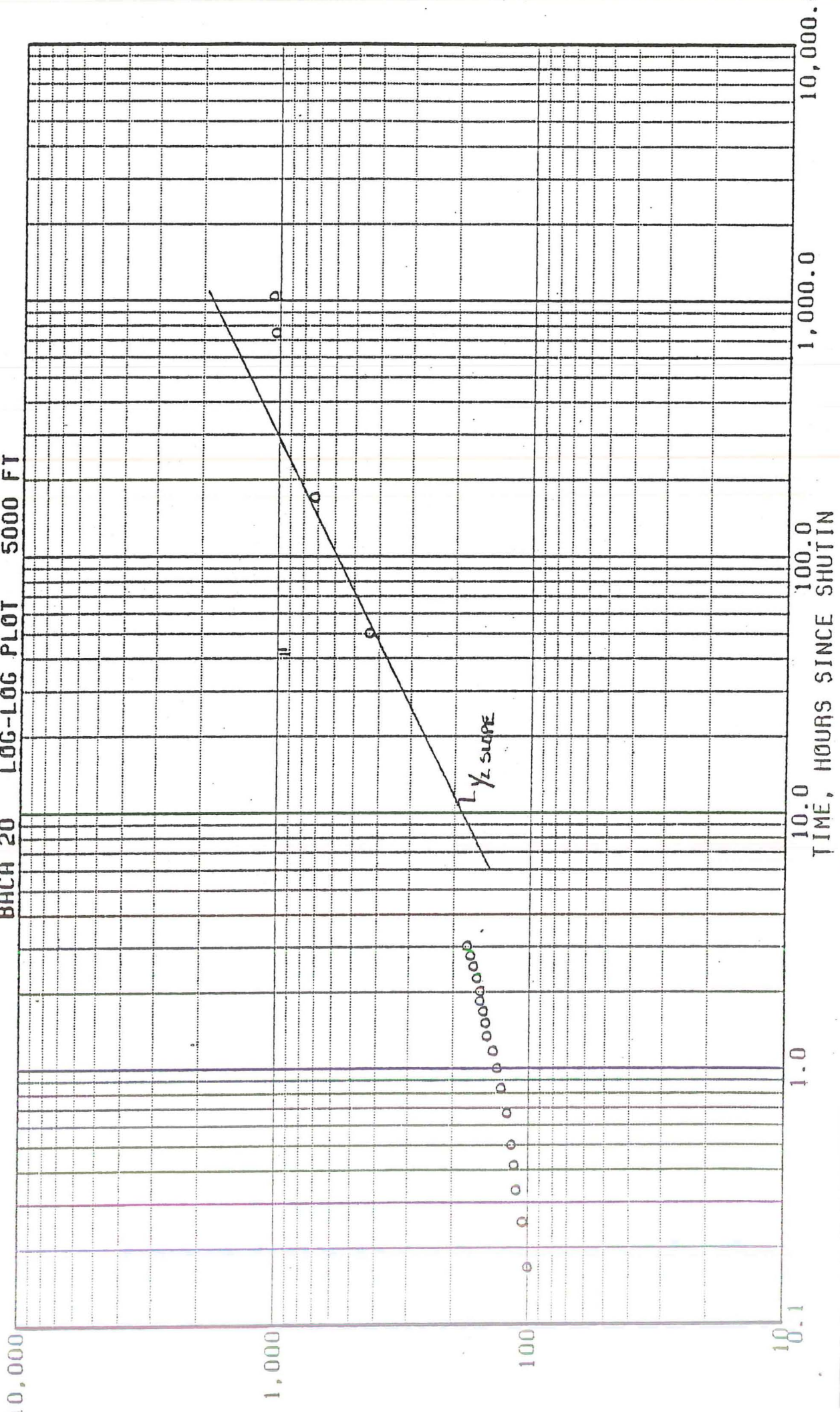
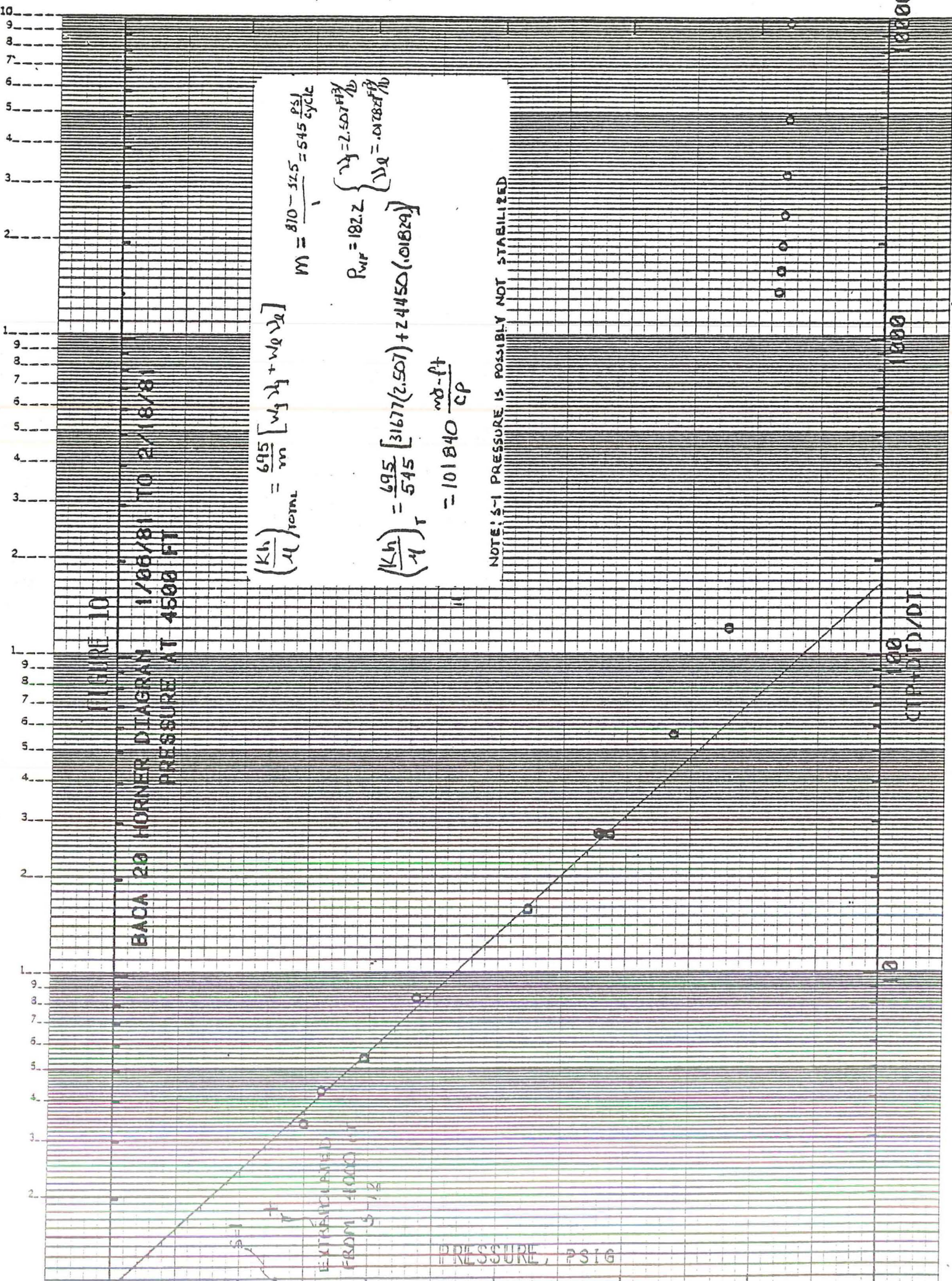


FIGURE 10

BACA 20 HORNER DIAGRAM 1/26/81 TO 2/18/81
 PRESSURE AT 4500 FT



$$\left(\frac{kh}{\mu}\right)_{\text{TOTAL}} = \frac{695}{m} [w_f y_f + w_o y_o]$$

$$M = \frac{810 - 325}{1} = 545 \frac{\text{psi}}{\text{cycle}}$$

$$P_{\text{wir}} = 182.2 \left\{ \begin{array}{l} y_f = 2.507 \text{ FF} / \text{lb} \\ y_o = .0128 \text{ FF} / \text{lb} \end{array} \right.$$

$$\left(\frac{kh}{\mu}\right)_T = \frac{695}{545} [31677(2.507) + 24450(.012829)] = 101840 \frac{\text{md}\cdot\text{ft}}{\text{cp}}$$

NOTE: S=1 PRESSURE IS POSSIBLY NOT STABILIZED

FIGURE 11

BACA 20 HORNER DIAGRAM 1/18/81 TO 2/18/81
 PRESSURE AT 5000 FT

EXTRAPOLATED FROM ACCOUNT 5-2

$$\left(\frac{kh}{\mu}\right)_{TOTAL} = \frac{695}{m} [w_g]_g + w_e]_e$$

$$m = \frac{1015 - 460}{1} = 555 \text{ cycle PSI}$$

$$P_{wf} = 190.7 \left\{ \begin{array}{l} w_g = 2.405 \text{ Ft}^3/\text{lb} \\ w_e = .0833 \text{ Ft}^3/\text{lb} \end{array} \right.$$

$$\begin{aligned} \left(\frac{kh}{\mu}\right)_{1/1/81} &= \frac{695}{555} [31677(2.405) + 24450(.0833)] \\ &= 95960 \frac{\text{md-ft}}{\text{cp}} \end{aligned}$$

NOTE: S-1 PRESSURE IS POSSIBLY NOT STABILIZED

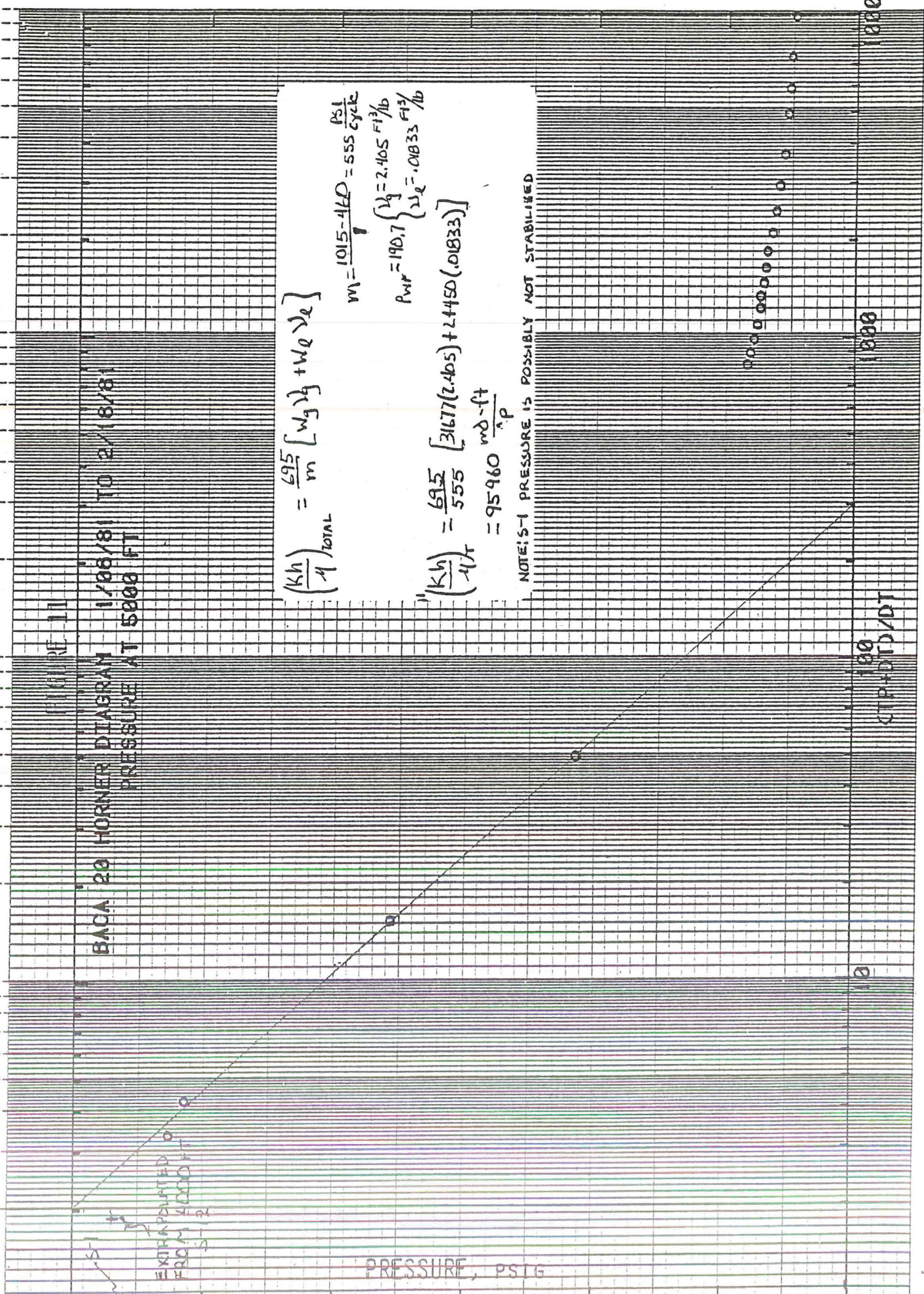


FIGURE 12

BACA 20 FLOWTEST NO. 4 9/26/80 TO 1/26/81
PERCENT NONCONDENSIBLE GAS

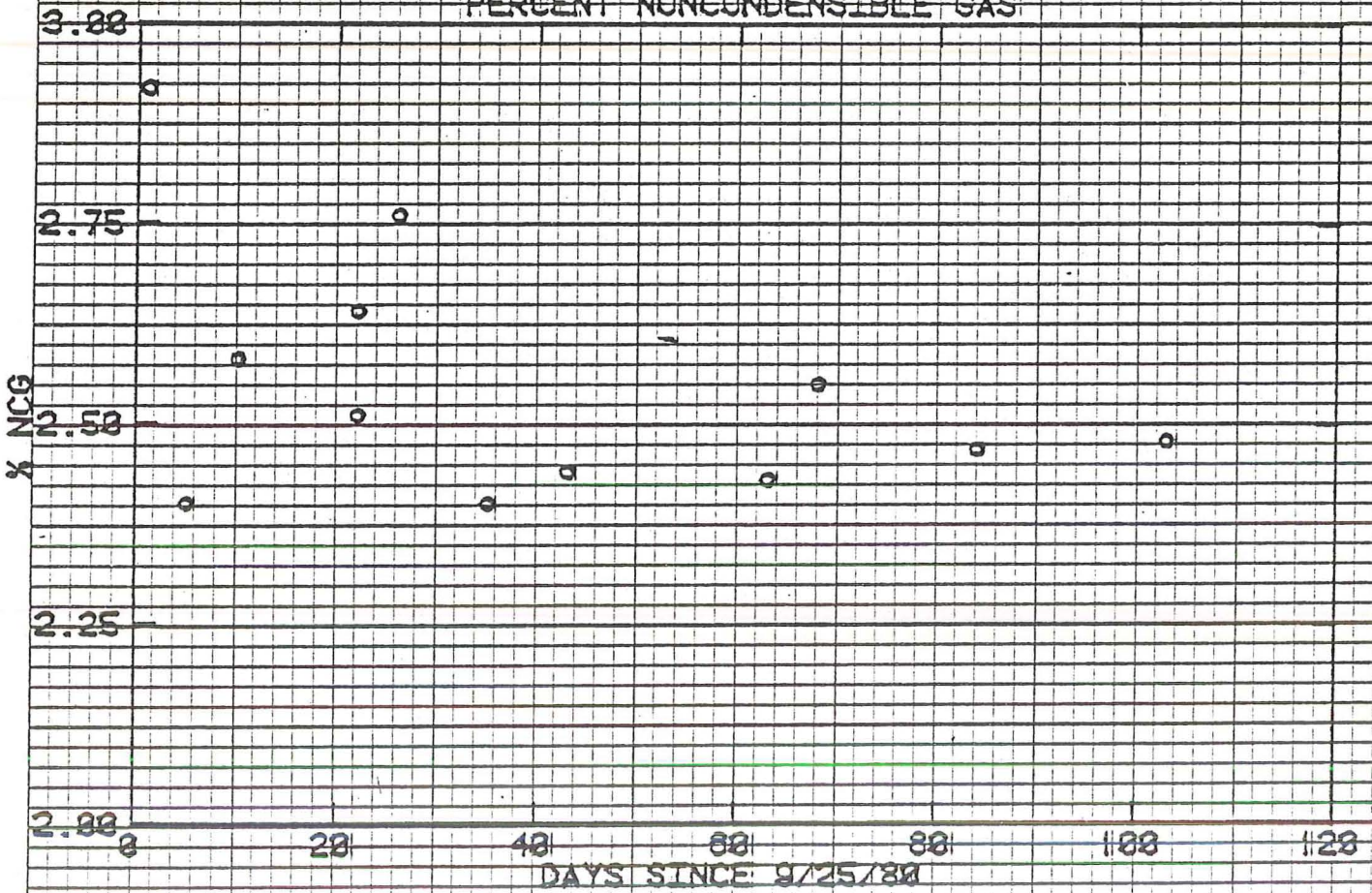
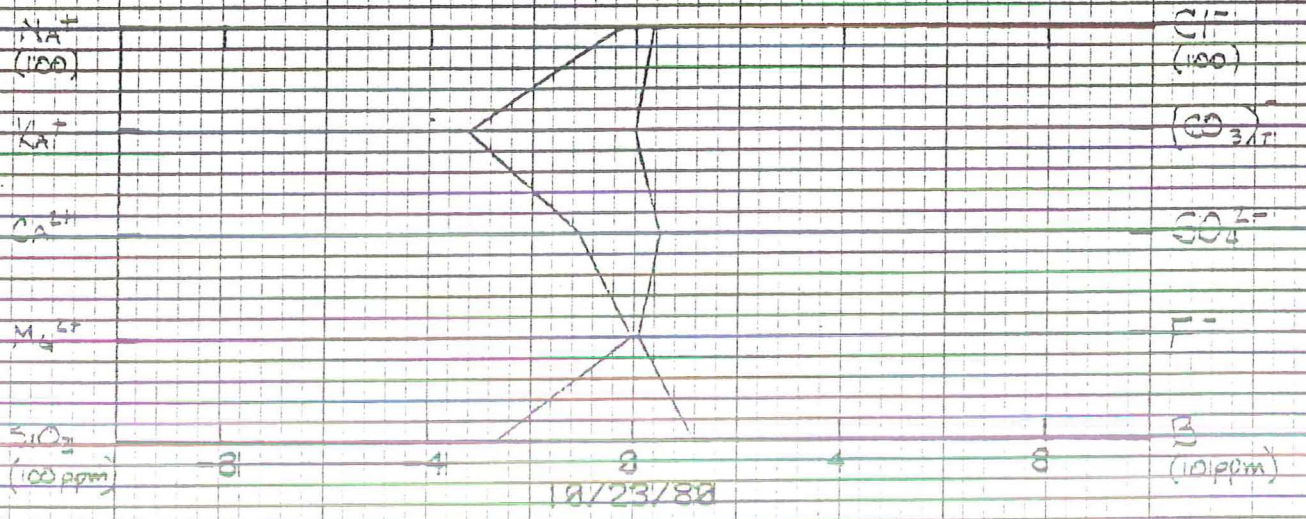
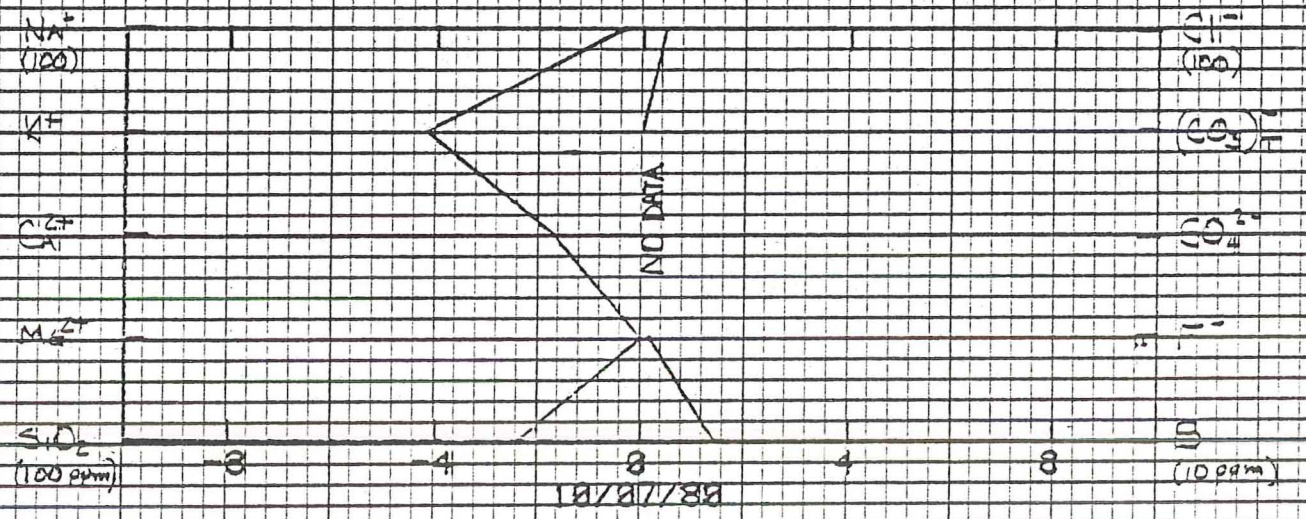
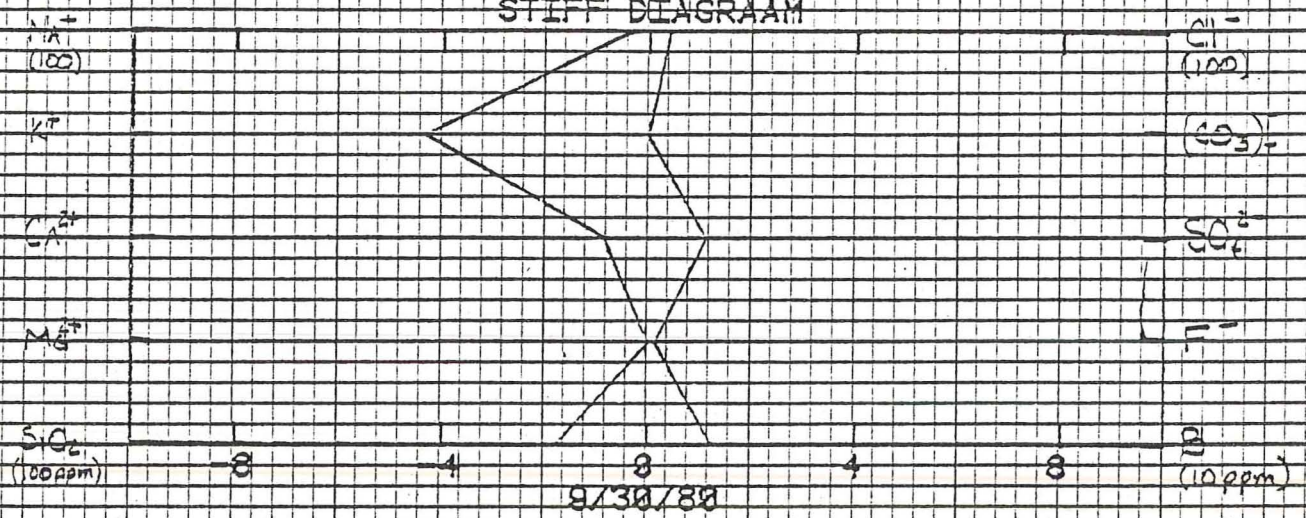


FIGURE 13

BACA 23
STIFF DIAGRAM



-
APPENDIX A

CHEMICAL ANALYSIS REPORTS

M. S. GULATI
NOV 14 1980

PAUL E. ATKINS
NOV 15 1980
Paul
file



To: R. O. Engebretsen
Rio Rancho, NM
Memo: ARS 80-442M
From: R. N. Wheatley
Date: November 10, 1980

Department: Chemical Research
Project: 267-61511
268-61511

Subject: BACA WELL #20, 9/30/80 AND 10/9/80 -
COMPOSITIONAL ANALYSIS OF STEAM
AND BRINE
Supervisor: L. W. Burdett ^{Lu B}

- cc: Library (2)
- Patent
- D. J. Christoffersen
- J. M. Fraser ^{JM}
- J. Walker
- Lyle Berger, Rio Rancho
- O. D. Whitescarver, Indio
- R. F. Dondanville)
- ~~M. S. Gulati~~)
- W. A. Smith)
- Carel Otte)
- D. E. Pyle)
- V. E. Suter)
- N. J. Stefanides)
- Santa Rosa
- UOC

The analytical results of samples taken from Well #20 by Baca personnel on 9/30/80 and 10/7/80 and received at the Research Center 10/6/80 and 10/9/80 are reported in Tables 1 through 5 below. Essentially the same analytical program was followed as was in effect when Baca Well #15 was flowed in 1976-77. Some tests, however, we were not able to run because of insufficient or unstable samples. The non-condensable gas samples taken 10/7/80 contained too much air (>50%) to obtain reliable results. Also, CO₂ in the 9/7/80 total steam was lower than the CO₂ present in the non-condensable gases. This may be due to a compositional change in the line at the time of sampling for CO₂ or possibly a sampling error. TOC results will be reported later due to instrument repairs. In your earlier operations, you sent us your samples within one day after collecting and they were also kept chilled with "Blue Ice." It would be highly desirable to resume that practice as some tests (i.e., BOD) need to be started within 24 hours on a sample held at a temperature less than 4°C.

