SSGF BRINE GEOCHEM.

PREPRINT UCRL- 81177

Lawrence Livermore Laboratory

CHEMICAL FINGERPRINTS TO ASSESS THE EFFECTS OF GEOTHERMAL DEVELOPMENT ON WATER QUALITY IN IMPERIAL VALLEY

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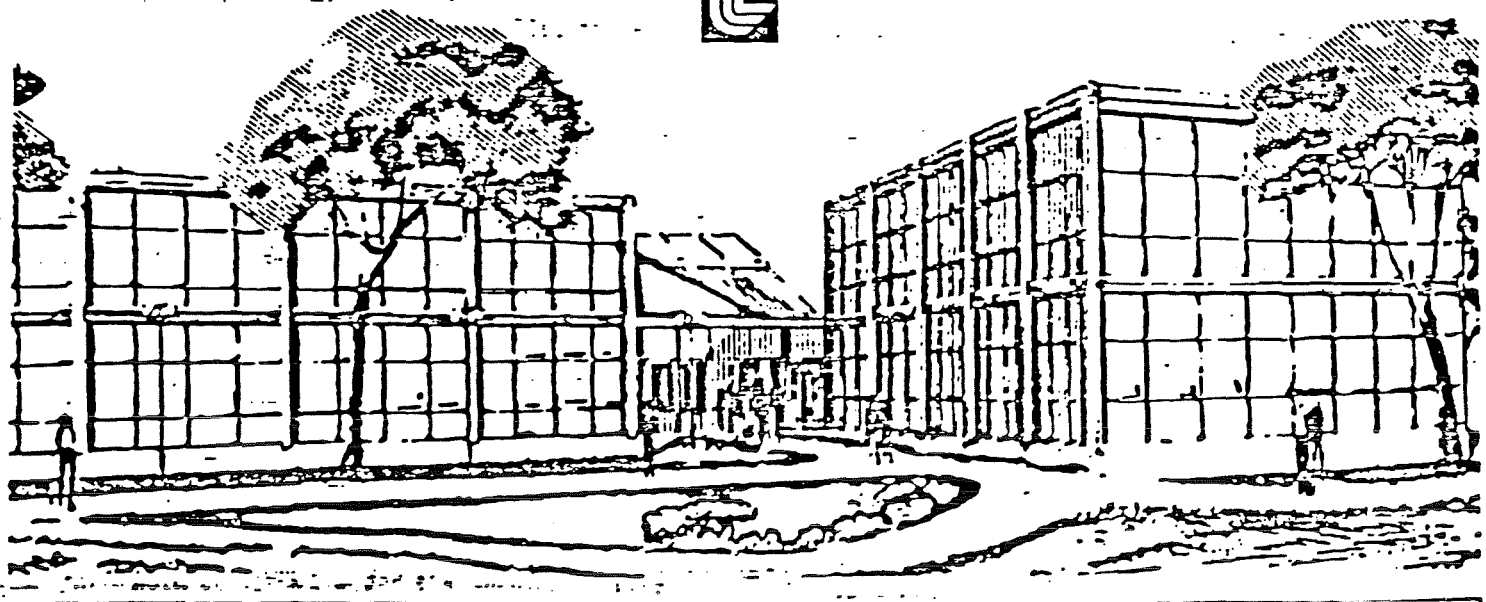
April 4, 1978

This paper was prepared for publication in the Transactions of the 1978 Annual Meeting of the Geothermal Resources Council, Hilo, Hawaii, July 25-28, 1978.