The 10/23/80 samples from Baca #20 were received 10/27/80 and are being processed now.

R N Wheatley

RNW:tsw
attach. Tables 1-5

TABLE 1

Trace Hydrocarbons in Non-Condensable Gases

(Results reported in ppm by volume.)

<u>Baca #20, 9/30/80</u>	
C ₂ (Ethene)	7.1
C ₂ (Ethane)	4.8
C ₃	15.8
i-C ₄	0.6
n-C ₄	1.7
n-C ₅	0.7
C ₆	1.07
Benzene	2.0
Toluene	2.07
C7's and higher	3.52

Above values represent the amount of components actually present in the non-condensable gases after condensation of steam and are not calculated on total well production.

TABLE 2

Baca #20, 9/30/80 and 10/7/80
Primary Components in Non-Condensable Gases

	<u>9/30/80</u>		<u>10/7/80</u>
	<u>ppm by wt.</u>	<u>ppm by vol.</u>	
Methane	0	0	
Hydrogen	2.1	18.7	(Gas sample tubes contained excess air.)
Nitrogen	111	73	
Hydrogen Sulfide	140	75	
Carbon Dioxide	27,750	11,540	
Argon (in excess of air)	0	0	
Avg. MW of Non-Condensibles		43.78	2.32 (a)
Non-Condensibles, wt.%		2.80	0.97 (a)
Non-Condensibles, vol.%		1.17	

Results are based on total-steam production after steam condensation.

(a) Calculated from on-site collection data using an assumed MW of 43.5

TABLE 3

Baca #20, 9/30/80
Trace Sulfur Compounds in Non-Condensable Gases

(Results reported in ppm by volume.)

Methyl mercaptan	7
Carbonyl sulfide	27
Sulfur dioxide	202
Carbon disulfide	30

Above values represent the amount of components actually present in the non-condensable gases after condensation of steam and are not calculated on total well production.

TABLE 4

Baca 20, 9/30/80 and 10/7/80
NH₃, H₂S and CO₂ in Total Steam

(Results are based on total steam production)

	<u>9/30/80</u>		<u>10/7/80</u>	
	<u>ppm by wt.</u>	<u>ppm by vol.</u>	<u>ppm by wt.</u>	<u>ppm by vol.</u>
NH ₃	51	54	25	27
H ₂ S	113	60	157	83
CO ₂	18,690	7,650	16,990	6,950
Hg	<0.0009 (a)		0.0010	

(a) No gas volume supplied with mercury collection data. Calculations based on an estimated 8000 cc. of non-condensable gases.

TABLE 5

Baca #20, 9/30/80 and 10/7/80
Composition of Condensate, Brine and Two Phase System

	9/30/80			10/7/80		
	<u>Condensate</u>	<u>Brine</u>	<u>2-Phase</u>	<u>Condensate</u>	<u>Brine</u>	<u>2-Phase</u>
<u>Physical Properties</u>						
Specific Gravity @60°F	1.000	1.004	1.001	1.000	1.005	1.000
Conductivity, umhos/cm	66.5	9,700	1,035	42	9,850	2,800
Turbidity, NTU	-	17	-	-	9.4	-
<u>Solids</u>						
Settleable, ml/l	-	(a)	-	-	<0.1	-
Suspended, mg/l	<2	20, 76	72	8	2	30
Total, mg/l	-	7,729	-	-	7,350	-
Total Dissolved, mg/l	21	7,549	604	5	7,200	1,720
<u>Metals and Silicon</u>						
Aluminum, mg/l	-	0.1	-	-	0.1	-
Barium, mg/l	0.2	0.3	0.03	0.2	0.3	0.0
Beryllium, mg/l	-	0.03	-	-	0.03	-
Boron, mg/l	0.6	34	24	0.5	34	7.9
Cadmium, mg/l	-	<.01	-	-	<.01	-
Calcium, mg/l	1.9	61	18	0.6	83	7.1
Chromium (Total), mg/l	-	0.005	-	-	0.005	-
Chromium VI, mg/l	-	<.002	-	-	<.002	-
Cobalt, mg/l	-	<.03	-	-	<.03	-
Copper, mg/l	-	0.04	-	-	0.05	-
Iron, mg/l	1.4	28	4.1	2.1	12	4.9
Lithium, mg/l	-	26	-	-	29	-
Lead, mg/l	-	3.6	-	-	1.0	-
Magnesium, mg/l	<0.5	2.7	<0.5	<0.5	1.2	<0.5
Manganese, mg/l	-	67	-	-	17	-
Mercury, mg/l	-	0.0035	-	-	0.0020	-
Molybdenum, mg/l	-	0.1	-	-	0.1	-
Nickel, mg/l	-	<.02	-	-	<.02	-
Potassium, mg/l	0.8	358	28	2.3	399	108
Selenium, mg/l	-	nd<.02	-	-	nd<.02	-
Silicon, mg/l	1	350	70	<1	270	90
Silver, mg/l	-	<.02	-	-	<.02	-
Sodium, mg/l	3	2,010	155	4.7	2,050	535
Vanadium, mg/l	-	<.03	-	-	<.03	-
Zinc, mg/l	-	18	-	-	3.3	-
<u>Anions and pH</u>						
pH	4.5	4.3	5.7	4.3	4.7	5.1
Bicarbonate, mg/l	30.6	0	82.6	15.3	<6	66.1
Carbonate, mg/l	0	0	0	0	0	0
Chloride, mg/l	5.0	3,400	240	4.9	3,640	820
Cyanide, mg/l	-	<.01	-	-	<.01	-

TABLE 5 (cont.)

	9/30/80			10/7/80		
	<u>Condensate</u>	<u>Brine</u>	<u>2-Phase</u>	<u>Condensate</u>	<u>Brine</u>	<u>2-Phase</u>
<u>Anions and pH</u>						
Fluoride, mg/l	<0.2	4.6	0.6	<0.2	7.6	1.4
Nitrite (as N), mg/l	-	<.001	-	-	<.001	-
Phosphate, mg/l	-	0.046	-	-	0.071-	-
Sulfide, mg/l	-	68	14	-	(a)	30
Sulfate, mg/l	<1	473	5	1.0	304	14
<u>Ammonia</u> , mg/l	-	20	-	-	2	-
<u>Demand</u>						
80D ₅ , mg/l	-	(a)	-	-	11.0 (b)	-
COD, mg/l	-	13.1	-	-	25.0	-

(a) Insufficient sample.

(b) This 80D₅ value is approximate, representing an average of a range of trials from 8 to 15 mg/l.

A dash (-) means that, by prior agreement, these tests would not be performed on condensate or two-phase samples.



PAUL G. ATKINSON
JAN 05 1980

M. S. GULATI
JAN 5 - 1981

To: R. O. Engebretsen
Rio Rancho, NM

Memo: ARS 80-488M

From: R. N. Wheatley

Date: December 15, 1980

Department: Chemical Research

Project: 267-61511

Subject: BACA WELL #20, 10/30/80-COMPOSITIONAL
ANALYSIS OF STEAM AND BRINE

Supervisor: L. W. Burdett / *lws*

cc: Library (2)
Patent

- D. J. Christoffersen
- J. M. Fraser *Jmf*
- J. Walker
- O. D. Whitescarver, Indio

- R. F. Dondanville)
- ~~M. S. Gulati~~)
- W. A. Smith) Santa Rosa
- S. C. Lipman)
- R. C. Lindwall)
- Carel Otte)
- D. E. Pyle) UOC
- N. J. Stefanides)
- V. E. Suter)

The analytical results of samples taken from Well #20 by Baca personnel and received at the Research Center 10/27/80 are reported in Tables 1 through 5 attached.

The values obtained are generally in the same range as reported on the two previous samplings of Well #20 (Tech Memo ARS 80-442M). Total H₂S is considerably higher; ammonia is lower.

RN Wheatley

RNW:tsw
attach. Tables 1-5

TABLE 1.

Trace Hydrocarbons in Non-Condensable Gases

(Results reported in ppm by volume)

Baca #20 10/23/80

Ethene	3.0
Ethane	2.2
Propane	1.8
i-Butane	0.1
n-Butane	0.1
Benzene	2.6
Toluene	1.8
C6's +	6.6

TABLE 2

Baca #20 10/23/80

Primary Components in Non-Condensable Gases

	<u>ppm by wt.</u>	<u>ppm by vol.</u>
Methane	1.8	2.1
Hydrogen	1.7	16
Nitrogen	0	0
Hydrogen Sulfide	130	70
Carbon Dioxide	24,900	10,333
Argon (in excess of air)	0	0
Avg. MW of Non-Condensibles		43.87
Non-Condensibles, wt.%		2.50
Non-Condensibles, vol.%		1.04

Results are based on total steam production after steam condensation.

TABLE 3

Baca #20 10/23/80

Trace Sulfur Compounds in Non-Condensable Gases

(Results reported in ppm by volume)

Methyl mercaptan	4
Carbonyl sulfide	14
Sulfur dioxide	74

Above values represent the amount of components actually present in the non-condensable gases after condensation of steam and are not calculated on total well production.

TABLE 4

Baca #20 10/23/80

NH₃, H₂S and CO₂ in Total Steam

(Results are based on total steam production.)

	<u>ppm by wt.</u>	<u>ppm by vol.</u>
NH ₃	8.4	8.9
H ₂ S	153	81
CO ₂	27,217	11,134
Hg	<.0015	

TABLE 5

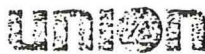
Baca #20 10/23/80

Composition of Condensate, Brine and Two Phase System

	<u>Condensate</u>	<u>Brine</u>	<u>2-Phase</u>
<u>Physical Properties</u>			
Specific Gravity @60°F	1.000	1.00050	1.0027
Conductivity, μ mhos/cm	-	7500	3700
Turbidity, NTU	-	0.6	-
<u>Solids</u>			
Settleable, ml/l	-	0.1	-
Suspended, mg/l	<2.0	8	<2.0
Total, mg/l	-	7487	-
Total Dissolved, mg/l	37	7068	3208
<u>Metals and Silicon</u>			
Arsenic, mg/l	nd<1.0	4.0	-
Aluminum, mg/l	-	0.1	-
Barium, mg/l	0.03	0.6	<.02
Beryllium, mg/l	-	<.01	-
Boron, mg/l	<1	33	15
Cadmium, mg/l	-	<.01	-
Calcium, mg/l	0.4	46	10
Chromium (Total), mg/l	-	<.002	-
Chromium VI, mg/l	-	nd<.002	-
Cobalt, mg/l	-	<.02	-
Copper, mg/l	-	0.04	-
Iron, mg/l	0.4	0.4	1.9
Lithium, mg/l	-	3.2	-
Lead, mg/l	-	0.7	-
Magnesium, mg/l	<0.5	<0.5	<0.5
Manganese, mg/l	-	0.5	-
Mercury, mg/l	-	<.0005	-
Molybdenum, mg/l	-	0.1	-
Nickel, mg/l	-	0.22	-
Potassium, mg/l	4.5	455	192
Selenium, mg/l	-	33	-
Silicon, mg/l	1.6	220	180
Silver, mg/l	-	0.03	-
Sodium, mg/l	11	2300	930
Vanadium, mg/l	-	<.03	-
Zinc, mg/l	-	0.7	-

TABLE 5 (cont.)

	<u>Condensate</u>	<u>Brine</u>	<u>2-Phase</u>
<u>Anions and pH</u>			
pH	3.9	6.0	4.9
Bicarbonate, mg/l	3	49	-
Carbonate, mg/l	0	0	0
Chloride, mg/l	12.3	3820	1650
Cyanide, mg/l	-	.01	-
Fluoride, mg/l	0.2	7.2	3.1
Nitrite (as N), mg/l	-	1	-
Phosphate, mg/l	-	0.03	-
Sulfide, mg/l	-	0.1	-
Sulfate, mg/l	1	89	27
<u>Ammonia, mg/l</u>	-	2	-
<u>Demand</u>			
BOD ₅ , mg/l	-	4.7	-
COD, mg/l	-	12	-
TOC, mg/l	-	7.3	-



Prepared by JPR Checked by _____ Date 1 / 1 / 81 Sheet 1 of 3

Title BACA NO 20 WATER INJECTION DATA W.O. / A.P.E. No. _____

DATE	TIME HRS.	WHP	WHT °F	ΔH "V.C.	RATE GPM	CUMMULATIVE M-GALS.	REMARKS
7-23-81	1000	560 PSIG					RUN SINKER BAR TO 5850'
7-24-81	0658	542 PSIG	— RUN	TEMP/PRESS GRADIENT S-13			
	0925	542 "					BLEEDED GAS
	1028	50 "	84	80	232.6		START WATER INJECTION
	1040	5 "	122	78	229.6	2.8	INJECTION LINE = 6"
	1120	1" Hg vac.	162	78	229.6	12.0	ORIFICE SIZE = 2.75"
	1450	8" " "	175	138	305.4	60.2	ORIFICE COEFF = 26
	1500	8" Hg.	175	78	229.6	63.2	
	1650	7" Hg.	175	77	228.15	88.5	
	1745	7" Hg.	175	78	229.6	101.0	
	1930	7" Hg.	170	77.5	228.9	125.2	RUN B 20 - S14 P/T
	2045	7" Hg.	168	77	228.15	142.3	@ 1900 HRS. TO
	2140	7" Hg.	165	76.5	227.41	154.9	0630 HRS. 7-25-81
	2320	7" Hg.	165	78	229.6	177.6	
7-25-81	0200	7" Hg.	165	76.5	227.41	214.4	
	0510	7" Hg.	163	78	229.6	257.6	
	0550	7" Hg.	163	79	231.1	266.7	
	0610	7" Hg.	163	75.5	225.92	271.4	
	0640	7" Hg.	163	78	229.6	278.1	
	0715	7" Hg.	163	74	223.7	286.2	
	0800	7" Hg.	162	77	228.15	296.2	
	0822	7" Hg.	164	76	226.7	301.3	RUN B 20 - S15 P/T
	0838	7" Hg.	166	77	228.15	304.7	@ 0820 HRS. - 1828 HRS.
	0846	7" Hg.	170	80	232.6	306.5	
	0907	7" Hg.	170	84	238.3	311.4	
	0915	7" Hg.	170	82	235.44	313.3	
	0930	7" Hg.	170	80	232.6	316.8	
	0950	7" Hg.	170	79	231.1	321.5	
	1040	8" Hg.	171	80	232.6	333.0	
	1145	8" Hg.	172	78	229.6	348.1	
	1310	9" Hg.	170	77	228.15	367.7	
	1330	9" Hg.	172	78	229.6	372.3	
	1410	9" Hg.	173	80	232.6	381.4	

CSTDOE



Prepared by JPR Checked by _____ Date 1 / 1 sheet 2 of 3

Title: BACA NO 20 WATER INJECTION DATA W.O. / A.P.E. No. _____

DATE	TIME HRS.	WHP "Hg. vac.	WHT OP	ΔH "W.C.	RATE GPM	CUMMULATIVE M-GALS.	REMARKS
7-25-81	1540	9	170	79	231.1	402.3	
	1550	9	172	78	229.6	404.6	
	1650	8.5	168	79	231.1	418.4	
	1745	"	167	80	232.6	431.1	
	1830	"	165	78	229.6	441.6	
	1930	"	165	79.5	231.8	455.3	
	2110	"	162	78	229.6	478.5	
	2205	"	161	79.5	231.8	491.1	
7-26-81	2400	"	160	78	229.6	517.8	
	2450	"	160	79.3	231.5	529.3	
	0245	"	160	78	229.6	555.9	
	0350	9	160	79	231.1	570.8	
	0535	"	160	78	229.6	595.1	
	0620	"	160	79	231.1	605.4	
	0915	"	165	80	232.6	645.9	
	1655	"	160	79	231.1	752.9	
	1820	8.5	165	79.5	231.8	772.5	
	1930	"	163	79	231.1	788.7	
	2025	"	160	80	232.6	801.4	
	2335	"	160	81	234	845.6	
7-27-81	0130	"	160	80	232.6	872.5	
	0855	"	165	81	234	976.1	
	0957	"	170	82.5	236.2	990.6	
	1300	"	165	83.5	237.6	1,033.8	RUN B 20-S 17 1/2
	1320	"	160	82	235.4	1,038.5	@ 1301 HRS - 1452 HRS
	1335	"	160	76	226.7	1,042.1	
	1400	"	170	79	231.1	1,047.7	
	1420	"	170	80	232.6	1,052.4	
	1520	9	160	78	229.6	1,066.3	
	1525	8.5	166	80	232.6	1,067.5	
	1935	"	164	79	231.1	1,125.6	
	2005	"	161	78	229.6	1,132.5	
	2020	"	160	79	231.1	1,136.0	
	2035	"	160	80	232.6	1,139.5	

CSTDOE

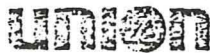


Prepared by JPR Checked by _____ Date 1 / 1 sheet 3 of 3

Title BACA NO 20 WATER INJECTION DATA W.O. / A.P.E. NO. _____

DATE	TIME HRS.	WHP "H. VAC.	IVHT °F	ΔH "W.C.	RATE GPM	CUMULATIVE M-GALS.	REMARKS
7-27-81	2215	8.5	159	81	234	1,162.7	
7-28-81	0140	"	158	77	228.15	1,210.7	
	0310	"	158	76	226.7	1,231.2	
	0650	"	158	77	228.15	1,281.1	
	0925	"	165	78	229.6	1,316.5	
	0950	"	166	80	232.6	1,322.2	RUN B 20 - S18 (SPINNER)
	1930	"	165	80.8	233.7	1,457.1	@ 1505 HRS - 1556 HRS.
	2315	"	160	80	232.6	1,509.7	
7-29-81	0600	"	160	80.5	233.3	1,603.9	
	0700	"	160	81	234	1,617.9	
	0830	"	165	82	235.4	1,639.0	
	1025	"	165	83.5	237.6	1,666.0	RUN B 20 - S19 (SPINNER)
	1122	"	165	79	231.1	1,679.6	@ 1020 HRS. - 1110 HRS.
	1340	"	160	78	229.6	1,711.5	
	1410	"	165	81	234	1,718.3	
	1705	"	170	82	235.4	1,759.3	
	1928	"				1,793.0	SHUT-IN WATER INJECTION THEN RUN P/T FALL OFF SURVEY

CSTDOE

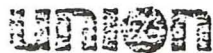


Prepared by JPR Checked by _____ Date 1 / 1 Sheet 1 of 3

Title BACA NO. 20 WATER INJECTION DATA W.O. / A.P.E. No. _____

DATE	TIME HRS.	WHP	WHT OP	ΔH "V.C.	RATE GPM	CUMULATIVE M-GALS.	REMARKS
7-23-81	1000	560 PSIG					RUN SINKER BAR TO 5850'
7-24-81	0658	542 PSIG	— RUN	TEMP/PRESS GRADIENT S-13			
	0925	542 "					BLEEDED GAS
	1028	50 "	84	80	232.6		START WATER INJECTION
	1040	5 "	122	78	229.6	2.8	INJECTION LINE = 6"
	1120	1" Hg VAC.	162	78	229.6	12.0	ORIFICE SIZE = 2.75"
	1450	8" " "	175	138	305.4	60.2	ORIFICE COEFF = 26
	1500	8" Hg	175	78	229.6	63.2	
	1650	7" Hg	175	77	228.15	88.5	
	1745	7" Hg	175	78	229.6	101.0	
	1930	7" Hg	170	77.5	228.9	125.2	RUN B 20-S14 P/T
	2045	7" Hg	168	77	228.15	142.3	@ 1900 HRS. TO
	2140	7" Hg	165	76.5	227.41	154.9	0620 HRS. 7-25-81
	2320	7" Hg	165	78	229.6	177.6	
7-25-81	0200	7" Hg	165	76.5	227.41	214.4	
	0510	7" Hg	163	78	229.6	257.6	
	0550	7" Hg	163	79	231.1	266.7	
	0610	7" Hg	163	75.5	229.97	271.4	
	0640	7" Hg	163	78	229.6	278.1	
	0715	7" Hg	163	74	223.7	286.2	
	0800	7" Hg	162	77	228.15	296.2	
	0822	7" Hg	164	76	226.7	301.3	RUN B 20-S15 P/T
	0838	7" Hg	166	77	228.15	304.7	@ 0820 HRS. - 1828 HRS
	0846	7" Hg	170	80	232.6	306.5	
	0907	7" Hg	170	84	238.3	311.4	
	0915	7" Hg	170	82	235.44	313.3	
	0930	7" Hg	170	80	232.6	316.8	
	0950	7" Hg	170	79	231.1	321.5	
	1040	8" Hg	171	80	232.6	333.0	
	1145	8" Hg	172	78	229.6	348.1	
	1310	9" Hg	170	77	228.15	367.7	
	1330	9" Hg	172	78	229.6	372.3	

STDOE



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

Title BACA NO 20 WATER INJECTION DATA W.O. / A.P.E. No. _____

DATE	TIME HRS.	WHP " H ₂ O VAC.	WHT °F	ΔH " W.C.	RATE GPM	CUMULATIVE M-GALS.	REMARKS
7-25-81	1540	9	170	79	231.1	402.3	
	1550	9	172	78	229.6	404.6	
	1650	8.5	168	79	231.1	418.4	
	1745	"	167	80	232.6	431.1	
	1830	"	165	78	229.6	441.6	
	1930	"	165	79.5	231.8	455.3	
	2110	"	162	78	229.6	478.5	
	2205	"	161	79.5	231.8	491.1	
7-26-81	2400	"	160	78	229.6	517.8	
	2450	"	160	79.3	231.5	529.3	
	0245	"	160	78	229.6	555.9	
	0350	9	160	79	231.1	570.8	
	0535	"	160	78	229.6	595.1	
	0620	"	160	79	231.1	605.4	
	0915	"	165	80	232.6	645.9	
	1655	"	160	79	231.1	752.9	
	1820	8.5	165	79.5	231.8	772.5	
	1930	"	163	79	231.1	788.7	
	2025	"	160	80	232.6	801.4	
	2335	"	160	81	234	845.6	
7-27-81	0130	"	160	80	232.6	872.5	
	0855	"	165	81	234	976.1	
	0957	"	170	82.5	236.2	990.6	
	1300	"	165	83.5	237.6	1,033.8	RUN B 20-S 17 1/2
	1320	"	160	82	235.4	1,038.5	@ 1301 HRS - 1452 HRS
	1335	"	160	76	226.7	1,042.1	
	1400	"	170	79	231.1	1,047.7	
	1420	"	170	80	232.6	1,052.4	
	1520	9	160	78	229.6	1,066.3	
	1525	8.5	166	80	232.6	1,067.5	
	1935	"	164	79	231.1	1,125.6	
	2005	"	161	78	229.6	1,132.5	
	2020	"	160	79	231.1	1,136.0	



Prepared by JPR Checked by _____ Date 1 / 1 sheet 3 of 3

Title BACA NO 20 WATER INJECTION DATA W.O./A.F.E. NO. _____

DATE	TIME HRS.	WHP "H. VAC.	IVHT °F	ΔH "W.C.	RATE GPM	CUMULATIVE M-GALS.	REMARKS
7-27-81	2215	8.5	159	81	234	1,162.7	
7-28-81	0140	"	158	77	228.15	1,210.7	
	0310	"	158	76	226.7	1,231.2	
	0650	"	158	77	228.15	1,281.1	
	0925	"	165	78	229.6	1,316.5	
	0950	"	166	80	232.6	1,322.2	RUN B 20 - S18 (SPINNE
	1930	"	165	80.8	233.7	1,457.1	@ 1505 HRS - 1556 HRS.
	2315	"	160	80	232.6	1,509.7	
7-29-81	0600	"	160	80.5	233.3	1,603.9	
	0700	"	160	81	234	1,617.9	
	0830	"	165	82	235.4	1,639.0	
	1025	"	165	83.5	237.6	1,666.0	RUN B 20 - S19 (SPINNE
	1122	"	165	79	231.1	1,679.6	@ 1020 HRS. - 1110 HRS.
	1340	"	160	78	229.6	1,711.5	
	1410	"	165	81	234	1,718.3	
	1705	"	170	82	235.4	1,759.3	
	1928	"				1,793.0	SHUT-IN WATER INJECTION THEN RUN P/T FALL OFF SURVEY



Prepared by JPR	Checked by	Date 7/28/81	Sheet of
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Title BACA NO 20 SPINNER SURVEY	W.O. / A.F.E. no.
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SPINNER SN: 123
 CLOCK: 3 HRS. SN: 23404
 WHP @ START/END OF SURVEY: 8.5" hg. vac.
 OPENED WELL TO SPINNER: 1505 HRS.
 PULL OUT OF HOLE: 1556 HRS.

STATION	DEPTH FT.	EXACT TIME AT STATION	NO OF MARKS	RPM	REMARKS
1	2500	1512 - 1516	17	425	
2	3000	1517 - 1521	13	325	
3	3500	1522 - 1526	13	325	
4	4000	1527 - 1531	12	300	USED 4 PINS FOR
5	4500	1532 - 1536	10	250	100 REVOLUTIONS PER
6	5000	1537 - 1541	8	200	MARK ON THE CHART
7	5500	1542 - 1546	6 ⁽³⁾	150	
8	5750	1547 - 1551	8	200	INJECTION RATE
9	5780	1552 - 1556	8	200	= 233 CPM

R.O. ENGBREISEN

JUL 29 1981

CSTDOE



Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N. M. FIELD REDONDO CREEK WELL NAME PAC'S NO 20
 CASING 20" @ 280' ; 13 1/2" @ 1415' ELEV. 3080' DATE: 7-28-81
 LINER DESCRIPTION: 7 5/8" @ 2505' TO SURFACE ; 7" @ 2390'-5812' ZERO POINT KB
 DEPTH 5827'

HOLE DESCRIPTION:

INSTRUMENT _____ FAH

SERIAL NO. _____

PURPOSE

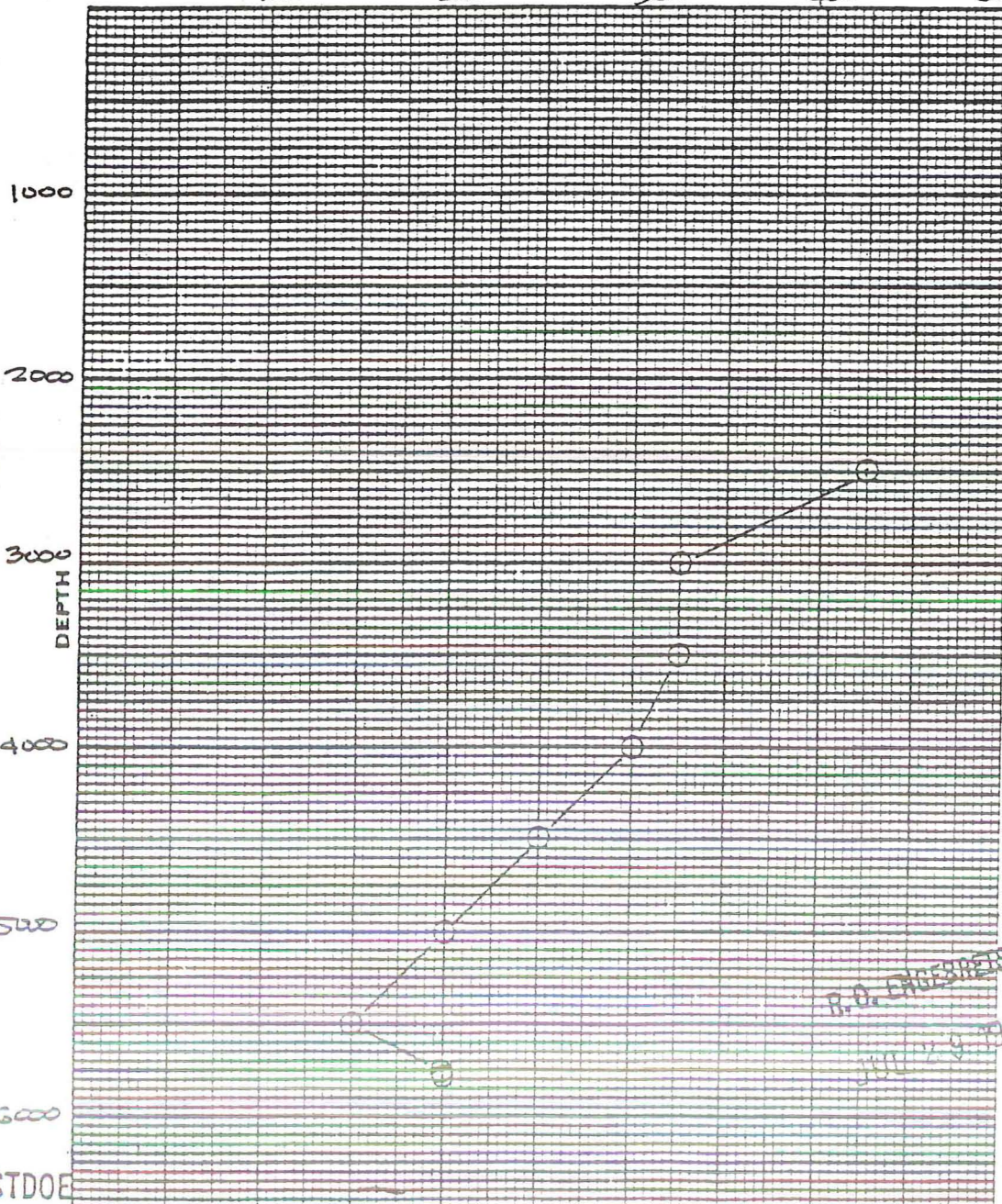
SPINNER SURVEY DURING WATER INJECTION

MAX. TEMP. _____ °F @ _____

REMARKS:

SPINNER RPM

0 100 200 300 400 500 STABILIZATION PERIOD



PRESSURES	GAUGE	BOMB	
CASING, PSI			
DEPTH	N'S OF HAAK	RPM	GRA

2250	17	425	
3000	13	325	
3500	13	325	
4000	12	300	
4500	10	250	
5000	8	200	
5500	6	150	
5750	8	200	
5780	8	200	

INJECTION RATE
= 233 GPM

R. O. ERGENSEN

JUL 29 1981

BY:

CSTDOE



Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

R.D. ENGBRETSSEN

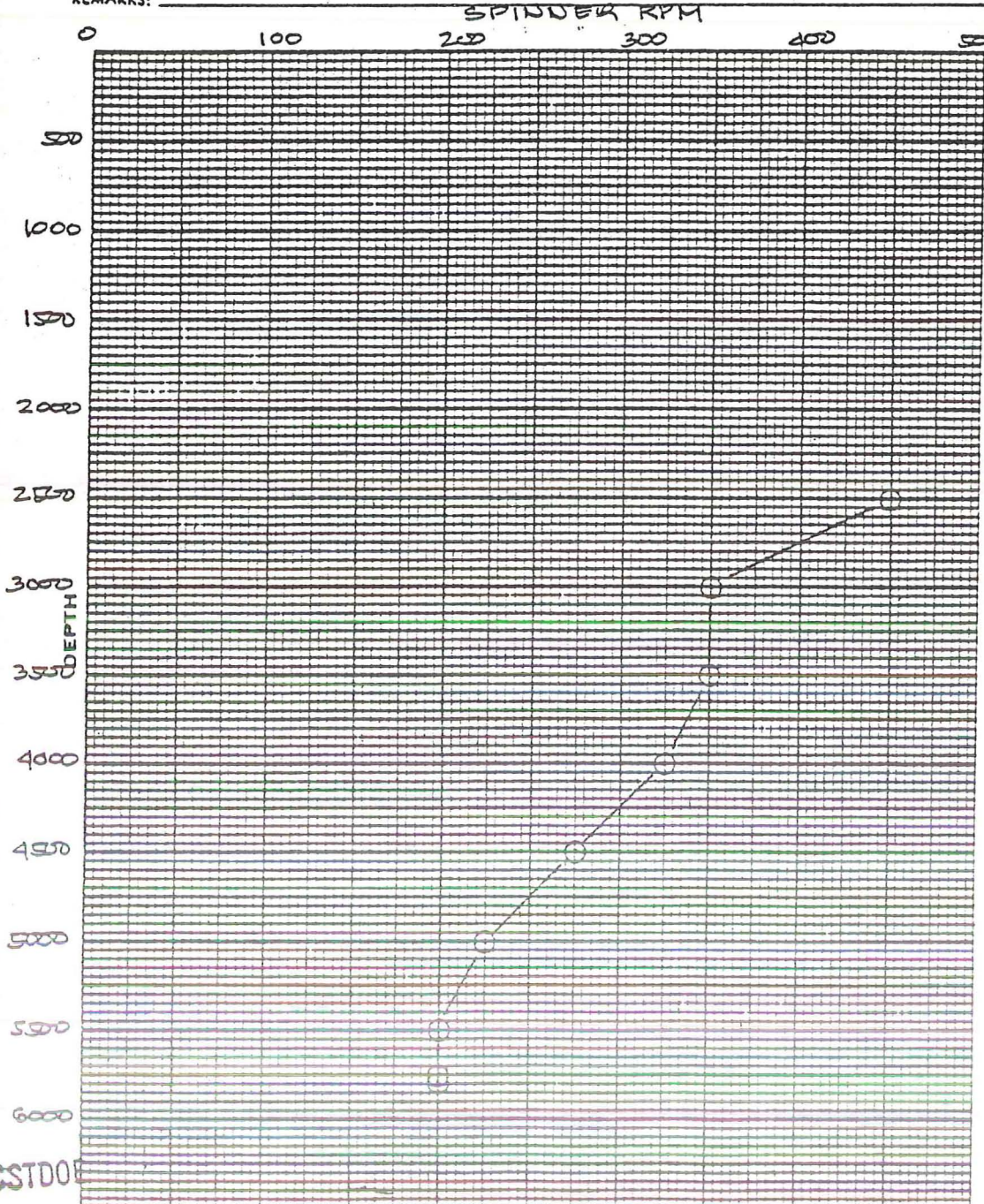
JUL 29 1981

OWNER UNION GEOTHERMAL CO. OF N. M. FIELD REDONDO CANYON WELL NAME BACA #2 20
 CASING 20" @ 280'; 13 3/8" @ 1415' ELEV. 9089 FT. DATE: 7-29-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827'

HOLE DESCRIPTION: _____ INSTRUMENT _____ FA
 SERIAL NO. _____

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

REMARKS: _____



STABILIZATION PERIOD _____

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	NO. OF MARKS	RPM	GR.
2500	18	450	
3000	14	350	
3500	14	350	
4000	13	325	
4500	11	275	
5000	9	225	
5500	8	200	
5750	8	200	
5820	8	200	

INJECTION RATE
= 235 GPM

BY: _____

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER Union Geothermal Co. - N.M. FIELD Redondo Canyon
 CASING 20" @ 280'; 13 3/4" @ 1415' ELEV 9089'
 LINED DESCRIPTION 9 5/4" Surface to 2505'
7" 2390' - 5812'

WELL NAME Baca # 20
 DATE 9-14-82
 ZERO POINT 62 + 4'
 DEPTH 5827'

HOLE DESCRIPTION

0-4700 ps. INSTRUMENT 93°-6.18° FAH
14191 SERIAL NO. 10222

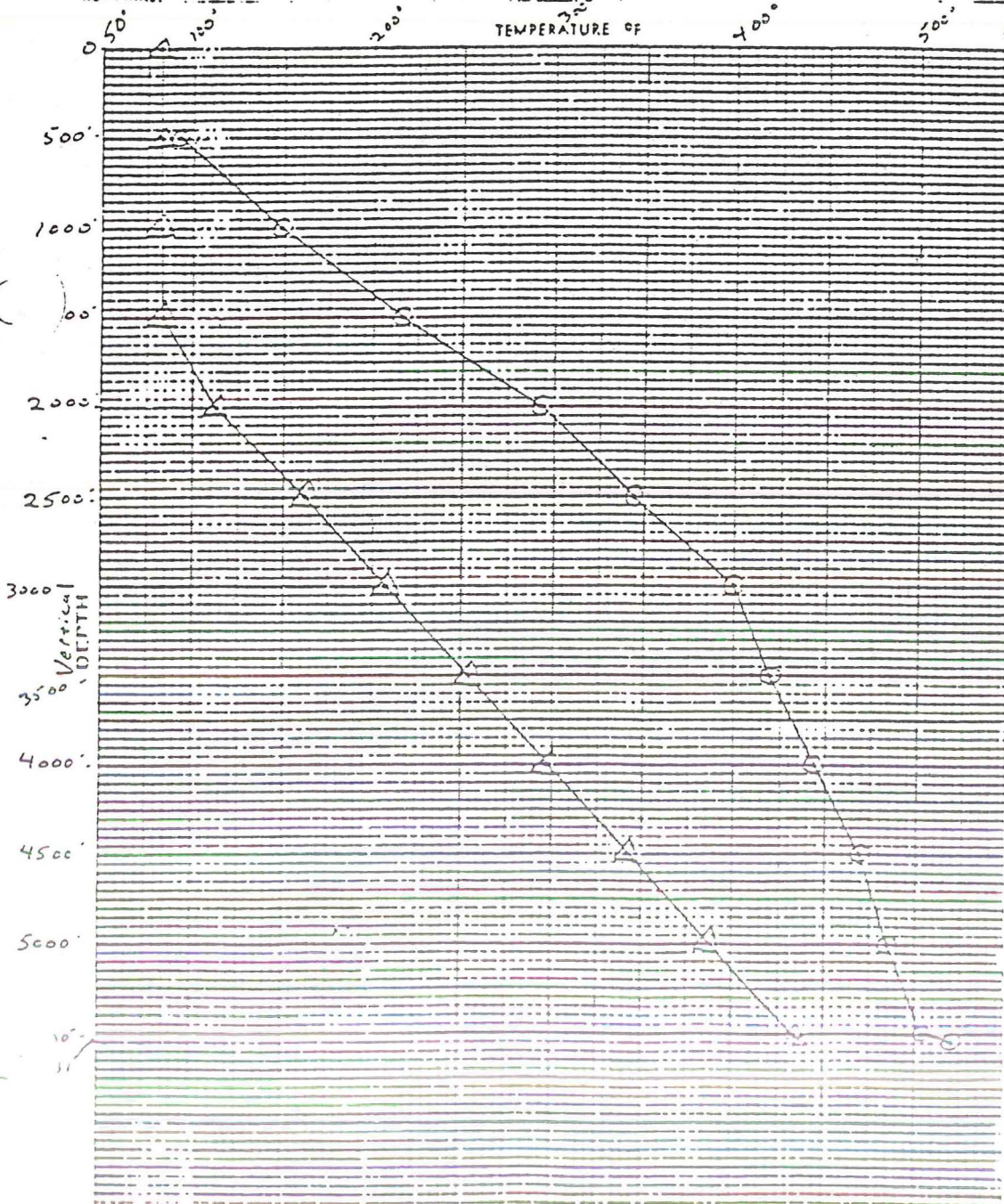
PURPOSE

MAX TEMP 521 °F @ 5750'

REMARKS

TEMPERATURE OF

STABILIZATION PERIOD



PRESSURE GAUGE
 CASING PS. 131 131

Measured DEPTH	TEMP	PRESS	GPA
0	NR	131	-
500	93	131	0
1000	148	136	.01
1500	217	138	.09
2001	293	251	.27
2513	344	450	.39
3032	400	633	.30
3552	421	819	.3
4081	444	993	.3
4620	470	1160	.3
5162	486	1351	.3
5715	503	1537	.3
5750	521	1579	.3

○ - Temp
 △ - Press

M. J. Thomson

Union Geothermal Co. of New Mexico

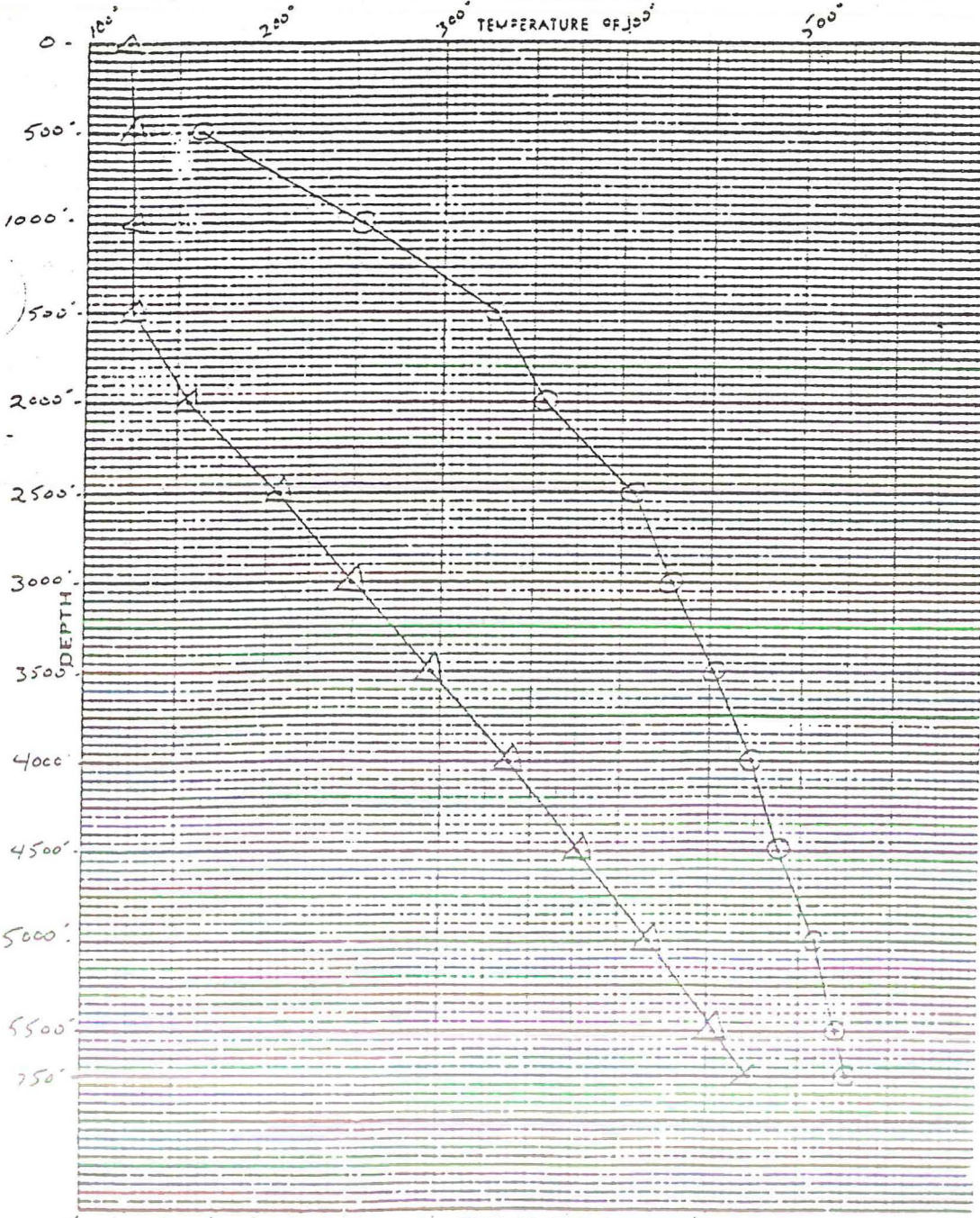
SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER Union Geothermal Co. of N.M. FIELD Redondo Canyon WELL NAME Baca # 20
 CASING 2 1/8" @ 280'; 1 3/8" @ 1415' ELEV 9089' DATE 9-23-80
 LINE DESCRIPTION 9 5/8" Surface to 2505' ZERO POINT 6L
7" 2390' - 5812' DEPTH 5827'

HOLE DESCRIPTION

0.4700 psi INSTRUMENT 93-618' FAH
 14191 SERIAL NO. 10222

PURPOSE Gradient Survey MAX. TEMP 527' @ 5750'
 REMARKS: Shot in 1655 hrs. 9-17-80



STABILIZATION PERIOD

DEPTH	TEMP.	PRES.	SPA
0	NR	95	-
500	163	100	.01
1000	254	103	.00
1500	328	103	0
2000	357	226	.24
2500	407	432	.41
3000	428	598	.33
3500	452	741	.36
4000	473	952	.34
4500	488	1111	.31
5000	508	1273	.32
5500	522	1412	.27
5750	527	1491	.31

○ - Temp
 △ - Press

B. Diesel & Thomson



Union Geothermal Co. of New Mexico

SURVEY DATE: 01-06-81

TITLE BACA # 20 PRESS/TEMP BUILD-UP AND GRADIENT SURVEY

TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPC 14191
 RANGE : 93°F - 618°F RANGE : 0 - 4700 PSI
 CALIBRATED : 11-10-76 CALIBRATED : 01-24-77
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 18336

WHP AT START OF SURVEY : 116 PSIG
 WHP AT END OF SURVEY : 337 PSIG
 OPENED WELL TO ELEMENT : 0922 HRS.
 POH : 1703 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. 4) 0922HRS. 01-06-1981

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5000'	0935	1.003	401	0.109	-	274	
		0940	1.053	415	0.112	-	281	
		0945	1.065	418	0.116	-	291	
		0950	1.071	420	0.118	-	296	
		0955	1.077	421	0.120	-	302	
		1000	1.082	423	0.121	-	304	
		1005	1.085	424	0.122	-	307	
		1015	1.091	425	0.124	-	312	
		1025	1.095	426	0.127	-	319	
		1035	1.100	428	0.129	-	324	
		1045	1.108	430	0.131	-	329	
		1055	1.109	430	0.134	-	337	
		1105	1.114	431	0.135	-	339	
		1115	1.120	433	0.136	-	342	
		1125	1.121	433	0.138	-	347	
		1135	1.127	435	0.138	-	347	
Y	6	1150	1.132	436	0.140	-	352	



Union Geothermal Co. of New Mexico

SURVEY DATE: 01-06-81

TITLE BACA NO 20 PRESS/TEMP BUILD-UP AND GRADIENT SURVEY (CONT.)

TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPC 14101
 RANGE : 93°F - 618°F RANGE : 0 - 4700 PSI
 CALIBRATED : 11-10-76 CALIBRATED : 01-24-77
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 18336

WHP AT START OF SURVEY : 116 PSIG
 WHP AT END OF SURVEY : 337 PSIG
 OPENED WELL TO ELEMENT : 0922 HRS.
 POH : 1703 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. 4) 0922 HRS. 01-06-1981

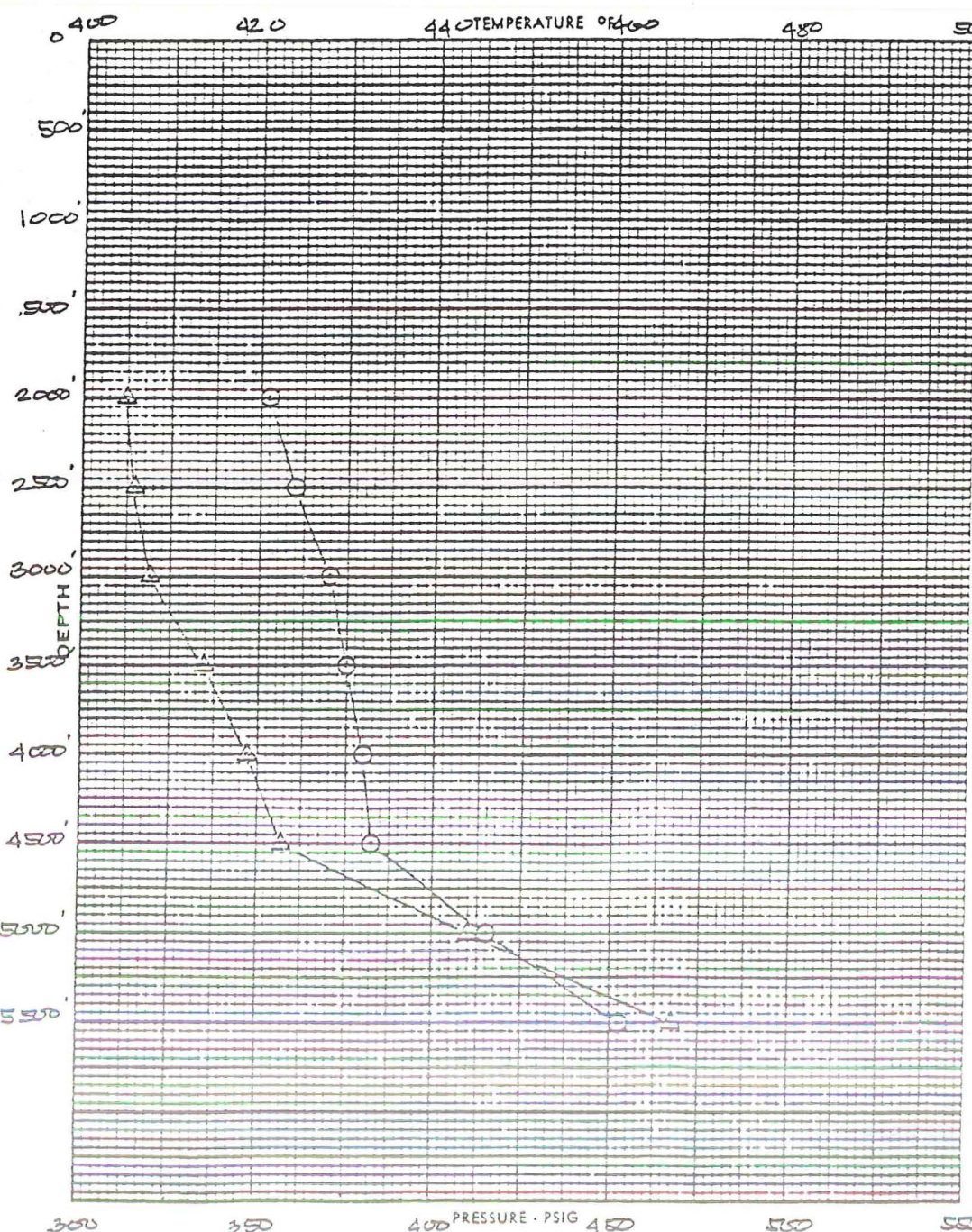
Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5000'	1205	1.136	437	0.142	-	357	GRADIENT SURVEY
2	}	1220	1.140	439	0.144	-	362	
3		1235	1.144	440	0.146	-	367	
2		2000'	20 MIN.	1.074	421	0.124	-	
3	2500'	15 "	1.087	424	0.125	-	314	
4	3000'	}	1.101	428	0.127	-	319	
5	3500'		1.108	430	0.133	-	334	
6	4000'		1.115	432	0.138	-	347	
7	4500'	}	1.120	433	0.142	-	357	
8	5000'		1.169	446	0.163	-	410	
9	5500'		1.222	461	0.186	-	467	
10	4500'	1518	1.131	436	0.140	-	352	
		1533	1.133	437	0.141	-	354	
		1548	1.125	437	0.141	-	354	
		1603	1.136	437	0.142	-	357	
		1618	1.138	438	0.143	-	359	
		1633	1.140	439	0.144	-	362	

RUN # 3

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL Co. OF N.M. FIELD REDONDO CREEK WELL NAME RACA # 20
 CASING 20" @ 230' ; 13 3/8" @ 1415' ELEV. 9089' DATE: 01-06-81
 LINER DESCRIPTION: 7 3/8" SURFACE TO 2525' ; 7" 2390' - 5812 FT. ZERO POINT GL + 4'
 DEPTH 5827'
 HOLE DESCRIPTION: KPG 14101 WTB 10222
0-4700 PSI INSTRUMENT 93°F - 618°F FAHR
 SERIAL NO. _____
 PURPOSE PRESS/TEMP GRADIENT SURVEY TO 5500 FT. MAX. TEMP. 461 °F @ 5500'
 REMARKS: JUST AFTER A 3-HOUR BUILD-UP @ 5000 FT.