ALAMO RIVER
SALTON SEA
IRRIGATION WATER
OBSIDIAN BUTTE SPRINGS

SURFACE WATERS

NEAR SURFACE WATER SOURCE INFORMATION

GL04336

SOURCE	DATE	SAMPLE #	FLOW RATE #/HR	TEMP °F	REMARKS
ALAMO RIVER	? 1978	A-1	—	—	UNKNOWN SAMPLE LOCATION
SALTON SEA	? 1978	SS-1	—	—	UNKNOWN SAMPLE LOCATION
SALTON SEA	830708	SS-2	—	81.9	NEAR OBSIDIAN BUTTE
SALTON SEA	870428	SS-3	—	—	NEAR UNIT-1 (POSSIBLE CONTAMINATION FROM IRRIGATION)
VAIL 4A CANAL	1978?	IW-1	—	—	UNKNOWN SAMPLE LOCATION
VAIL 4A DRAIN	1978?	IW-2	—	—	UNKNOWN SAMPLE LOCATION
CANAL WATER	870400	IW-3	—	—	UNKNOWN SAMPLE LOCATION - DRILLING WATER
OBSIDIAN BUTTE	830618	OB-1A	—	91.6	SPRINGS ON SOUTHERN SIDE IV 83-31
OBSIDIAN BUTTE	830618	OB-1B	—	91.0	" IV 83-32
OBSIDIAN BUTTE	830618	OB-1C	—	83-3	" IV 83-33
IRRIGATION WATER - VESTAL AREA	881222	IW-4	-	-	FROM CANAL USED AS DRILLING WATER

ALAMO RIVER
SALTON SEA
IRRIGATION WATER
OBSIDIAN BUTTE SPRINGS

ORIGINAL FLUID ANALYSES

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO_4	NH_3	ΣCO_2	TDS	pH	sg. g/cc	ISOTOPES $\delta^{18}O$	ISOTOPES δD	SiO_2
A-1	0.01	3.2	0.02	NA	760	0.66	NA	960	NA	205	3000	7.7	NA	—	—	—
SS-1	<0.1	13.5	0.03	NA	14700	1.1	NA	8100	NA	206	38600	8.8	—	—	—	—
SS-2	<1.0	20.93	<0.50	(8)	15400	2.4	NA	8847	NA	216	38063	8.2	—	(-1.0)	(-38)	11.0
SS-3	NA	NA	NA	46	8570	NA	NA	4800	NA	174	22200	8.5	NA	-5.4	-61.8	23.1
IW-1	<0.01	1.3	0.02	NA	158	0.5	NA	357	NA	167	928	8.2	—	—	—	—
IW-2	0.02	6.0	0.12	NA	1870	0.05	NA	1480	NA	330	5970	7.6	—	—	—	—
IW-3	NA	NA	NA	10	1770	NA	NA	300	NA	<0.1	4180	11.8	—	-11.6	-98.3	4.3
OB-1A	<0.52	52.9	<0.26	—	24430	16.0	—	4318	—	253	45641	6.9	—	—	—	58.6
OB-1B	<0.52	32.8	<0.26	—	21200	10.0	—	6903	—	320	44622	7.1	—	—	—	47.3
OB-1C	<0.52	22.3	<0.26	—	16346	8.5	—	8003	—	370	38891	7.1	—	—	—	40.1
IW-4	<0.24	1.12	<0.06	<0.50	110	0.44	<0.10	285	0.17	181	733	8.4	—			

ALAMO RIVER
SALTON SEA
IRRIGATION WATER
OBSIDIAN BUTTE SPRINGS

ORIGINAL FLUID ANALYSES

SAMPLE #	units	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
A-1	mg/lit	NA	0.007	0.76	201	0.014	0.045	15	0.23	120	0.035	607	0.12
SS-1	mg/lit	NA	<0.01	6.8	850	0.08	0.24	195	3.2	1200	0.08	10600	0.07
SS-2	mg/lit	<0.20	<2.50	10.3	958	<0.25	<0.10	200	3.23	1283	<1.0	11221	<2.50
SS-3	ppm	NA	NA	5.6	622	NA	0.1	134	NA	722	NA	5950	NA
IW-1	mg/l	NA	0.005	0.25	93	<0.005	0.03	6.3	0.08	35	0.01	168	0.09
IW-2	mg/l	NA	0.005	2.0	437	0.007	0.08	66	1.24	160	1.9	970	0.093
IW-3	ppm	NA	NA	0.4	1140	NA	0.1	42	NA	0.2	NA	826	NA
OB-1A	mg/l	<0.1	<1.29	16.8	1872	<0.13	NA	239	7.6	1710	10.7	12794	<1.29
OB-1B	mg/l	<0.1	<1.29	17.5	1085	<0.13	0.40	232	6.7	1508	7.7	13419	<1.29
OB-1C	mg/l	<0.1	<1.29	14.0	928	<0.13	1.8	184	3.9	1283	3.63	11880	<1.29
FW-4	ppm	<0.1	<0.49	<0.05	78.2	<0.06	<0.12	4.3	0.15	30.2	<0.24	126.5	<0.31

WELL

DATA SOURCES

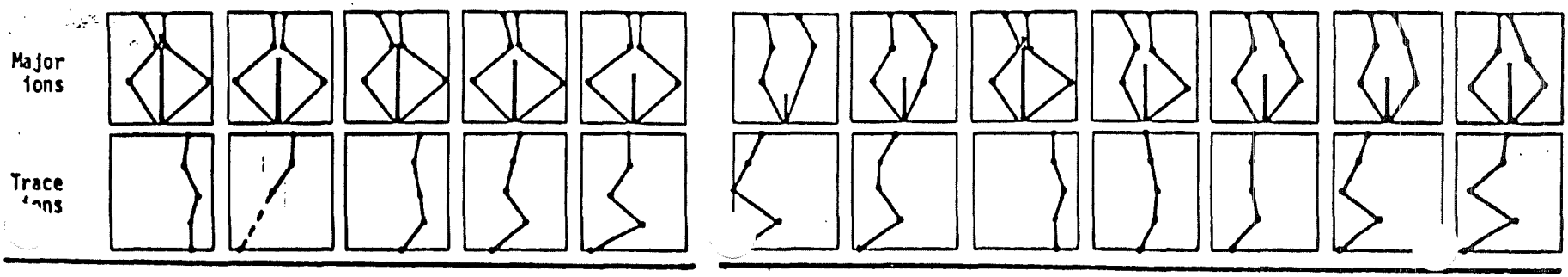
WELL	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
A-1	LLL									Pimental et al., 1978		
SS-1	LLL									Pimental et al., 1978		
SS-2	UURI									Potochnik, 1983	Br, δD, $\delta^{18}O$ from Nicholson et al., 1987	
SS-3	Dellavalle Labs						SMU					
IW-1	LLL									Pimental et al., 1978		
IW-2	LLL									Pimental et al., 1978		
IW-3	Dellavalle Labs						SMU					
OB-1A	UURI									Potochnik, 1983		
OB-1B	UURI									Potochnik, 1983		
OB-1C	UURI									Potochnik, 1983		
IW 4	UURI											

Table 1A. Average concentrations in geothermal brines, mg/l.

Ion	Salton Sea	Westmorland	Brawley	Heber	East Mesa
Na	52000.	10000.	22000.	4200.	2600.
K	14000.	1400.	3800.	260.	190.
Ca	24000.	690.	8100.	880.	130.
Mg	106.	188.	34.	5.4	3.4
Cl	145000.	18000.	46000.	7900.	3900.
SO_4	84	57		99	65
CO_3	0.	130.	0.	3.3	33.
HCO_3	140.	2900.	49.	27.	490.
TDS	240000.	37000.	76000.	14000.	7600.
pH	5.2	7.5	6.1	6.5	7.3
As	11.		2.6	<0.1	0.16
B	350.	63.	140.	14.	5.4
Ba	433.		363.	3.8	2.2
Cu	4.	0.07	0.11	0.53	0.03
F	9.	2.24		1.6	2.0
Fe	2300.	0.3	65.	22.	2.2
Li	211.	48.	100.	9.5	6.3
Mn	1200.	2.8	190.	2.7	0.42
Ni	<4.				0.03
Pb	100.	3.6	1.1	1.9	0.09
Se					1.2
Sr	500.		340.	53.	38.
Zn	660.	0.04	14.	0.83	0.07
K/Na × 10	2.68	1.31	1.75	0.61	0.74
Cl/SO_4	1730.	316.		80.	25.

Table 1B. Average concentrations in water samples in Salton Sea KGRA, mg/l.