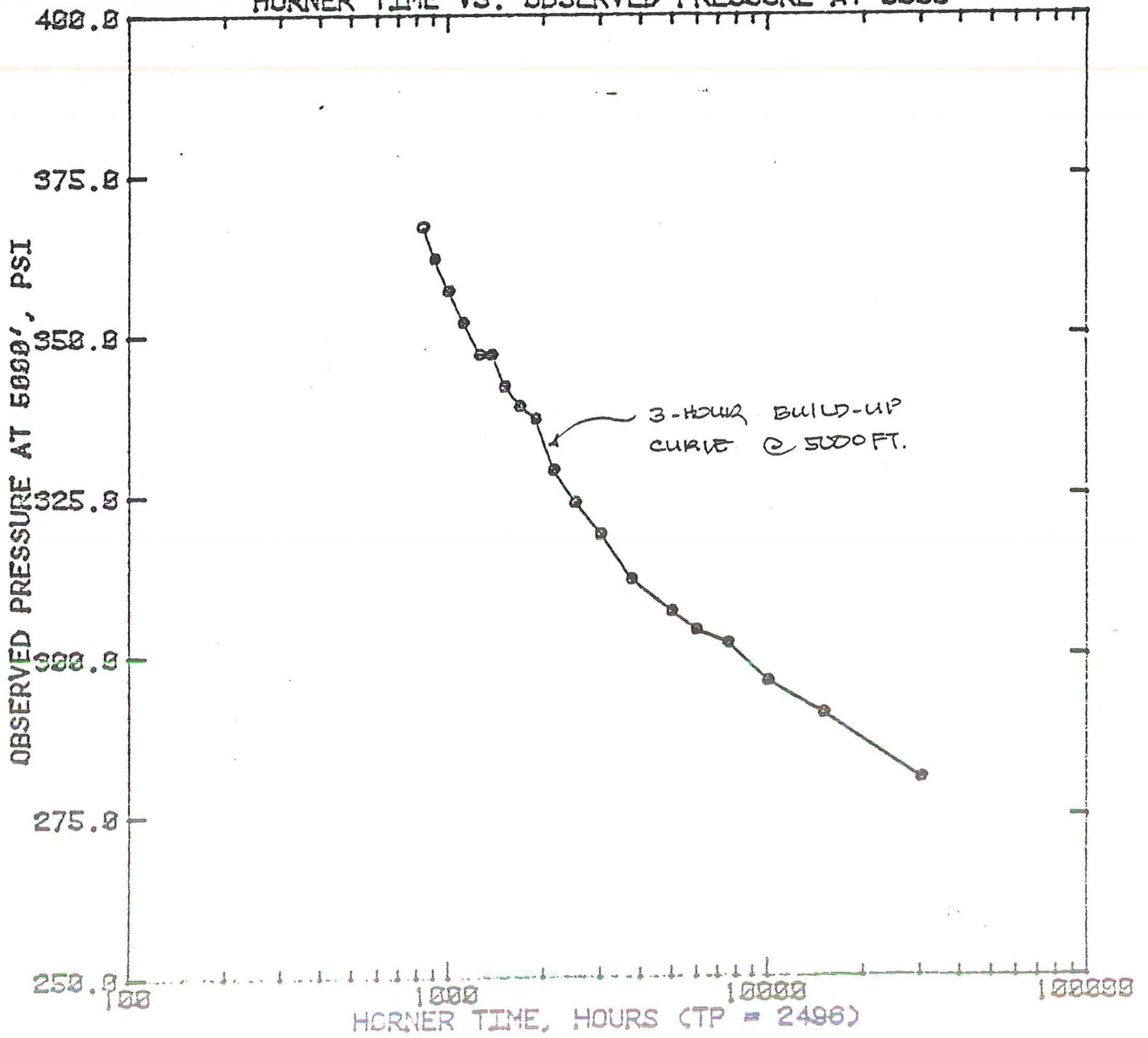


STABILIZATION PERIOD			
DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
2000	421	312	
2500	424	314	0.00
3000	428	319	0.01
3500	430	324	0.02
4000	432	327	0.02
4500	433	357	0.03
5000	446	410	0.10
5500	461	467	0.11

○ TEMPERATURE
 △ PRESSURE

BY: JPK

BACA NO. 20 PRESSURE BUILDUP OF 01/06/81
 HORNER TIME VS. OBSERVED PRESSURE AT 5000'



$$\frac{t + \Delta t}{\Delta t}$$

R.O. ENGBREITSEN

JAN 14 1981 RUN # 5



Union Geothermal Co. of New Mexico

SURVEY DATE: 01-08-81

TITLE BACA NO 20 PRESS/TEMP GRADIENT SURVEY TO 5750 FT.

TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPG 14191
 RANGE : 93°F - 618°F RANGE : 0 - 4700 PSI
 CALIBRATED : 11-10-76 CALIBRATED : 01-24-77
 CLOCK: 12 HRS. : S/N: 14089 CLOCK: 12 HRS. : S/N: 18336

WHP AT START OF SURVEY : 475 PSIG
 WHP AT END OF SURVEY : 480 PSIG
 OPENED WELL TO ELEMENT : 0923 HRS.
 POH : 1205 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
 MOS., 2 DAYS, 0 HRS., 1 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 4) 0922 HRS. 01-06- 1981

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	0	5 MIN.	N.R.	—	0.200	—	502	→ NOT CORRECTED
2	500	12 "	0.466	244	0.205	0.195	490	@ 5000 FT. ROGS. ARE AT THE BEGINNING AND END OF 12 HRS.
3	1000		0.689	311	0.206	0.197	495	
4	1500		0.778	337	0.207	0.200	502	
5	2000		0.922	378	0.207	0.202	507	
6	2500		1.092	425	0.210	0.207	519	
7	3000		1.186	443	0.211	0.208	521	
8	3500		1.218	460	0.211	0.208	521	
9	4000		1.189	452	0.212	0.209	524	
10	4500		1.247	468	0.214	0.210	526	
11	5000		1.342	492	0.269	0.266	660	
	"		1.337	491	0.256	0.253	629	
12	5500		1.364	497	0.277	0.274	679	
13	5750		1.386	502	0.291	0.288	712	

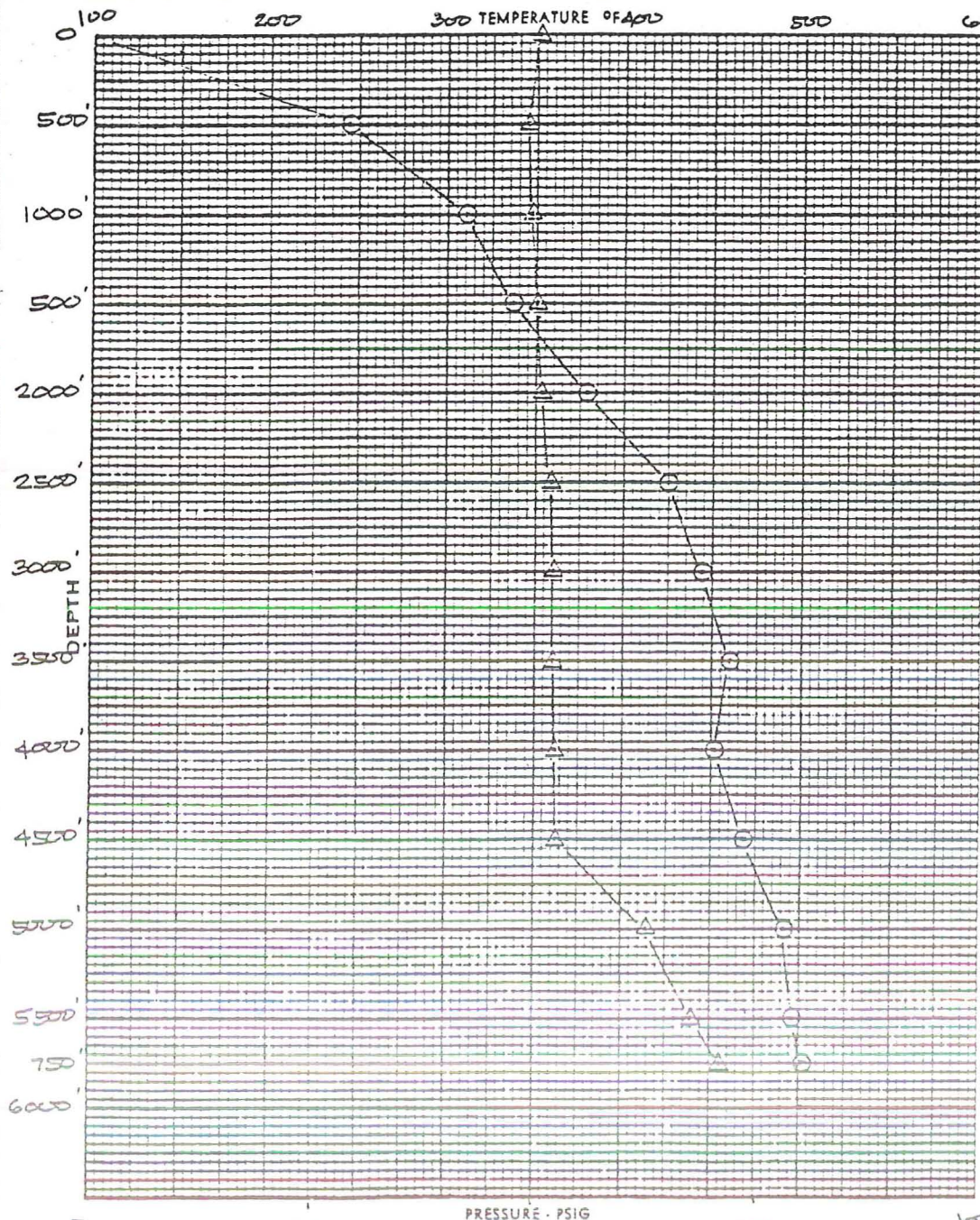
BO. ENGBRETSSEN

JAN 14 1981 Run # 5

Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL Co. OF N.M. FIELD REDONDO CREEK WELL NAME BACA NR 20
 CASING 20" @ 280'; 13 3/8" @ 1415' ELEV. 9089 FT. DATE: 01-08-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE; 7" @ 2370' - 5827' ZERO POINT GL + 4'
 DEPTH 5827'
 HOLE DESCRIPTION: _____
 INSTRUMENT KPC 14101 INSTRUMENT 93°F - 618°F FAH
 SERIAL NO. 0-4700 PSI SERIAL NO. KTB 10222
 PURPOSE PRESS/TEMP GRADIENT SURVEY TO 5750 FT. MAX. TEMP. 502 °F @ 5750'
 REMARKS: _____



DEPTH	TEMP.	PRESS.	GRAD.
0	-	502	
500	244	490	
1000	311	495	
1500	337	502	
2000	378	507	
2500	425	510	
3000	443	521	
3500	460	521	
4000	452	524	
4500	468	526	0.0
5000	491	629	0.5
5500	497	670	0.10
5750	502	712	0.15

○ TEMPERATURE
 △ PRESSURE

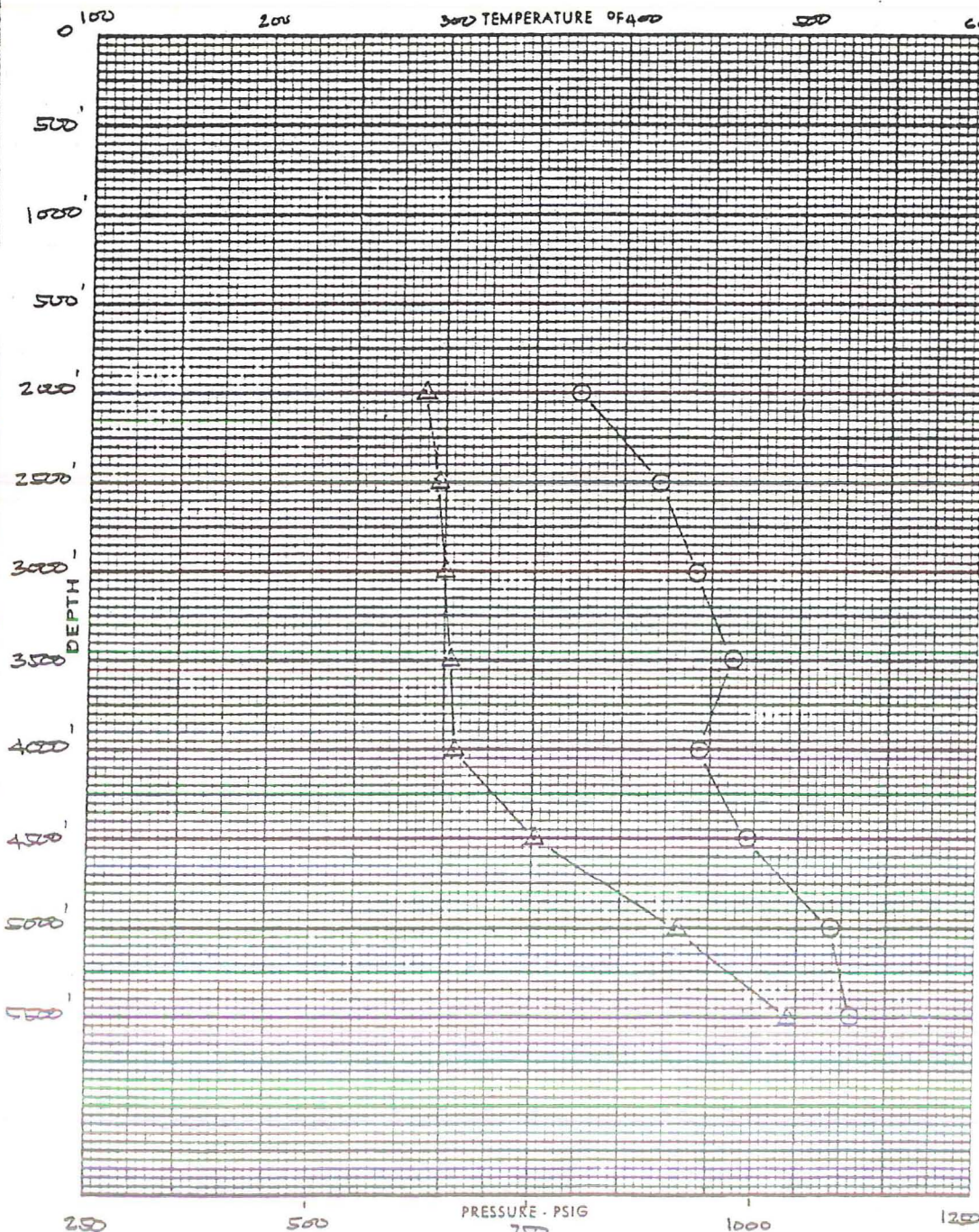
BY: JPR

Union Geothermal Co. of New Mexico

S.O. ENGBREISEN # 7
JAN 14 1981

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CREEK WELL NAME BACA NR 20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9089 FT. DATE: 01-13-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT CL + 4'
 HOLE DESCRIPTION: _____ DEPTH 5827'
 _____ KPG 14101 INSTRUMENT 93°F - 618°F FAHR
 _____ 0-4700 PSI SERIAL NO. KTB 10222
 PURPOSE PRESS/TEMP GRADIENT SURVEY TO 5500 FT. MAX. TEMP. 530 °F @ 5500'
 REMARKS: _____



DEPTH FT.	TEMP. °F	PRESS. PSI	GRAD.
2000	374	626	
2500	420	683	
3000	441	650	
3500	462	657	
4000	443	662	.18
4200	471	752	.32
4500	518	914	.25
5000	530	1040	

PRESSURES GAUGE BOMB
 CASING, PSI
 STABILIZATION PERIOD
 ○ TEMPERATURE
 △ PRESSURE
 BY: _____

R.O. ENGELB...
FEB 06 1981

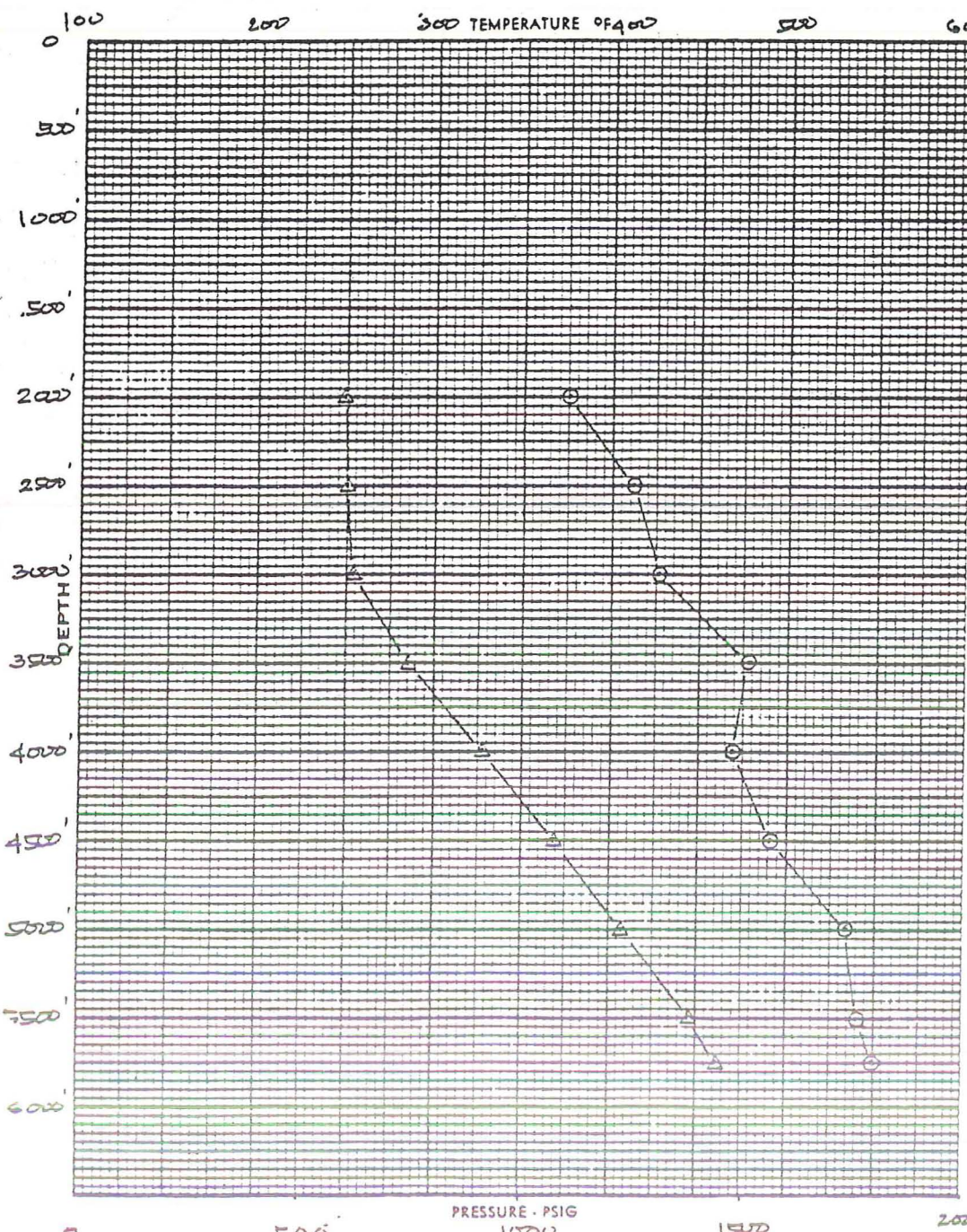
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CREEK WELL NAME BACA 13-20
 CASING 20" @ 280'; 13 3/8" @ 1415' ELEV. 9087 FT. DATE: 02-06-81
 LINER DESCRIPTION: 1) 5/8" @ 2505' TO SURFACE; 7" @ 2370' - 5812' ZERO POINT GL + 4'
 DEPTH 5827'

HOLE DESCRIPTION: _____
 _____ KPG 14171 INSTRUMENT 93°F-618°F FAHR.
 _____ 0-4200 PSI SERIAL NO. KTB 10222

PURPOSE PRESS/TEMP GRADIENT SURVEY TO 5750 FT. MAX. TEMP. 549 °F @ 5750'
 REMARKS: _____



PRESSURES	Gauge	BOMB	
CASING, PSI			
DEPTH	TEMP.	PRESS.	GRAD.
FT.	°F	PSIG	
2000	376	505	
2500	412	605	.02
3000	427	617	.02
3500	478	741	.26
4000	460	910	.31
4500	491	1073	.31
5000	533	1230	.31
5500	541	1382	.30
5750	549	1443	.26

○ TEMPERATURE
 ▲ PRESSURE

BY: _____

R. O. ENGBREITSEN

FEB 17 1981

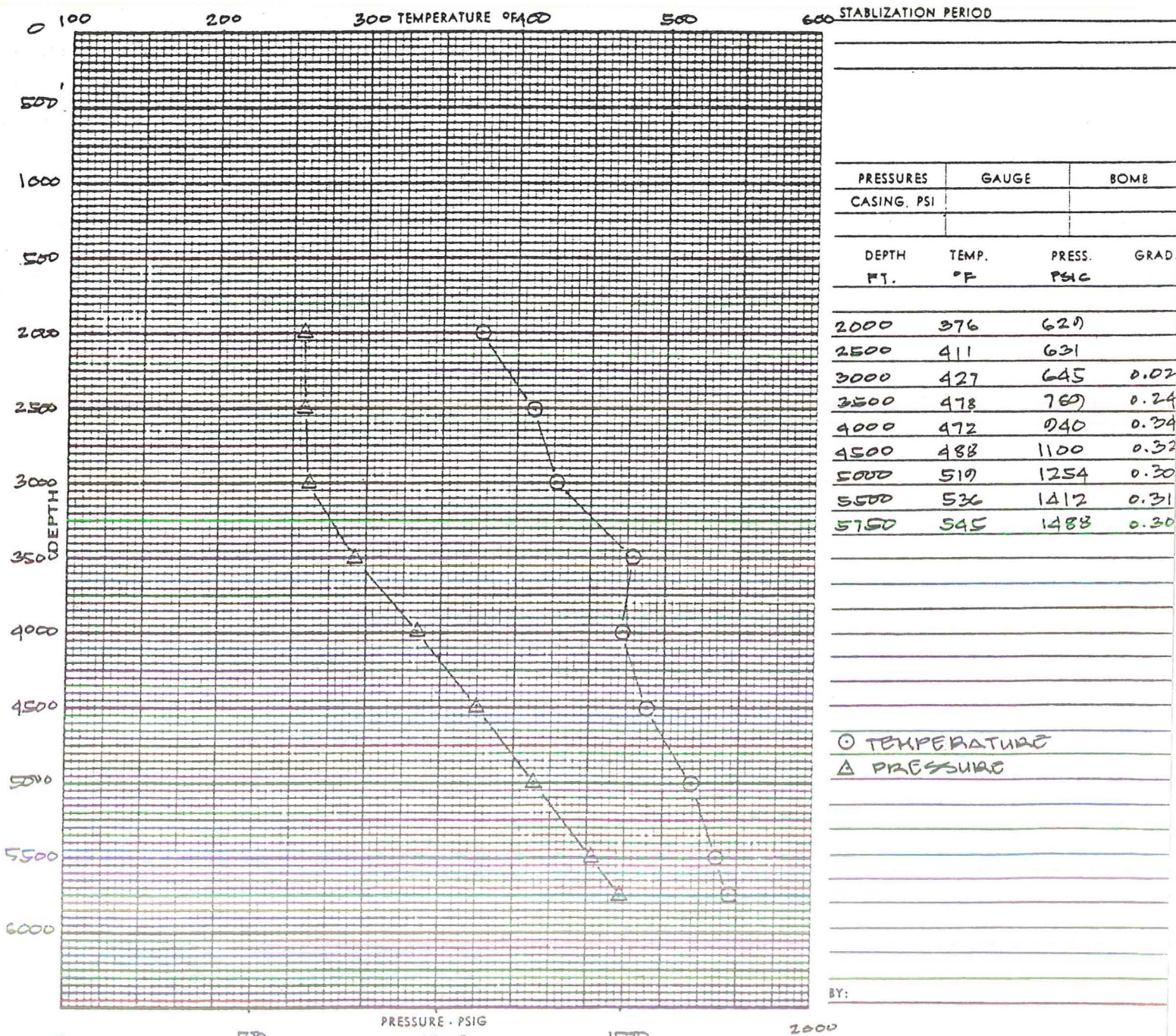
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CREEK WELL NAME BACA Nº 20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9089 FT. DATE: 02-18-81
 LINER DESCRIPTION: 1 1/2" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT GL + 4'
 DEPTH 5827'

HOLE DESCRIPTION: _____
 _____ KPG 14171 INSTRUMENT 93-612 FAHR.
 _____ 0-4700 PSI SERIAL NO. KTB 10222

PURPOSE PRESS/TEMP GRADIENT SURVEY TO 5750 FT. MAX. TEMP. 545 °F @ 5750'
 REMARKS: _____



○ TEMPERATURE
 △ PRESSURE

BY: _____

Union Geothermal Co. of New Mexico

R. O. ENGBREITSEN

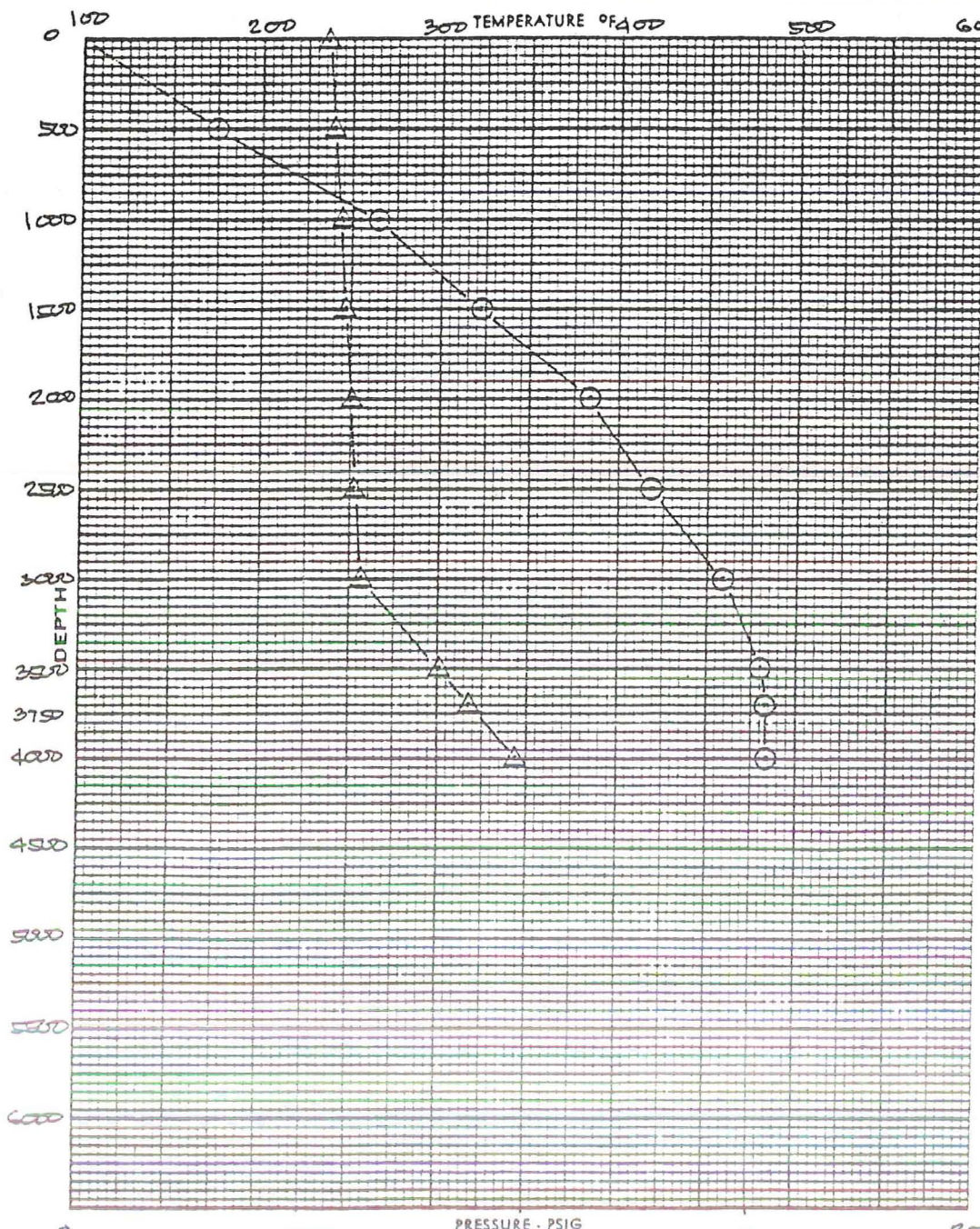
SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

MAY 08 1981

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CREEK WELL NAME BACA # 20
 CASING 20" @ 280'; 13 3/8" @ 1415' ELEV. 9080 FT. DATE: 5-7-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE; 7" @ 2300' - 5212' ZERO POINT KTB
 DEPTH 5827'

HOLE DESCRIPTION: _____
 _____ KPG 9235 INSTRUMENT 03-612 FAHR.
 _____ 2950 PSI SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 4000 FT. MAX. TEMP. 483 °F @ 4000'
 REMARKS: PRIOR TO SPERRY-SUN INSTALLATION



PRESSURES	GAUGE	BOMB
CASING, PSI	538	545

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	-	545	
500	175	561	0.03
1000	265	579	0.03
1500	322	589	0.02
2000	383	601	0.02
2500	418	610	0.01
3000	459	632	0.02
3500	480	806	0.34
3700	483	873	0.33
4000	483	975	0.32

○ TEMPERATURE
 △ PRESSURE

BY: JPR



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-24-81

TITLE: B 20 - S 13 P/T

TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPG 9235
 RANGE : 93°F - 618°F RANGE : 2750 PSI
 CALIBRATED : 11-10-76 CALIBRATED : 7-26-76
 CLOCK: 12 HRS. : S/N: 23778 CLOCK: 12 HRS. : S/N: 23781

WHP AT START OF SURVEY : 542 PSIG
 WHP AT END OF SURVEY : 542 PSIG
 OPENED WELL TO ELEMENT : 0658 HRS.
 POH : 1730 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

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	2550	0706-0721	1.078	422	0.402	0.400	620	
2	3000	0723-0738	1.232	464	0.405	0.403	624	
3	3500	0739-0754	1.300	482	0.531	0.531	811	① START BLEED
4	4000	0755-0810	1.326	488	0.648	0.648	982	CAS @ 09.
5	4500	0811-0826	1.367	498	0.759	0.760	1146	② START INJECT
6	5000	0827-0842	1.409	507	0.873	0.875	1313	@ 1028 lbs.
7	5500	0844-0859	1.463	520	0.984	0.986	1475	7-24-81
8	5750	0920	1.481	524	1.033	1.036	1548	
		0925	1.481	524	1.033	1.036	1548	
		0940	1.482	525	1.003	1.005	1503	
		0955	1.485	525	1.006	1.008	1507	
		1010	1.487	526	1.006	1.008	1507	
		1025	1.489	526	1.007	1.009	1509	
		1030	"	526	1.011	1.013	1515	
CSTD0E		1035	"	526	1.042	1.045	1561	
		1040	"	526	1.071	1.074	1603	
		1045	1.488	526	1.087	1.090	1626	

R.O. ENGBRETS
JUL 29 1981



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-24-81

TITLE B 20 - 513 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.

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__

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
8	5750	1050	1.487	526	1.101	1.104	1647	WATER INJECTION IN PROGRESS R.O. ENGBRE " " " "
		1055	1.484	525	1.112	1.115	1663	
		1100	1.481	524	1.124	1.127	1680	
		1105	1.479	524	1.133	1.137	1695	
		1110	1.476	523	1.142	1.146	1708	
		1115	1.472	522	1.151	1.155	1721	
		1120	1.469	521	1.158	1.162	1731	
		1125	1.464	520	1.165	1.169	1741	
		1130	1.458	519	1.171	1.176	1751	
		1135	1.452	518	1.178	1.183	1762	
		1140	1.445	516	1.183	1.188	1769	
		1150	1.426	511	1.194	1.199	1785	
		1200	1.395	504	1.203	1.209	1799	
-		1210	1.343	493	1.211	1.217	1811	
CSTDOE		1220	1.292	480	1.216	1.223	1820	
		1230	1.230	463	1.221	1.229	1828	
	▽	1240	1.170	447	1.225	1.235	1837	



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-24-81

TITLE B 20 - S 13 P/T (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____

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
8	5750	1255	1.083	423	1.229	1.240	1844	WATER INJECTION IN PROGRESS
		1310	1.013	404	1.234	1.246	1853	
		1325	0.959	389	1.239	1.252	1862	
		1355	0.878	366	1.248	1.260	1874	
		1425	0.818	349	1.253	1.264	1879	
		1455	0.772	335	1.257	1.268	1885	
		1500	0.765	333	1.263	1.274	1894	
		1505	0.756	321	1.273	1.284	1908	
		1510	0.747	328	1.277	1.288	1914	
		1525	0.725	322	1.270	1.280	1903	
		1555	0.695	313	1.268	1.278	1900	
		1625	0.671	306	1.268	1.278	1900	
		1655	0.652	300	1.268	1.277	1898	
		1730	0.632	294	1.268	1.277	1898	
CSTDOE								

R.O. ENGBRETTSEN
 JUL 29 1981



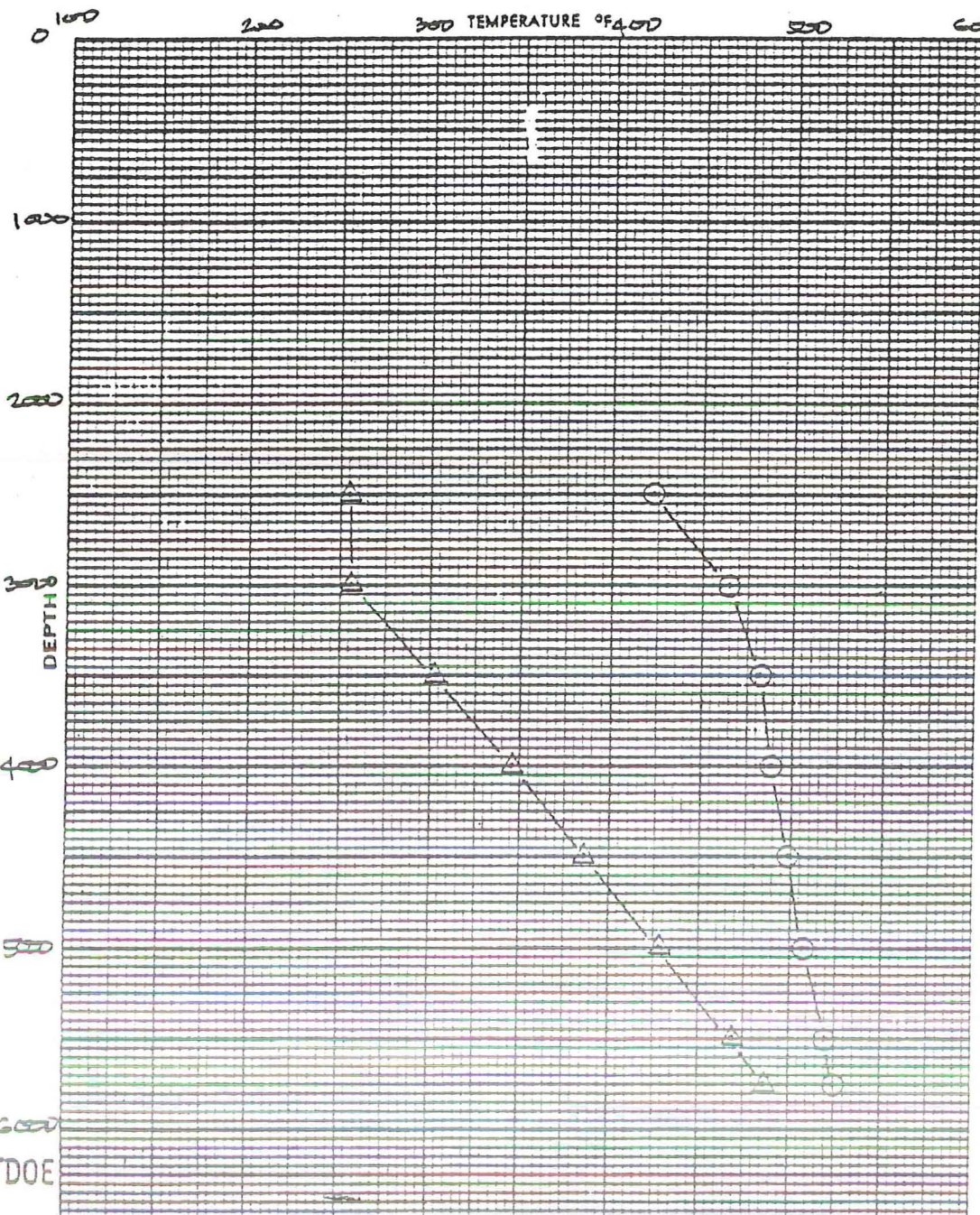
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA 10 120
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9080' DATE: 7-24-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827'

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

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5750' MAX. TEMP. 526 °F @ 5750'
 REMARKS: PRIOA TO AND DURING WATER INJECTION



STABILIZATION PERIOD		
PRESSURES	GAUGE	BOM
CASING, PSI		
DEPTH FT.	TEMP. °F	PRESS. PSIC
2390	422	620
2500	464	624
2500	482	811
4000	488	982
4500	498	1146
5000	507	1313
5500	520	1475
5750	524	1548

○ TEMPERATURE
 △ PRESSURE

START INJECTION @ 10
 7-24-81 WHILE ELE
 WAS @ 5750 FT.

R.O. ENGBRETSSEN

JUL 29 1981

BY:



Union Geothermal Co. of New Mexico

SURVEY DATE: 7 - 24/25 - 81

TITLE B 20 - S 14 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: 23778 CLOCK: 12 HRS. : S/N: 23781

WHP AT START OF SURVEY : 7" Hg. vac. PSIG
 WHP AT END OF SURVEY : " " PSIG
 OPENED WELL TO ELEMENT : 1000 HRS. 7 - 24 - 81
 POH : 0620 HRS. 7 - 25 - 81

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

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5750	1025	0.570	276	1.268	1.274	1894	WATER INJECTION IN PROGRE
		1055	0.570	276	1.267	1.273	1892	
		2025	0.563	274	1.266	1.272	1891	
		2055	0.560	273	1.265	1.271	1890	
		2125	0.554	271	1.266	1.272	1891	
		2155	0.548	269	1.264	1.270	1888	
		2225	0.542	267	1.263	1.268	1885	
		2255	0.535	265	1.262	1.267	1884	
		2325	0.531	264	1.262	1.267	1884	
		2355	0.525	262	1.261	1.266	1882	
		2425	0.521	261	1.260	1.265	1881	
		2455	0.517	260	1.260	1.265	1881	
		0125	0.514	259	1.260	1.265	1881	
		0155	0.510	258	1.260	1.265	1881	
CSTDOE		0225	0.507	257	1.259	1.263	1878	
		0255	0.505	256	1.258	1.262	1876	

R.O. ENGBRETSEN

1111 10 1981



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-25-81

TITLE B 20 - S 15 P/T

TEMP. EL. S/N	: <u>KTB 10222</u>	PRESS. EL. S/N	: <u>KPG 9235</u>
RANGE	: <u>93 F - 618 F</u>	RANGE	: <u>2950 PSI</u>
CALIBRATED	: <u>11-10-76</u>	CALIBRATED	: <u>7-26-76</u>
CLOCK: <u>12</u> HRS. : S/N: <u>23778</u>		CLOCK: <u>12</u> HRS. : S/N: <u>23781</u>	

WHP AT START OF SURVEY : 7" Hg. vac. PSIG
 WHP AT END OF SURVEY : 8" Hg. vac. PSIG
 OPENED WELL TO ELEMENT : 0820 HRS.
 POH : 1828 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

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	2550	0827-0842	0.294	190	0.377	0.365	569	WATER INJECTION IN PROGRE
2	2600	0843-0853	0.312	196	0.405	0.393	610	
3	2650	0854-0904	0.316	197	0.419	0.408	632	
4	2975	0905-0915	0.325	200	0.509	0.498	765	
5	3025	0916-0926	0.330	202	0.524	0.513	785	
6	3075	0927-0937	0.331	202	0.538	0.527	806	
7	3475	0938-0948	0.338	204	0.648	0.638	968	
8	3525	0948-0958	0.343	206	0.662	0.653	990	
9	3575	0958-1008	0.350	208	0.675	0.666	1009	
10	4000	1010-1020	0.359	211	0.790	0.783	1179	
11	4500	1022-1032	0.377	217	0.924	0.919	1378	
12	5000	1034-1044	0.403	225	1.057	1.055	1576	
13	5500	1046-1056	0.426	232	1.186	1.186	1766	
14	5750	1058	0.453	240	1.252	1.254	1865	
	"	1828	0.451	240	1.250	1.252	1862	
LSTD0E								

R.O. ENGBREITSEN
 JUL 29 1981



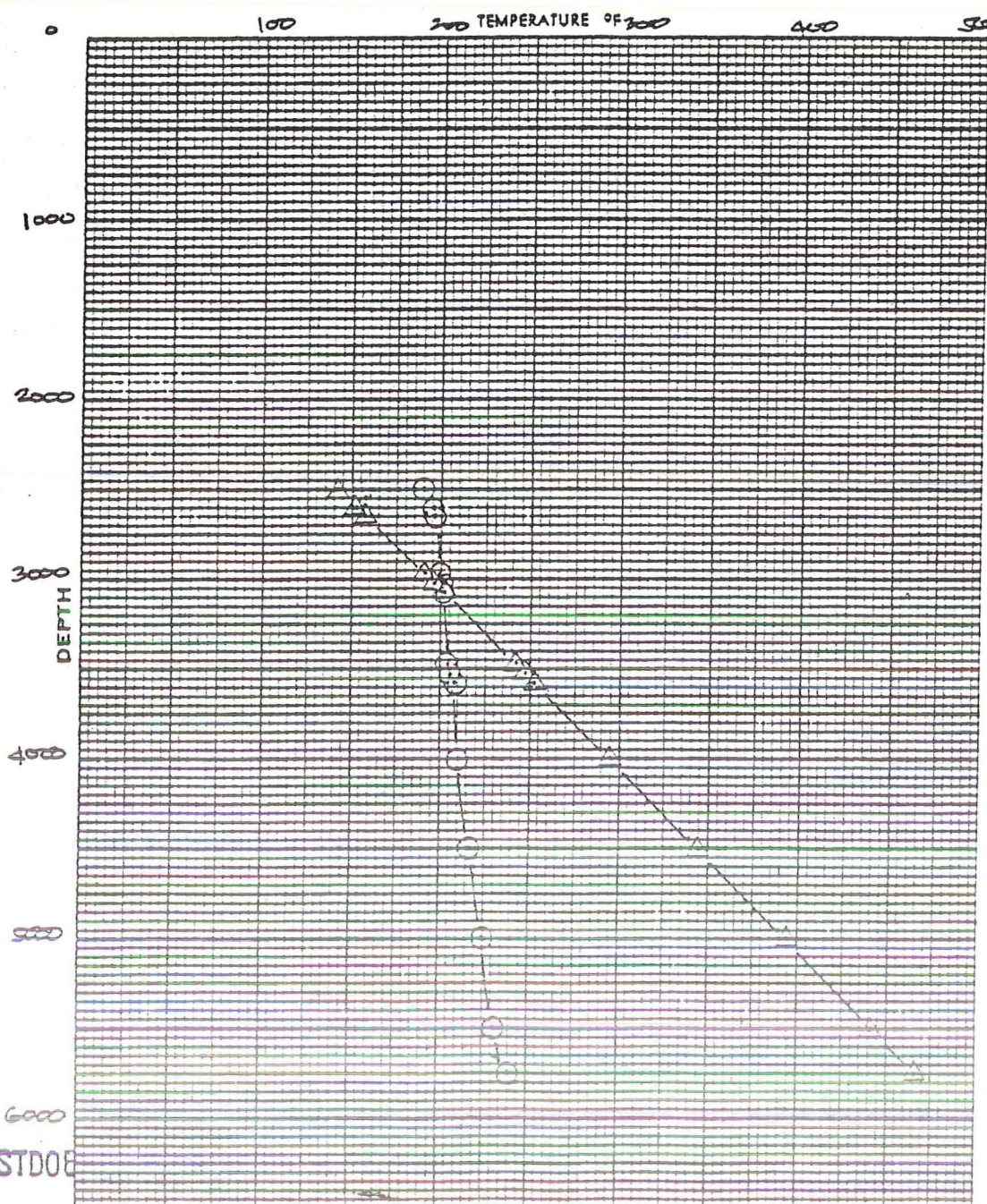
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N. M. FIELD REDONDO CANYON WELL NAME BACA 152 20
CASING 20" @ 230' ; 13 1/2" @ 1415' ELEV. 9089' DATE: 7-23-81
LINER DESCRIPTION: 9 1/2" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT KTB
DEPTH 5827'

HOLE DESCRIPTION: KPC 9235 INSTRUMENT 03 - 618 FAULT
2950 PSI SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5750' MAX. TEMP. 240 °F @ 5750'
REMARKS: WHILE WATER INJECTION GOING ON



STABILIZATION PERIOD			
PRESSURES	GAUGE	SOMB	
CASING, PSI			
DEPTH FT.	TEMP. °F	PRESS. PSIG	GRA
2500	170	549	
2600	196	610	0.0
2650	197	632	0.0
2975	200	765	0.0
3025	202	785	0.0
3075	202	806	0.0
3475	204	968	0.0
3525	206	990	0.0
3575	208	1009	0.0
4000	211	1179	0.0
4500	217	1378	0.0
5000	225	1576	0.0
5500	232	1766	0.0
5750	240	1865	0.0

○ TEMPERATURE
△ PRESSURE
R.O. ENGBRETSSEN
JUL 29 1981

BY:



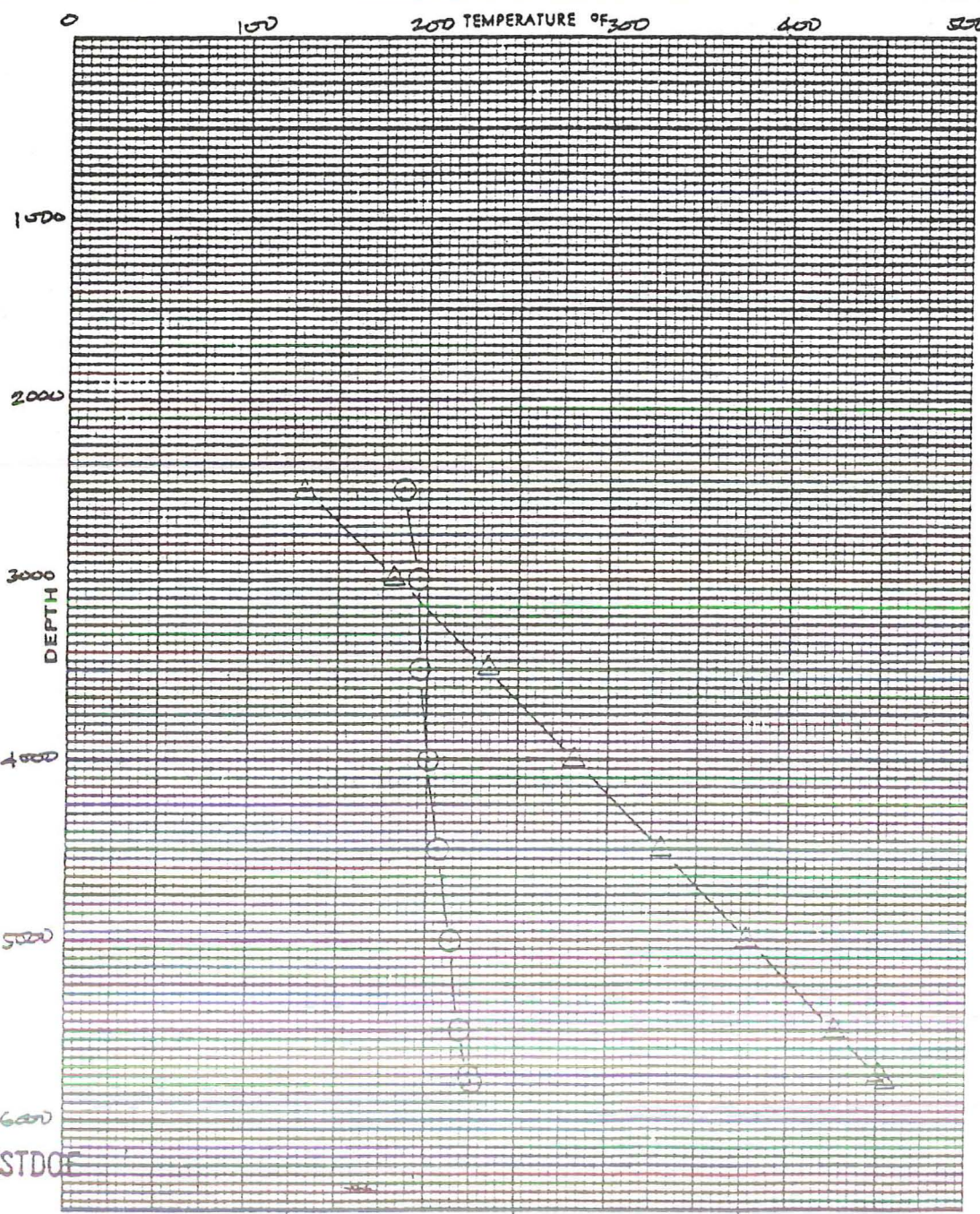
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N. M. FIELD REDONDO CANYON WELL NAME BACA #20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9089' DATE: 7-27-81
 LINER DESCRIPTION: 1 5/8" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827'

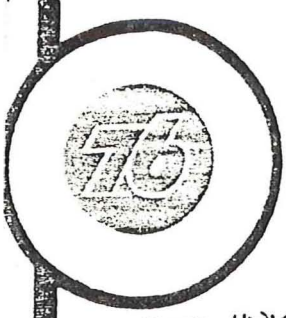
HOLE DESCRIPTION: _____
 _____ KPG 9235 INSTRUMENT 93-618 FA
 _____ 2950 PSI SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5780' MAX. TEMP. 225 °F @ 5780'
 REMARKS: WILE WATER INJECTION STILL ON



STABILIZATION PERIOD			
PRESSURES	GUAGE	BOMB	
CASING, PSI			
DEPTH FT.	TEMP. °F	PRESS. PSIG	GR.
2500	187	526	
3000	196	728	0.1
3500	197	927	0.3
4000	201	1128	0.4
4500	207	1321	0.3
5000	214	1515	0.3
5500	219	1708	0.1
5750	224	1805	0.1
5780	225	1816	0.1

○ TEMPERATURE
 △ PRESSURE
 R.O. ENGBRETSSEN
 JUL 29 1981



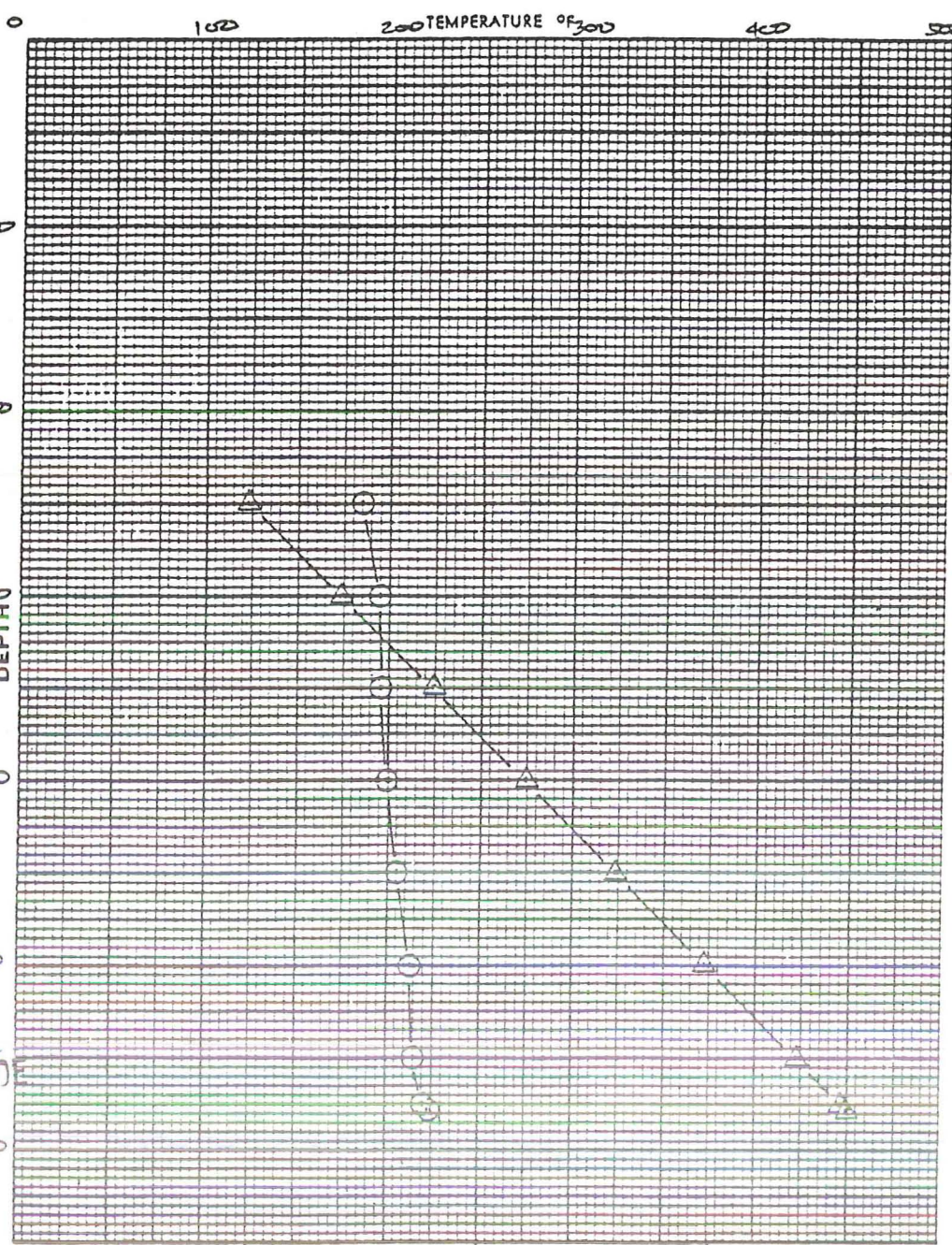
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME DACA W 20
 CASING 20" @ 280' ; 13 2/3" @ 1415' ELEV. 9080 FT. DATE: 7-27-81
 LINER DESCRIPTION: 7 5/8" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827'

HOLE DESCRIPTION: _____
 _____ 2950 PSI INSTRUMENT J3 - 618 FAHR
 _____ KPG 7235 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5780' MAX. TEMP. 223 °F @ 5780'
 REMARKS: _____



STABILIZATION PERIOD			
PRESSURES	GAUGE	BOMB	
CASING, PSI			
DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD
2500	184	474	
3000	194	696	0.40
3500	196	809	0.40
4000	199	1099	0.40
4500	205	1296	0.30
5000	213	1491	0.30
5500	215	1682	0.30
5750	221	1782	0.30
5780	223	1797	0.30

○ TEMPERATURE
 △ PRESSURE

BY: _____

R. O. ENGBREITSEN

JUL 31 1981

B 20 - 3 21 P/T



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-29-81 / 7-30-81

TITLE BACA NO 20 S 21 P/T (FALL OFF)

TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPC 17235
 RANGE : 93°F - 618°F RANGE : 2950 PSI
 CALIBRATED : 11-10-76 CALIBRATED : 7-26-76
 CLOCK: 12 HRS. : S/N: 23778 CLOCK: 12 HRS. : S/N: 23287

WHP AT START OF SURVEY : 8.5" Hg. Vac. PSIG
 WHP AT END OF SURVEY : 57 PSIG
 OPENED WELL TO ELEMENT : 1848 HRS. 7-29-81
 POH : 0621 HRS. 7-30-81

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

Station	Depth	Time at Sta. <small>1923</small>	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5750'	1913	0.376	217	1.199	1.198	1783	SHUT-IN WATER INJECTION @ 1928 hrs 7-29-81
		1928	0.376	217	1.199	1.198	1783	
		1933	0.376	217	1.184	1.183	1762	
		1938	0.385	220	1.172	1.171	1744	
		1943	0.389	221	1.164	1.163	1733	
		1948	0.392	222	1.157	1.157	1724	
		1953	0.396	223	1.152	1.152	1717	
		1958	0.401	225	1.147	1.146	1708	
		2003	0.404	226	1.143	1.142	1702	
		2008	0.407	227	1.139	1.138	1696	
		2013	0.410	228	1.136	1.135	1692	
		2018	0.415	229	1.133	1.132	1688	
		2023	0.424	232	1.131	1.130	1685	
GSTDOE		2028	0.430	234	1.128	1.127	1680	
		2033	0.437	236	1.126	1.126	1679	
		2038	0.443	237	1.124	1.124	1676	
		2043	0.450	240	1.122	1.122	1673	



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-29/20-81

TITLE B 20 - S 21 P/T (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__

Station	Depth	Time at Sta. <small>HRS.</small>	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5750'	2048	0.456	241	1.120	1.120	1670	
		2053	0.463	243	1.119	1.119	1669	
		2058	0.471	246	1.118	1.119	1669	
		2103	0.476	247	1.116	1.117	1666	
		2108	0.481	249	1.115	1.116	1664	
		2113	0.486	250	1.113	1.114	1661	
		2118	0.491	252	1.111	1.112	1658	
		2123	0.496	253	1.110	1.111	1657	
		2128	0.499	254	1.108	1.109	1654	
		2138	0.507	257	1.105	1.107	1651	
		2148	0.512	258	1.103	1.105	1648	
		2158	0.521	261	1.101	1.103	1645	
		2208	0.528	263	1.099	1.101	1642	
CSTDOE		2218	0.533	265	1.097	1.099	1640	
		2228	0.538	266	1.096	1.098	1638	
		2238	0.544	268	1.094	1.097	1637	
		2248	0.549	269	1.093	1.096	1635	



Union Geothermal Co. of New Mexico

SURVEY DATE: 7 - 29/30 - 81

TITLE: B 20 - S 21 P/T (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____

Station	Depth	Time at Sta. #28	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5750'	2258	0.556	271	1.071	1.074	1632	
		2308	0.562	273	1.087	1.092	1627	
		2318	0.567	275	1.088	1.091	1628	
		2333	0.574	277	1.087	1.090	1626	
		2348	0.582	279	1.086	1.089	1625	
		7-30-81 → 2403	0.589	281	1.084	1.088	1624	
		2418	0.596	283	1.083	1.087	1622	
		2433	0.602	285	1.081	1.085	1619	
		2448	0.607	287	1.080	1.084	1618	
		0103	0.615	289	1.078	1.083	1616	
		0118	0.620	291	1.078	1.083	1616	
		0133	0.626	293	1.077	1.082	1615	
		0148	0.631	294	1.076	1.081	1613	
CSTDOE		0203	0.637	296	1.076	1.081	1613	
		0218	0.642	297	1.075	1.080	1612	
		0233	0.647	299	1.074	1.079	1610	
		0248	0.652	300	1.073	1.078	1609	

R.O. ENGBREITSEN
JUL 31 1981

B 20-S 22 P/T



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-30-81

TITLE DACA № 20 S 22 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: 23778 CLOCK: 12 HRS. : S/N: 23781

WHP AT START OF SURVEY : 80 PSIG
 WHP AT END OF SURVEY : 135 PSIG
 OPENED WELL TO ELEMENT : 0857 HRS.
 POH : 1633 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

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	2500	0904-0919	0.627	293	0.242	0.234	377	
2	3000	0921-0931	0.677	308	0.374	0.370	576	
3	3500	0933-0943	0.711	318	0.506	0.504	772	
4	4000	0945-0955	0.763	333	0.630	0.620	956	
5	4500	0957-1007	0.790	341	0.753	0.755	1138	
6	5000	1009-1019	0.787	340	0.877	0.881	1322	
7	5500	1021-1031	0.781	338	1.001	1.007	1506	
8	5750	1048	0.783	339	1.064	1.071	1599	
		1103	0.783	339	1.063	1.070	1597	
		1133	0.783	339	1.063	1.070	1597	
		1203	0.783	339	1.063	1.070	1597	
		1233	0.787	340	1.062	1.069	1596	
		1303	0.791	341	1.062	1.069	1596	
		1333	0.796	342	1.062	1.069	1596	
CSTDOE		1403	0.800	343	1.062	1.069	1596	
		1433	0.804	345	1.061	1.068	1594	
		1503	0.807	345	1.060	1.067	1593	



Union Geothermal Co. of New Mexico

B20-528 P/T

SURVEY DATE: 11-09-81

TITLE BACA # 20 P/T GRADIENT SURVEY FOLLOWING FLOWTEST # 5 S. I.

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 : 09-01-81
 CLOCK: 12 HRS. : S/N: 18336 CLOCK: 12 HRS. : S/N: 12389

WHP AT START OF SURVEY : 24 PSIG
 WHP AT END OF SURVEY : 262 PSIG
 OPENED WELL TO ELEMENT : 0833 HRS.
 POH : 1213 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
0 MOS., 0 DAYS, 0 HRS., -4 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 5) 0837 HRS. 11-09-1981

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	0	0837-0847	0.249	95	0.122	-	109	NO CORRECTIONS
2	500	0848-0903	1.073	371	0.122	-	109	
3	1000	0904-0914	1.081	374	0.115	-	187	
4	1500	0915-0925	1.093	378	0.115	-	187	
5	2000	0926-0936	1.104	381	0.117	-	191	
6	2500	0937-0947	1.111	384	0.120	-	195	
7	3000	0948-0958	1.160	400.8	0.145	-	236	
8	3500	0959-1009	1.217	419.5	0.182	-	296	
9	4000	1010-1020	1.264	435	0.218	-	355	
10	4500	1021-1031	1.309	450	0.254	-	414	
11	4700	1032-1042	1.330	457	0.271	-	441	
12	4750	1043-1053	1.335	458.6	0.278	-	453	
13	4800	1053-1103	1.341	460.5	0.280	-	456	
14	4850	1103-1113	1.344	461.5	0.283	-	461	
15	4900	1113-1123	1.347	462.5	0.285	-	464	
16	4950	1123-1133	1.349	463	0.287	-	471	
17	5000	1133-1143	1.351	464	0.294	-	479	
18	5050	1143-1153	1.265	435	0.307	0.309	503	
19	5075	1153-1213	1.254	432	0.315	0.317	516	



Union Geothermal Co. of New Mexico

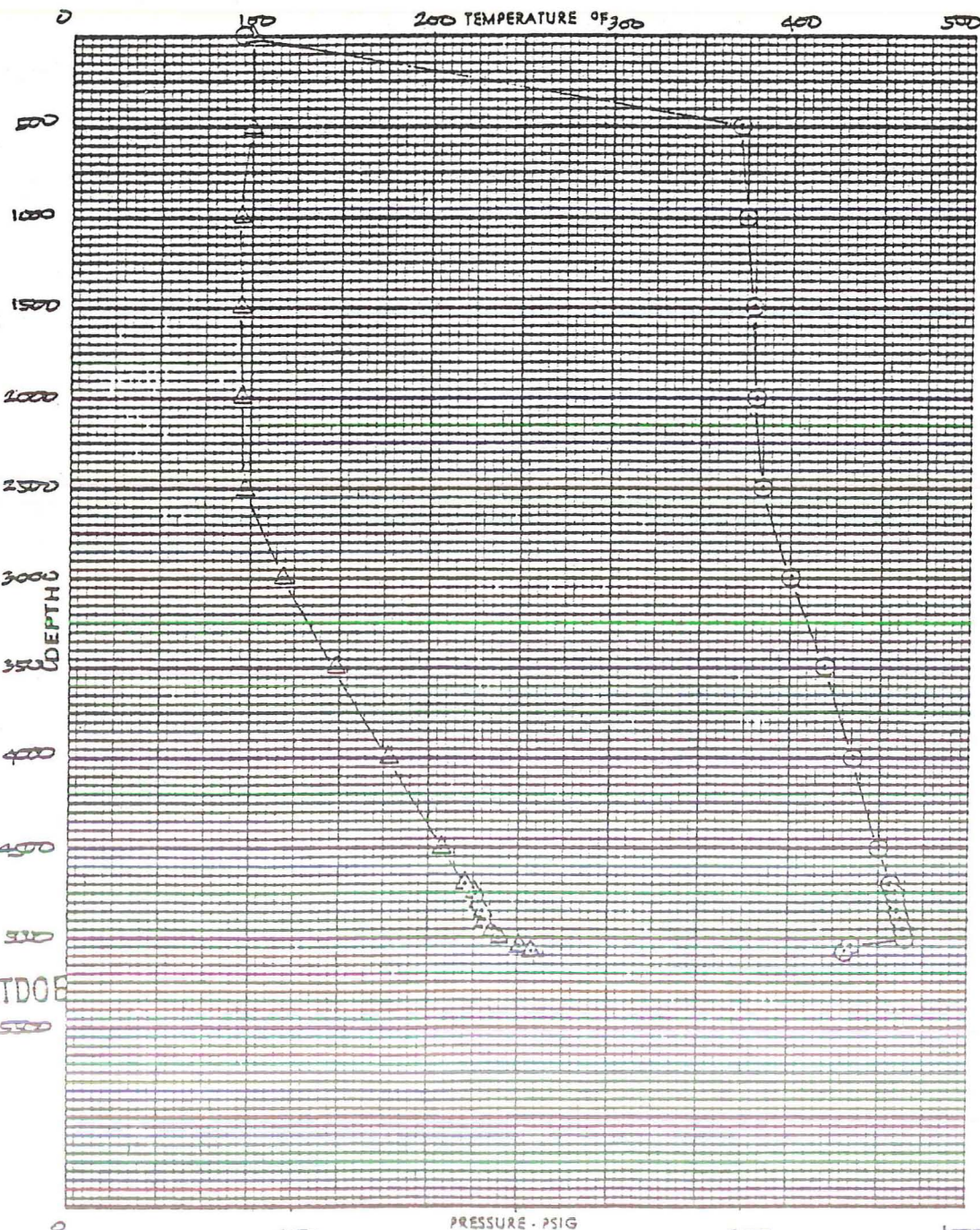
SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B20-328 P/T

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA 182 20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9089' DATE: 11-09-81
 LINER DESCRIPTION: 9 5/8" @ 2505' - SURFACE ; 5 1/2" @ 4750' - 5180' ZERO POINT KB
 DEPTH 5180'

HOLE DESCRIPTION: _____
 _____ 3,250 PSI INSTRUMENT 1-690 FAHR.
 _____ KFC 22390 SERIAL NO. KFB 23338

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5075' MAX. TEMP. 464 °F @ 5000'
 REMARKS: FOLLOWING FLOW TEST ± 5 SHUT-IN



STABILIZATION PERIOD			
PRESSURES	GAUGE	BOMB	
CASING, PSI			
DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	95	199	
500	371	199	
1000	374	187	
1500	378	187	
2000	381	191	0.008
2500	384	195	0.008
3000	400.4	236	0.082
3500	419.5	296	0.170
4000	435	355	0.118
4500	450	414	0.118
4700	457	441	0.135
4750	453.6	453	0.240
4800	460.5	456	0.060
4850	461.5	461	0.100
4900	462.5	464	0.060
4950	463	471	0.140
5000	464	479	0.160
5050	435	503	0.930
5075	432	516	0.520

○ TEMPERATURE
 △ PRESSURE
 BY: _____



Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

R.O. ENGBREITSEN

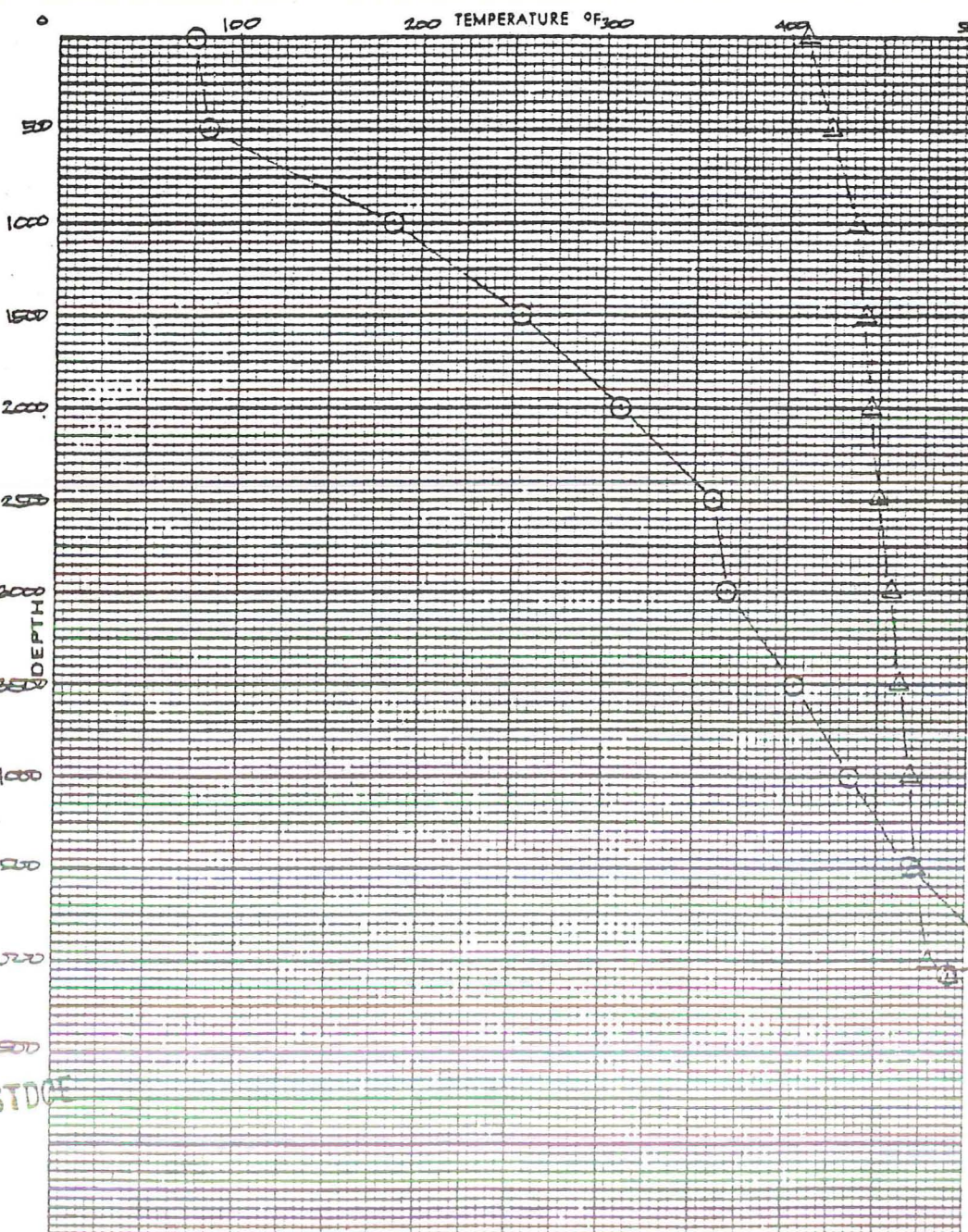
NOV 17 1981

B20-S29 P/T

OWNER UNION GEOTHERMAL CO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA #20
 CASING 20" @ 280' ; 13 1/2" @ 1415' ELEV. 9089' DATE: 11-17-81
 LINER DESCRIPTION: 9 5/8" @ 2505' - SURF. ; 7" @ 4850' - 2382' ; 5 1/2" @ 5131' - 4760' ZERO POINT KB
 DEPTH 5131'

HOLE DESCRIPTION: _____
 _____ 3,250 PSI INSTRUMENT 1-G80 FAHR.
 _____ KPC 22370 SERIAL NO. KTB 23338

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5075' MAX. TEMP. 525 °F @ 5000'
 REMARKS: PRIOR TO FLOWTEST # 6



STABILIZATION PERIOD _____

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	75	818	-
500	83	844	0.052
1000	184	873	0.058
1500	255	884	0.022
2000	300	871	0.014
2500	360	900	0.018
3000	368	915	0.030
3500	405	926	0.022
4000	436	937	0.022
4500	467	944	0.014
5000	525	958	0.028
5075	471	982	0.370

○ TEMPERATURE
 △ PRESSURE

BY: JPR

CSTDGE



Union Geothermal Co. of New Mexico

B 20-530 P/T

SURVEY DATE: 5-26-82

TITLE BACA NR 20 TEMP/PRESS GRADIENT SURVEY TO 5100'

TEMP. EL. S/N : KTB 23338 PRESS. EL. S/N : KPG 22389
 RANGE : 1-680°F RANGE : 3275 PSI
 CALIBRATED : 10-16-81 CALIBRATED : 9-1-81
 CLOCK: 12 HRS. : S/N: 18336 CLOCK: 12 HRS. : S/N: 14087

WHP AT START OF SURVEY : 63 PSIG
 WHP AT END OF SURVEY : 61 PSIG
 OPENED WELL TO ELEMENT : 1000 HRS.
 POB : 1235 HRS.

TIME ELAPSED FROM LATEST S. I. TO START OF THIS SURVEY
5 MOS., 17 DAYS, 1 HRS., 23 MINS.

DATE AND TIME OF LATEST S. I. (FT. NO. 5) 0837 HRS. 11-9-1981

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	0	1001-1006	0.184	74	0.036	-	58	} NO CORRECTIONS
2	500	1007-1022	0.422	153	0.036	-	58	
3	1000	1023-1033	0.869	304	0.036	-	58	
4	1500	1034-1044	0.894	312	0.036	-	58	
5	2000	1045-1055	1.113	384	0.138	-	224	
6	2500	1056-1106	1.125	389	0.249	-	404	
7	3000	1107-1117	1.266	436	0.357	0.360	584	
8	3500	1118-1128	1.394	478	0.462	0.465	755	
9	4000	1129-1139	1.448	496	0.563	0.567	920	
10	4500	1140-1150	1.437	493	0.659	0.664	1079	
11	4800	1151-1201	1.512	518	0.719	0.723	1176	
12	4900	1202-1212	1.524	522	0.736	0.740	1204	
13	5000	1214-1224	1.466	502	0.755	0.760	1237	
14	5100	1225-1235	1.461	501	0.774	0.779	1268	



Union Geothermal Co. of New Mexico

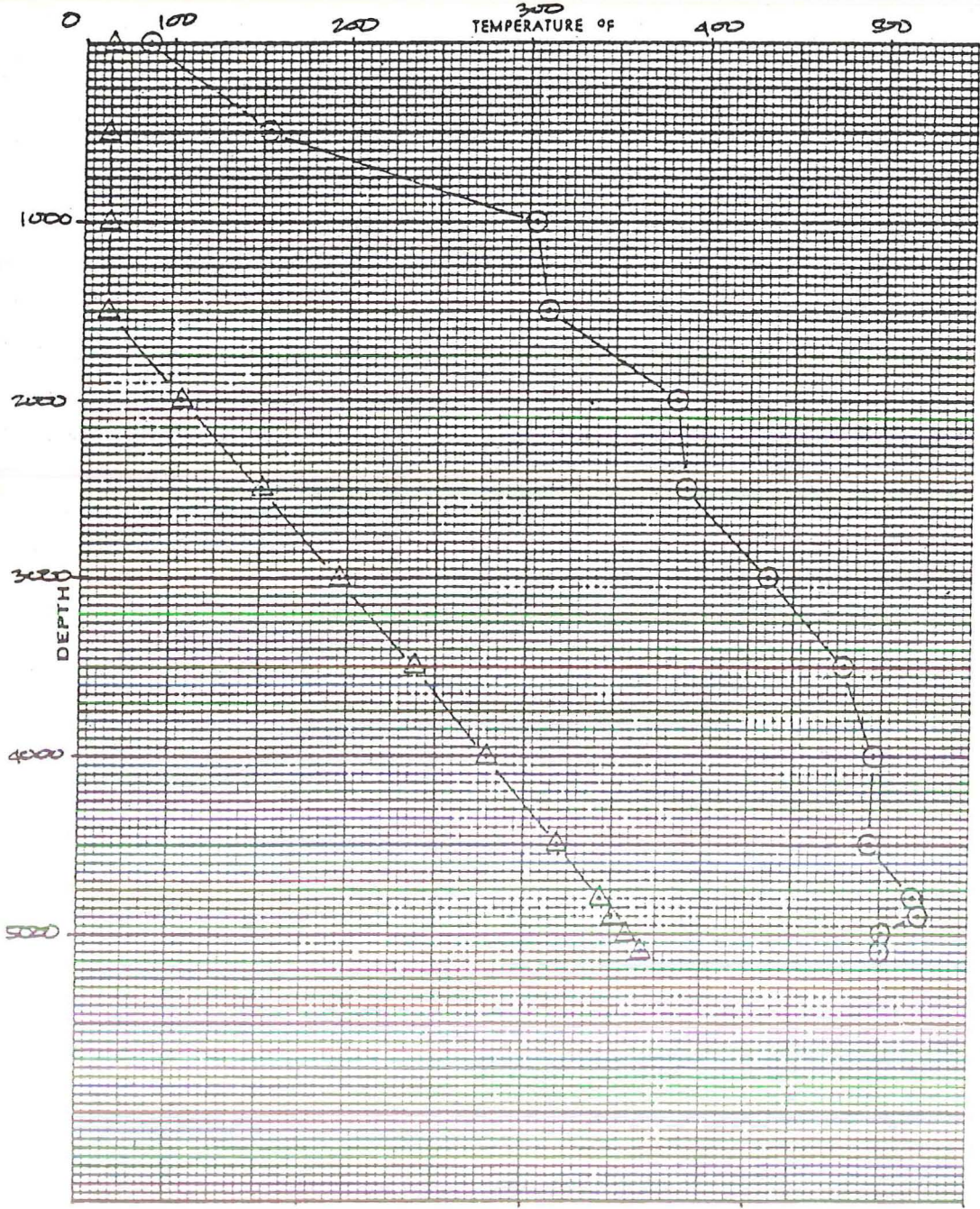
SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B70-S 30 P/T

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CREEK WELL NAME BACA # 20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9080' DATE: 5-26-82
 LINER DESCRIPTION: 2 5/8" @ 2505' ; 7" @ 4880' - 2383' ; 5 1/2" @ 5131' - 4760' ZERO POINT KB
 DEPTH 5131 FT.

HOLE DESCRIPTION: _____
 _____ 3275 PSI INSTRUMENT 1 - 680 FAHR.
 _____ KPG 22380 SERIAL NO. KTB 22338

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5100' MAX. TEMP. 522 °F @ 4900'
 REMARKS: PRIOA TO SPERRY-SUN INSTALLATION



STABILIZATION PERIOD _____

PRESSURES	GAUGE	BOMB
CASING. PSI	63	58

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	74	58	-
500	153	58	-
1000	304	58	-
1500	312	58	-
2000	384	224	0.332
2500	389	404	0.360
3000	436	584	0.360
3500	478	755	0.382
4000	496	920	0.330
4500	493	1079	0.318
4800	518	1176	0.323
4900	522	1204	0.280
5000	502	1237	0.330
5100	501	1268	0.310

○ TEMPERATURE
 △ PRESSURE

BY: _____



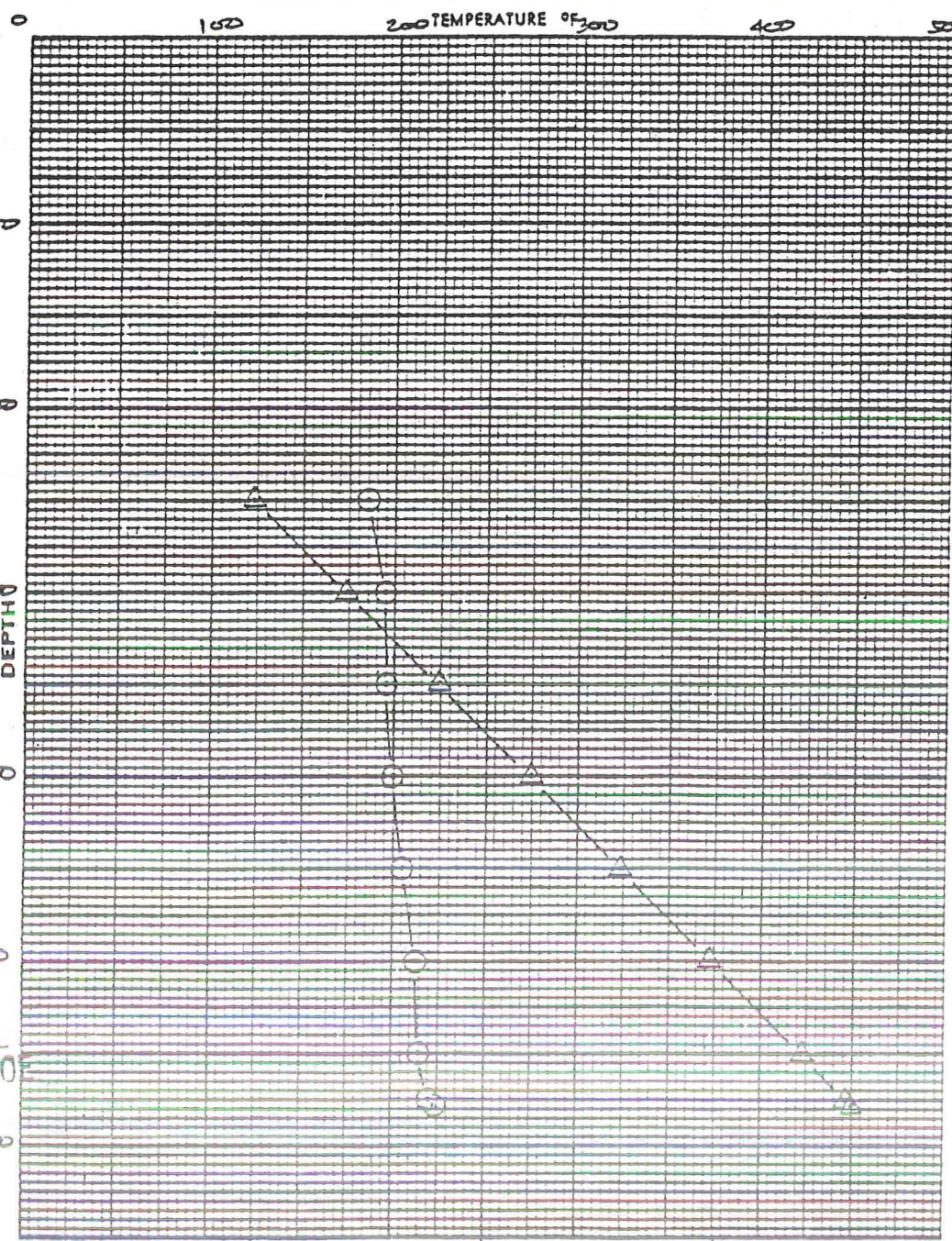
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N. M. FIELD REDONDO CANYON WELL NAME BACA W-20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9080 FT. DATE: 7-27-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827'

HOLE DESCRIPTION: _____
 _____ 2950 PSI INSTRUMENT J3 - 618 FA
 _____ KPG 9235 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5780' MAX. TEMP. 223 °F @ 5780'
 REMARKS: _____



STABILIZATION PERIOD _____

PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GR
2500	184	474	
3000	194	696	0.
3500	196	809	0.
4000	199	1099	0.
4500	205	1396	0.
5000	213	1491	0.
5500	215	1682	0.
5700	221	1782	0.
5780	223	1797	0.

○ TEMPERATURE
 △ PRESSURE

CSTDO

BY: _____

R.O. ENGBREITSEN

JUL 31 1981



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-29-81 / 7-30-81

TITLE BACA NO 20 S 21 P/T (FALL OFF)

TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPC 11235
 RANGE : 93°F - 618°F RANGE : 2950 PSI
 CALIBRATED : 11-10-76 CALIBRATED : 7-26-76
 CLOCK: 12 HRS. : S/N: 23778 CLOCK: 12 HRS. : S/N: 23287

WHP AT START OF SURVEY : 8.5" Hg. Vac. PSIG
 WHP AT END OF SURVEY : 57 PSIG
 OPENED WELL TO ELEMENT : 1848 HRS. 7-29-81
 POH : 0621 HRS. 7-30-81

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____

Station	Depth	Time at Sta. <small>1123</small>	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5750'	1913	0.376	217	1.199	1.198	1783	SHUT-IN WATER INJECTION @ 1928 H 7-29-81
		1928	0.376	217	1.199	1.198	1783	
		1933	0.376	217	1.184	1.183	1762	
		1938	0.385	220	1.172	1.171	1744	
		1943	0.389	221	1.164	1.163	1733	
		1948	0.392	222	1.157	1.157	1724	
		1953	0.396	223	1.152	1.152	1717	
		1958	0.401	225	1.147	1.146	1708	
		2003	0.404	226	1.143	1.142	1702	
		2008	0.407	227	1.139	1.138	1696	
		2013	0.410	228	1.136	1.135	1692	
		2018	0.415	229	1.133	1.132	1688	
		2023	0.424	232	1.131	1.130	1685	
CSTDOE		2028	0.430	234	1.128	1.127	1680	
		2033	0.437	236	1.126	1.126	1679	
		2038	0.443	237	1.124	1.124	1676	
		2043	0.450	240	1.122	1.122	1673	



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-29/70-31

TITLE B 20 - S 21 P/T (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__

Station	Depth	Time at Sta. HRS.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5750'	2048	0.456	241	1.120	1.120	1670	
		2053	0.463	243	1.119	1.119	1669	
		2058	0.471	246	1.118	1.119	1669	
		2103	0.476	247	1.116	1.117	1666	
		2108	0.481	249	1.115	1.116	1664	
		2113	0.486	250	1.113	1.114	1661	
		2118	0.491	252	1.111	1.112	1658	
		2123	0.496	253	1.110	1.111	1657	
		2128	0.499	254	1.108	1.109	1654	
		2138	0.507	257	1.105	1.107	1651	
		2148	0.512	258	1.103	1.105	1648	
		2152	0.521	261	1.101	1.103	1645	
		2208	0.528	263	1.099	1.101	1642	
CSTDOE		2218	0.533	265	1.097	1.099	1640	
		2228	0.538	266	1.096	1.098	1638	
		2238	0.544	268	1.094	1.097	1637	
		2248	0.549	269	1.093	1.096	1635	



Union Geothermal Co. of New Mexico

SURVEY DATE: 7 - 20/30 - 81

TITLE: B 20 - S 21 P/T (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__

Station	Depth	Time at Sta. 1428	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	5750'	2258	0.556	271	1.071	1.074	1632	
		2308	0.562	273	1.087	1.092	1627	
		2318	0.567	275	1.088	1.091	1628	
		2333	0.574	277	1.087	1.090	1626	
		2348	0.582	279	1.086	1.089	1625	
		7-30-81 → 2403	0.587	281	1.084	1.088	1624	
		2418	0.596	283	1.083	1.087	1622	
		2433	0.602	285	1.081	1.085	1619	
		2448	0.607	287	1.080	1.084	1618	
		0103	0.615	289	1.078	1.083	1616	
		0118	0.620	291	1.078	1.083	1616	
		0133	0.626	293	1.077	1.082	1615	
		0148	0.631	294	1.076	1.081	1613	
CSTDOE		0203	0.637	296	1.076	1.081	1613	
		0218	0.642	297	1.075	1.080	1612	
		0233	0.647	299	1.074	1.079	1610	
		0248	0.652	300	1.073	1.078	1609	

R.O. ENGBREITSEN

JUL 31 1981

B 20-S 22 P/T



Union Geothermal Co. of New Mexico

SURVEY DATE: 7-30-81

TITLE DACA Nº 20 S 22 P/T

TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPG 9235
 RANGE : 93° - 618 °F RANGE : 295D PSI
 CALIBRATED : 11-10-76 CALIBRATED : 7-26-76
 CLOCK: 12 HRS. : S/N: 23778 CLOCK: 12 HRS. : S/N: 23781

WHP AT START OF SURVEY : 80 PSIG
 WHP AT END OF SURVEY : 135 PSIG
 OPENED WELL TO ELEMENT : 0857 HRS.
 POH : 1633 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

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	2500	0904-0919	0.627	293	0.242	0.234	377	
2	3000	0921-0931	0.677	308	0.374	0.370	576	
3	3500	0933-0943	0.711	318	0.506	0.504	772	
4	4000	0945-0955	0.763	333	0.630	0.620	956	
5	4500	0957-1007	0.790	341	0.753	0.755	1138	
6	5000	1009-1019	0.787	340	0.877	0.881	1322	
7	5500	1021-1031	0.781	338	1.001	1.007	1506	
8	5750	1048	0.783	339	1.064	1.071	1599	
		1103	0.783	339	1.063	1.070	1597	
		1133	0.783	339	1.063	1.070	1597	
		1203	0.783	339	1.063	1.070	1597	
		1233	0.787	340	1.062	1.069	1596	
		1303	0.791	341	1.062	1.069	1596	
		1333	0.796	342	1.062	1.069	1596	
CSTDOE		1403	0.800	343	1.062	1.069	1596	
		1433	0.804	345	1.061	1.068	1594	
		1503	0.807	345	1.060	1.067	1593	



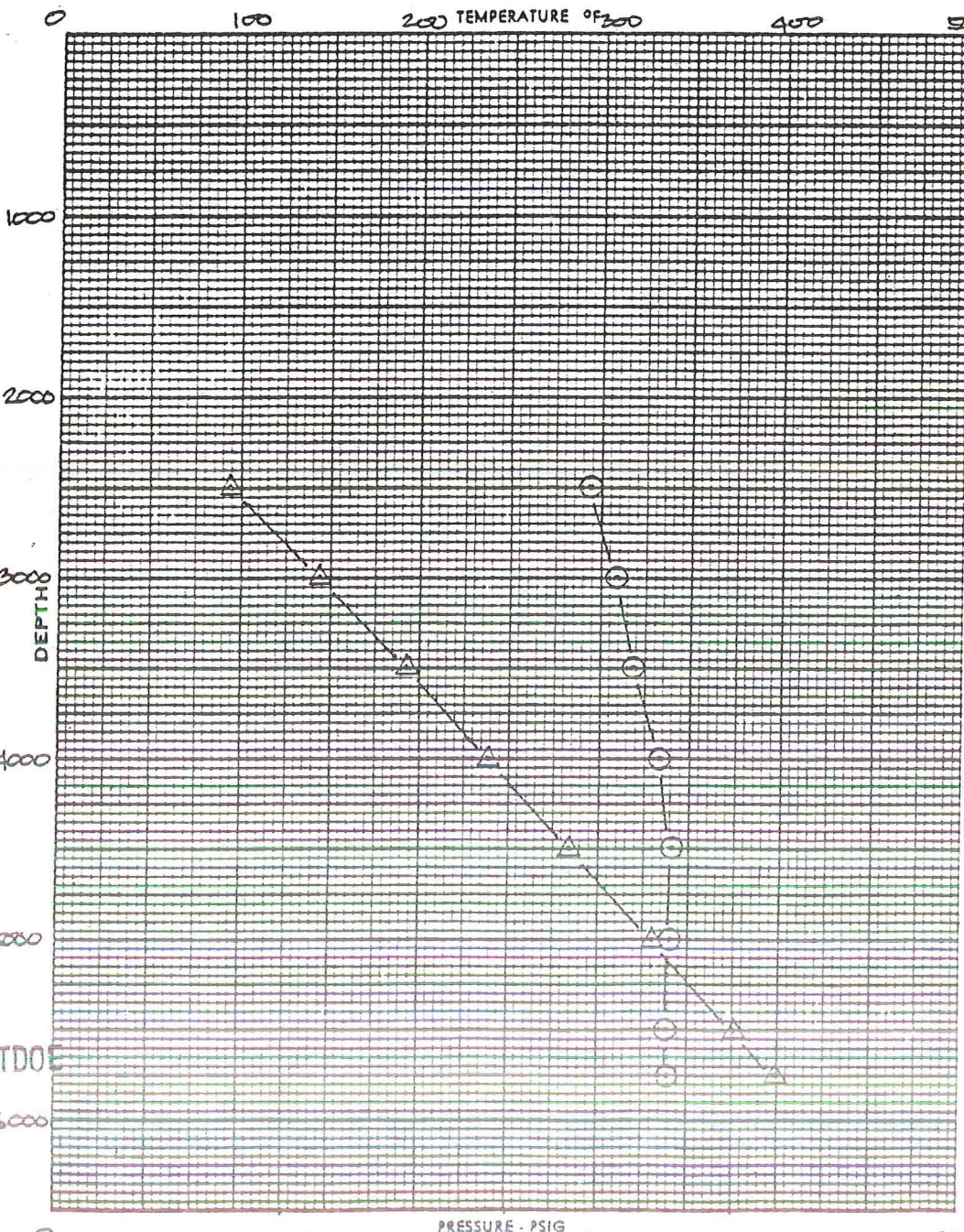
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA # 20
 CASING 20" @ 280' ; 13 2/3" @ 1415' ELEV. 9089' DATE: 7-30-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827'

HOLE DESCRIPTION: _____
 _____ 2950 PSI INSTRUMENT 93 - G18 FAHR
 _____ KPC 9235 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEYS TO 5750' MAX. TEMP. 341 °F @ 4500'
 REMARKS: _____



STABILIZATION PERIOD _____

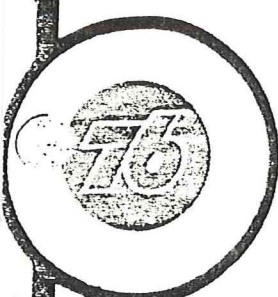
PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD
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2950	293	377	-
3000	308	576	0.30
3500	318	772	0.30
4000	333	956	0.30
4500	341	1138	0.30
5000	340	1322	0.30
5500	338	1506	0.30
5750	339	1599	0.30

○ TEMPERATURE
 △ PRESSURE

BY: _____



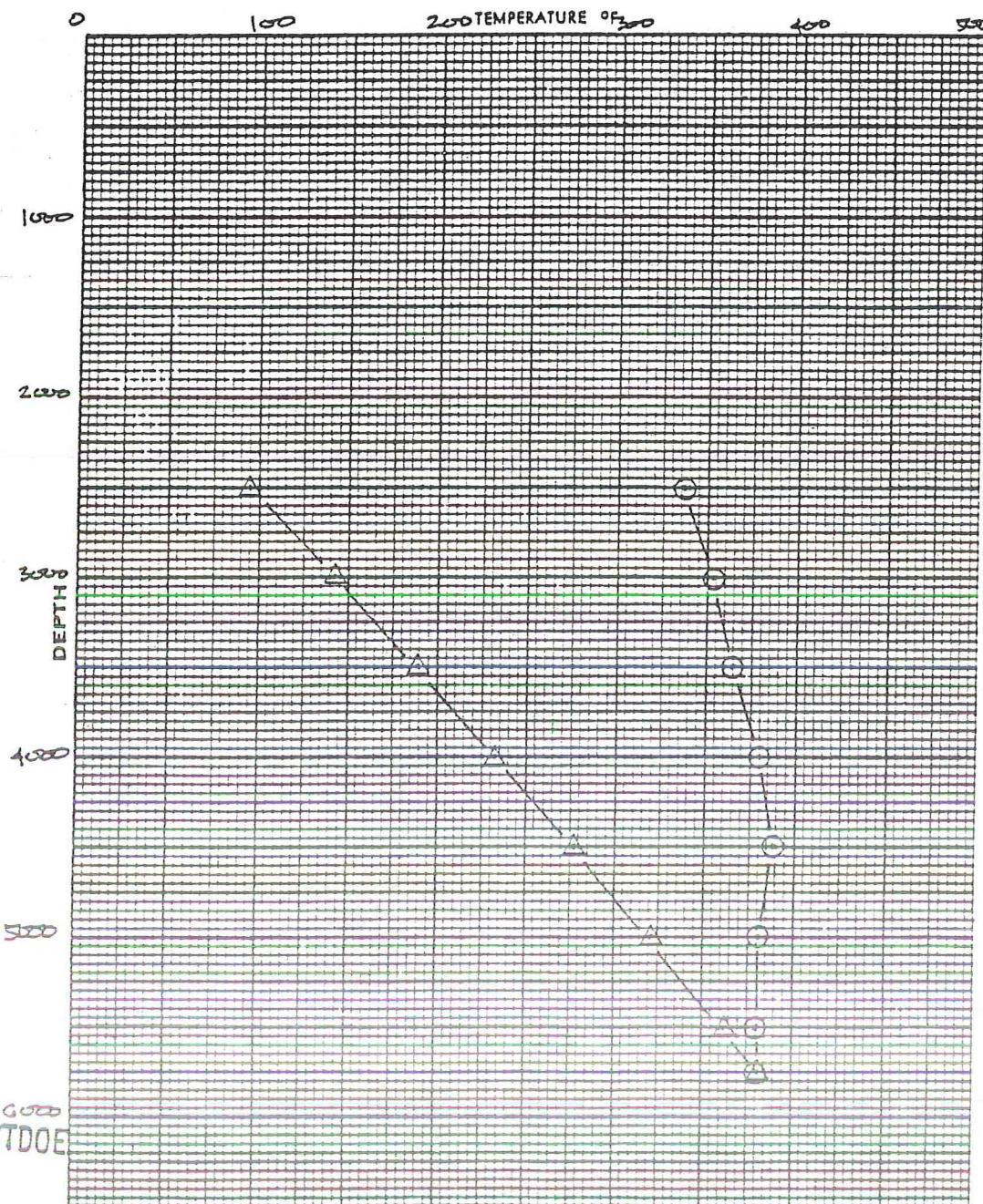
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N. M. FIELD REDONDO CANYON WELL NAME BACA #20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9089' DATE: 7-31-81
 LINER DESCRIPTION: 9 5/8" @ 2505' TO SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827 FT.

HOLE DESCRIPTION: _____
 _____ 2950 PSI INSTRUMENT 03-618 FAHR
 _____ KPC 923S SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5750' MAX. TEMP. 388 °F @ 4500'
 REMARKS: _____



STABILIZATION PERIOD			
PRESSURES	GAUGE	BOMB	
CASING, PSI			
DEPTH	TEMP.	PRESS.	GRAD.
FT.	°F	PSIG	
2500	337	380	-
3000	353	572	0.34
3500	365	756	0.34
4000	380	933	0.35
4200	388	1111	0.34
5000	381	1283	0.34
5750	381	1522	0.27

○ TEMPERATURE
 △ PRESSURE

R.O. ENGBRETSSEN
 AUG 05 1981

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BY:



Union Geothermal Co. of New Mexico

SURVEY DATE: 8-01-81

TITLE B 20 - 524 P/T

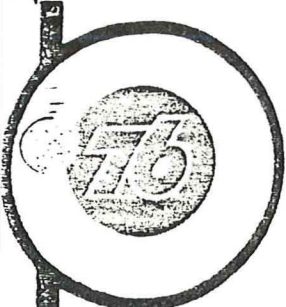
TEMP. EL. S/N : KTB 10222 PRESS. EL. S/N : KPC 7235
 RANGE : 93 - 618 °F RANGE : 2930 PSI
 CALIBRATED : 11-10-76 CALIBRATED : 7-26-76
 CLOCK: 12 HRS. : S/N: 14087 CLOCK: 12 HRS. : S/N: 23778

WHP AT START OF SURVEY : 344 PSIG
 WHP AT END OF SURVEY : 355 PSIG
 OPENED WELL TO ELEMENT : 0912 HRS.
 POH : 1420 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

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	2500	0930-0935	0.819	349	0.182	0.174	289	
2	3000	0936-0946	0.889	369	0.285	0.281	446	
3	3500	0947-0957	0.937	383	0.393	0.391	607	
4	4000	0958-1008	0.986	397	0.505	0.505	773	
5	4500	1009-1019	1.015	405	0.618	0.620	942	SUSPECT
6	5000	1020-1030	0.980	395	0.743	0.747	1127	PRESSURE
7	5500	1031-1041	0.983	396	0.863	0.869	1305	ELEMENT
8	5750	1057	0.989	397	0.921	0.928	1391	FALLURE
		1127	0.989	397	0.920	0.927	1389	
		1157	0.989	397	0.918	0.925	1386	
		1227	0.989	397	0.918	0.925	1386	R.O. ENGBRET
		1257	0.990	398	0.918	0.925	1386	AUG 6 1981
		1327	0.991	398	0.916	0.923	1383	
CSTDOE		1357	0.992	398	0.914	0.921	1380	
		1420	0.993	399	0.913	0.920	1379	



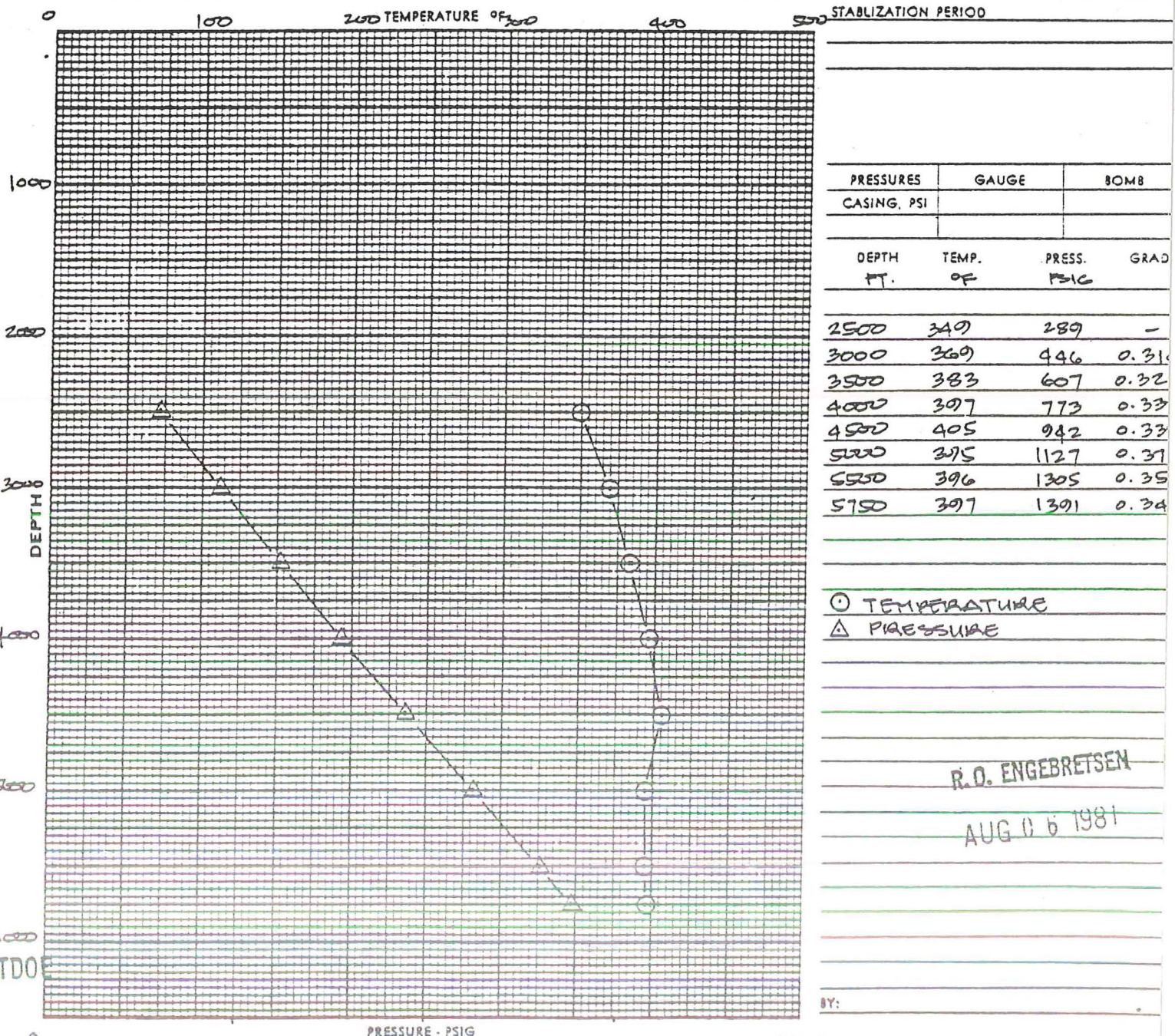
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA W 20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9089' DATE: 8-01-81
 LINER DESCRIPTION: 9 5/8" @ 2505' - SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827 FT.

HOLE DESCRIPTION: _____
 _____ 2950 PSI INSTRUMENT 93-613 FAHR
 _____ KPG 9235 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5750' MAX. TEMP. 405 °F @ 4500'
 REMARKS: _____



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD
2500	349	289	-
3000	369	446	0.31
3500	383	607	0.32
4000	397	773	0.33
4500	405	942	0.33
5000	395	1127	0.31
5500	396	1305	0.35
5750	397	1391	0.34

○ TEMPERATURE
 △ PRESSURE

R.O. ENGBRETSSEN
 AUG 06 1981

BY: _____



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. 20
 CASING 20" @ 250' ; 13 3/8" @ 1415' ELEV. 9089 FT. DATE: 8-3-81
 LINER DESCRIPTION: 9 5/8" @ 2505' - SURFACE ; 7" @ 2390' - 5812' ZERO POINT KB
 DEPTH 5827 FT.

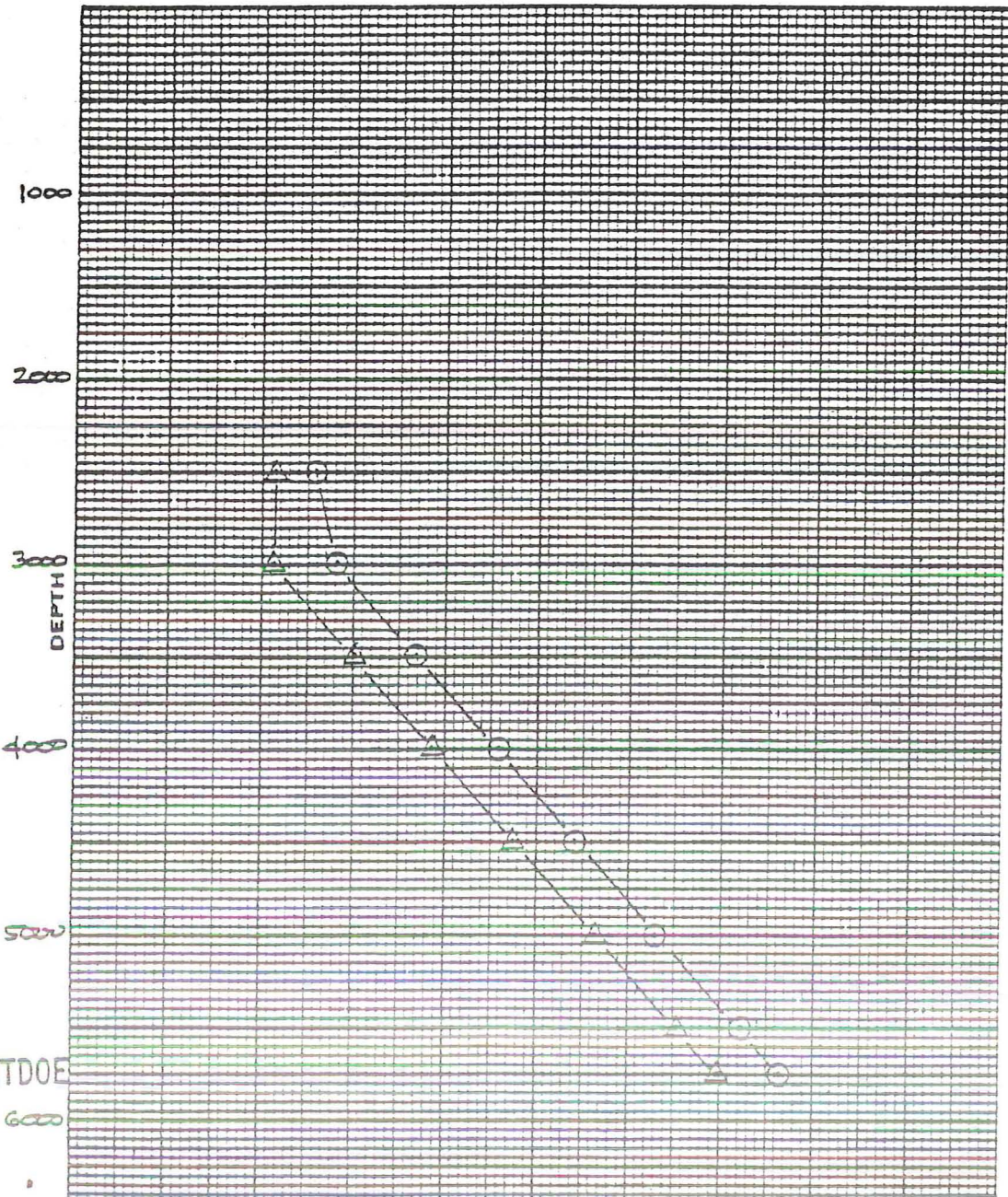
HOLE DESCRIPTION: _____
 _____ KPG 14191 INSTRUMENT 2050 PSI FA
 _____ 4575 PSI SERIAL NO. KPG 9235

PURPOSE CALIBRATION CHECK FOR KPG 9235 MAX. TEMP. _____ °F @ _____

REMARKS: _____

TEMPERATURE OF

STABILIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI		

DEPTH FT.	TEMP. KPG 14191 PSI	TEMP. KPG 9235 PSI	GA.
2500	516	480	
3000	561	425	1
3500	738	601	1
4000	918	773	1
4500	1083	952	1
5000	1260	1131	1
5500	1445	1309	1
5750	1528	1397	1

○ KPG 14191
 △ KPG 9235

R.O. ENGBRETSEN

AUG 16 1981

BY:



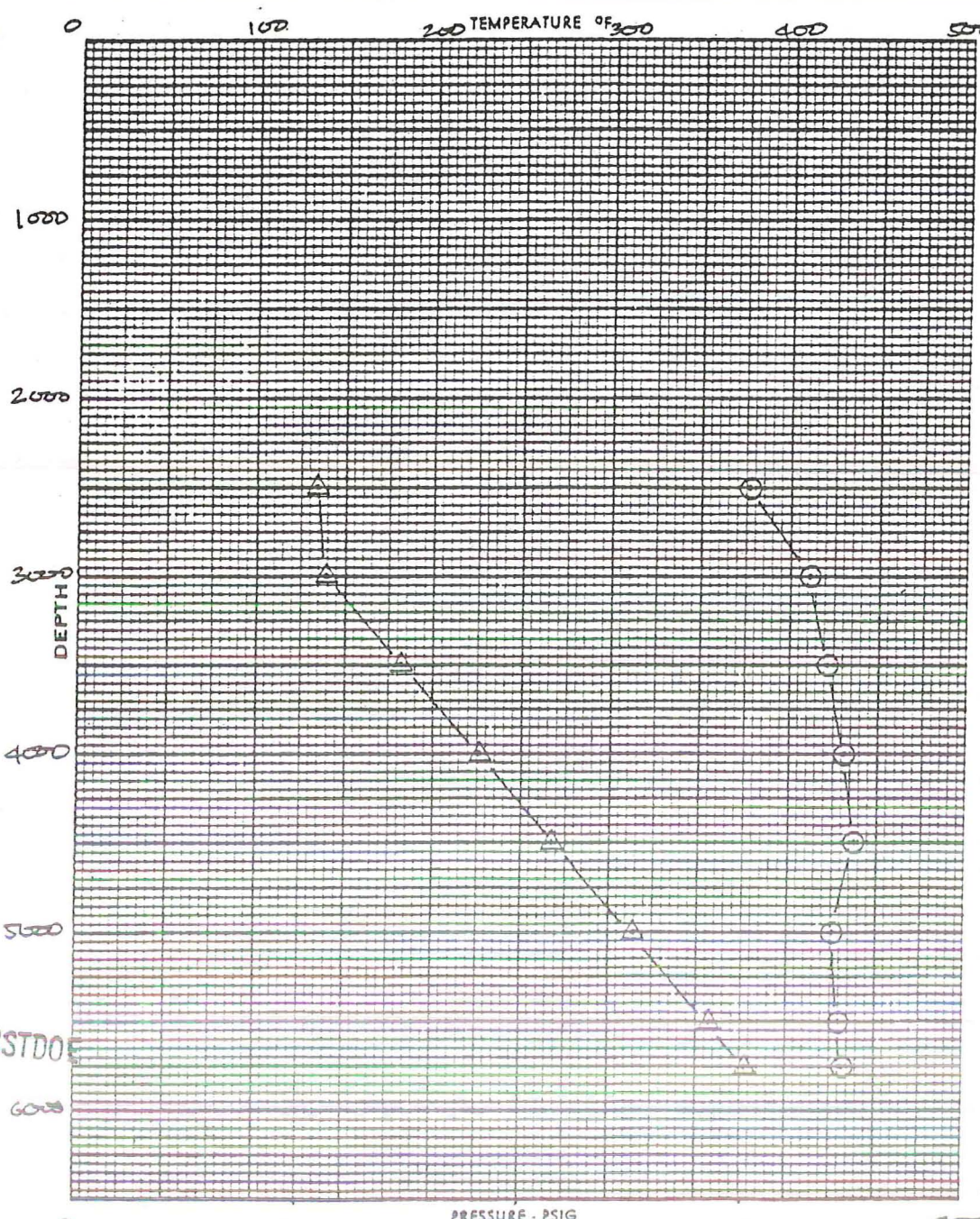
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

OWNER UNION GEOTHERMAL CO. OF N.M. FIELD REDONDO CANYON WELL NAME BACA # 20
 CASING 20" @ 250' ; 13 3/8" @ 1415' ELEV. 9089' DATE: 8-9-81
 LINER DESCRIPTION: 9 5/8" @ 2505' - SURFACE ; 7" @ 2390' - SB12' ZERO POINT KB
 DEPTH 5827'

HOLE DESCRIPTION: _____
 _____ 4575 PSI INSTRUMENT 73-618 FAHR
 _____ KPG 14191 SERIAL NO. KTB 10222

PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5750' MAX. TEMP. 438 °F @ 4500'
 REMARKS: _____



PRESSURES	GAUGE	BOMB	
CASING, PSI			
DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD

2500	377	537	—
3000	412	556	0.03
3500	422	731	0.35
4000	432	904	0.34
4500	438	1071	0.33
5000	426	1258	0.37
5500	430	1420	0.34
5750	432	1511	0.34

○ TEMPERATURE
 △ PRESSURE

R.O. ENGBREITSEN
 AUG 06 1981

BY:

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OCT 22 1981



Union Geothermal Co. of New Mexico

SURVEY DATE: 10-23-81

B 20-327 P/T

TITLE BACA NO 20 P/T SURVEY (AFTER FRACTURING)

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: 12880

WHP AT START OF SURVEY : 308 PSIG
 WHP AT END OF SURVEY : 308 PSIG
 OPENED WELL TO ELEMENT : 1304 HRS.
 POH : 1516 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

Station	Depth	Time at Sta.	TEMPERATURE		PRESSURE			REMARKS
			Defl.	°F	Defl.	Corr. Defl.	PSIG	
1	0	1304-1309	N.R.	-	0.127	-	297	} NO CORRECTIONS
2	500	1311-1325	0.202	160	0.130	-	304	
3	1000	1326-1337	0.442	237	0.132	-	308	
4	1500	1338-1348	0.646	299	0.134	-	313	
5	2000	1349-1359	0.807	345	0.134	-	313	
6	2500	1400-1410	0.833	353	0.161	-	376	
7	3000	1411-1421	0.983	396	0.240	0.245	572	
8	3500	1422-1432	1.027	408	0.316	0.321	750	
9	4000	1433-1443	1.179	449	0.391	0.396	925	
10	4500	1444-1454	1.076	421	0.462	0.469	1094	
11	5000	1455-1505	1.011	403	0.534	0.544	1267	
12	5132	1506-1516	1.126	435	0.553	0.562	1309	

CSTDC



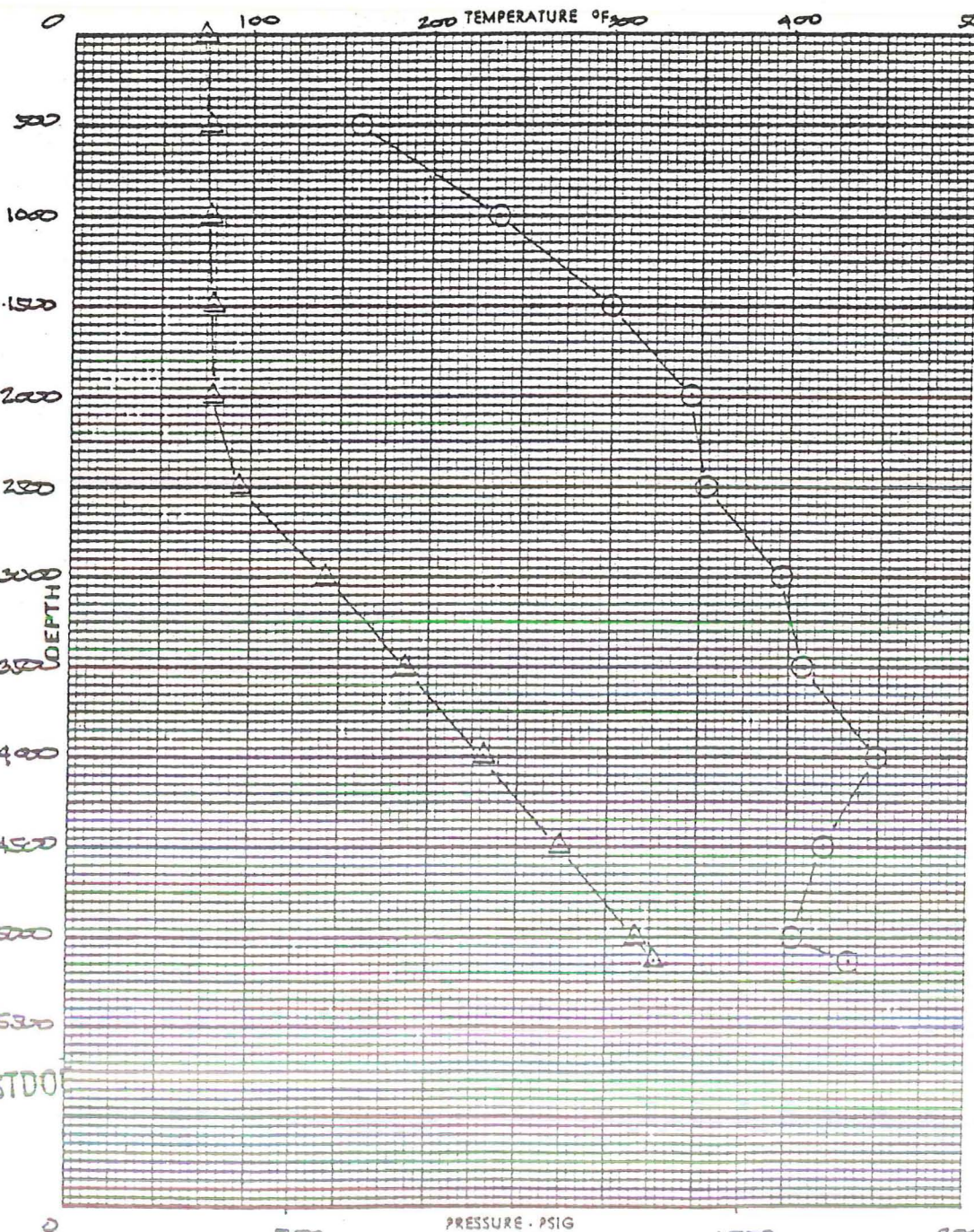
Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

B 20-527 P/T

OWNER UNION GEOTHERMAL CO. OF N. M. FIELD REDWOOD CANYON WELL NAME BACA NR 20
 CASING 20" @ 250' ; 12 3/8" @ 1415' ELEV. 9089' DATE: 10-23-81
 LINER DESCRIPTION: 9 5/8" @ 255' - SURFACE ; 5 1/2" @ 4750' - 5150' ZERO POINT KB
 DEPTH 5150'

HOLE DESCRIPTION: _____
4515 PSI INSTRUMENT 93 - 618 FAHR.
KPG 14191 SERIAL NO. KTB 10722
 PURPOSE TEMP/PRESS GRADIENT SURVEY TO 5132' MAX. TEMP. 449 °F @ 4000'
 REMARKS: (AFTER FRACTURING)



PRESSES	GAUGE	SOMB
CASING. PSI		

DEPTH FT.	TEMP. °F	PRESS. PSI	GRAD.
0	-	297	
500	160	304	
1000	237	308	
1500	277	313	-
2000	345	313	-
2500	353	376	0.126
3000	376	572	0.292
3500	408	750	0.356
4000	449	925	0.390
4500	421	1094	0.338
5000	403	1267	0.346
5132	435	1309	0.318

○ TEMPERATURE
 △ PRESSURE
 R.O. ENGBRETSEN
 OCT 27 1981

BY: _____



Union Geothermal Co. of New Mexico

SUBSURFACE TEMPERATURE AND PRESSURE SURVEY

R. O. ENGBREITSEN

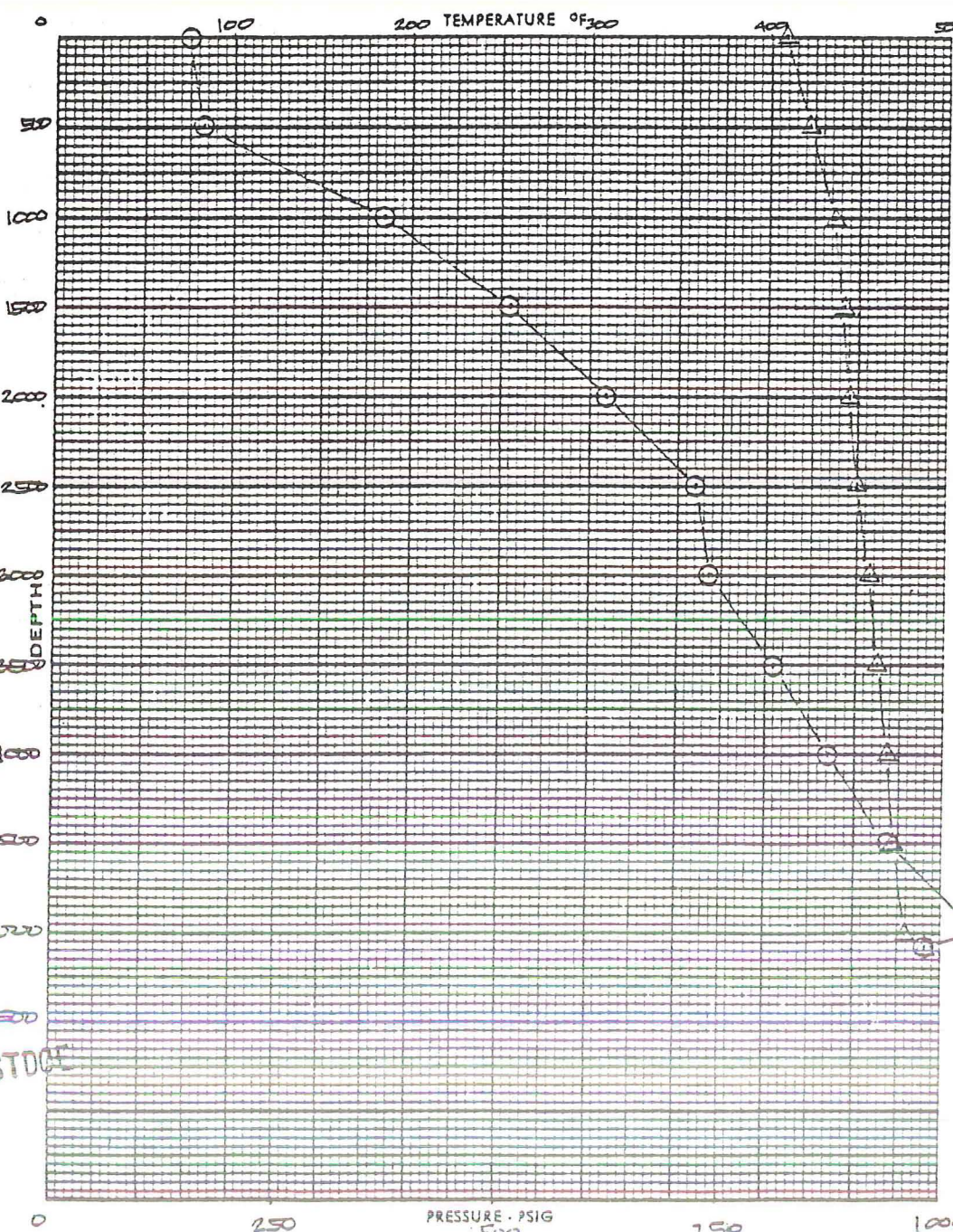
NOV 17 1981

B20-S 29 P/T

OWNER UNION GEOTHERMAL CO. OF NEW MEXICO FIELD REDONDO CANYON WELL NAME BACA NO 20
 CASING 20" @ 280' ; 13 3/8" @ 1415' ELEV. 9089' DATE: 11-17-81
 LINER DESCRIPTION: 7 3/8" @ 2505' - SURF. ; 7" @ 4880' - 2383' ; 5 1/2" @ 5131' - 4760' ZERO POINT KB
 DEPTH 5131'

HOLE DESCRIPTION: _____
 _____ 3,250 PSI INSTRUMENT 1-G80 FAHR.
 _____ KPC 22390 SERIAL NO. KTB 23338

PURPOSE TEMP/PRESS GRADIENT SURVEY TO EDTS' MAX. TEMP. 525 °F @ 5000'
 REMARKS: PRIOR TO FLOWTEST # 6



STABILIZATION PERIOD _____

PRESSURES	GAUGE	BOMB	
CASING, PSI			
DEPTH FT.	TEMP. °F	PRESS. PSIG	GRAD.
0	75	818	-
500	83	844	0.052
1000	184	873	0.058
1500	255	884	0.022
2000	307	891	0.014
2500	360	900	0.018
3000	368	915	0.030
3500	405	926	0.022
4000	436	937	0.022
4500	467	944	0.014
5000	525	958	0.028
5075	491	782	0.370

○ TEMPERATURE
 △ PRESSURE

BY: JFR

CSTOGE