Vail4 Canal	Sump 120	Sinclair 4	Sump 116	Vail4A Drain	Alamo River	Salton Sea
168.	1080.	58442.	2470.	970.	607.	10600.
6.3	20.	14918.	247.	66.	15.	195.
93.	373.	26992.	2050.	437.	201.	850.
35.	187.	736.	385.	160.	120.	1200.
158.	989.	154590.	8540.	1870.	760.	14700.
357.	1990.	19.	1590.	1480.	960.	8100.
15.	<2.5		<2.5	<2.5	<2.5	63.
152.	338.	0.	380.	330.	205.	143.
928.	5030.	266560.	17700.	5970.	3000.	38600.
8.2	7.0	5.3	6.8	7.6	7.7	8.8
0.005	<0.005	10.	0.005	0.005	0.007	<0.01
0.25	1.1	332.	9.7	2.	0.76	6.8
0.09	0.097	1100.	0.54	0.093	0.12	0.07
<0.005	0.005	3.	0.075	0.007	0.014	0.08
0.5	0.57	14.	0.48	0.05	0.66	1.1
0.03	0.08	1240.	0.26	0.08	0.045	0.24
0.08	0.31	344.	14.3	1.24	0.23	3.2
0.01	0.30	1475.	47.	1.9	0.035	0.08
0.01	<0.01	<4.	0.31	<0.01	<0.01	<0.2
<0.01	0.01	60.	0.29	0.02	0.01	<0.1
<0.005	<0.005		<0.01	<0.005	<0.005	0.02
1.3	5.0	448.	38.	6.0	3.2	13.5
0.02	0.03	600.	7.8	0.12	0.02	0.03
0.38	0.19	2.55	1.0	0.68	0.25	0.18
0.44	0.50	8140.	5.36	1.26	0.79	1.82



W. BRUCE BLAIKIE

JAN 5

Dr. Memorial - Death of a Well - Sinc. #2

At aproximatly 0700 on Thursday the 31 of December 1981 I (Ernie King) recieved a call by radio of a problem at the Old Phillips yard. Upon arriving I found a hole about 10"-12" in diameter north west of the new office building in a location which would have been under the old garage. The old garage was torn down about 2 weeks prior to this day.

I then call Bruce Blaikie to inform him. He called Don Ash to get the information on the possible and probables.

The ground was wet around the hole about 2 feet away. A water level could be seen down about 30-40 feet. A string with a large nut tied to the end was lowered till it stopped. The string measured 215 feet long when it tagged bottom.

Dave Holligon and I calculated the hole to require 4.2 yards of concrete. Bruce Blaikie requested that the hole be filled to the top with concrete with 1/4" gravel. I ordered 5 yards from Peyerson Concrete and dumped it into the hole. It appeared to me that all of the concrete was coming out with the water that was being displaced so I borrowed some bulk concrete from the drilling rig and started pouring it into the hole. I left 55 gallon drums full of concrete in the hole with instructions for the crew on the next shift to put in another if it still had water on top on Friday.

On Friday the 3rd 55 gallon Drum full was put in the hole.

The hole was barricaded off and monitored for the rest of the weekend. On Monday morning the concrete had set up about 3" below existing ground level with no water visible. The mud displaced with the water was also set up proving it was concrete and not drilling mud.

The area will be cleaned up and regraded by Clyerson when equipment is available.

UNION 76

CHLORIDE DETERMINATION VIA MOHR METHOD

Sinc #2

SAMPLE: 12-31-81 (Date) 11:30 (Time) ARTESIAN WELL (Location) AT LINDSAY Rd

SAMPLE POINT: _____ psig (Pressure) _____ °F (Temperature) _____ % (Level)

% NON-CONDENSIBLES _____ pH _____

	Trial I	Trial II
Erlenmeyer + _____ ml sample	71.4 g	73.9 g
- Dry 125 ml Erlenmeyer	- 70.4 g	- 72.9 g
Weight of sample	1.0 g	1.0 g
ml $AgNO_3$ _____ normality (N)	7.4 ml	6.7 n
- ml $AgNO_3$ to titrate blank	- .1 ml	- .1 n
Net ml $AgNO_3$	7.3 ml	6.6 n

PPM Cl in Brine

$$\frac{(\text{net ml } AgNO_3) \times (N\ AgNO_3) \times 35{,}450}{\text{Weight of Sample}}$$

25,878.5 ppm | 23,397 p

PPM Cl in Steam

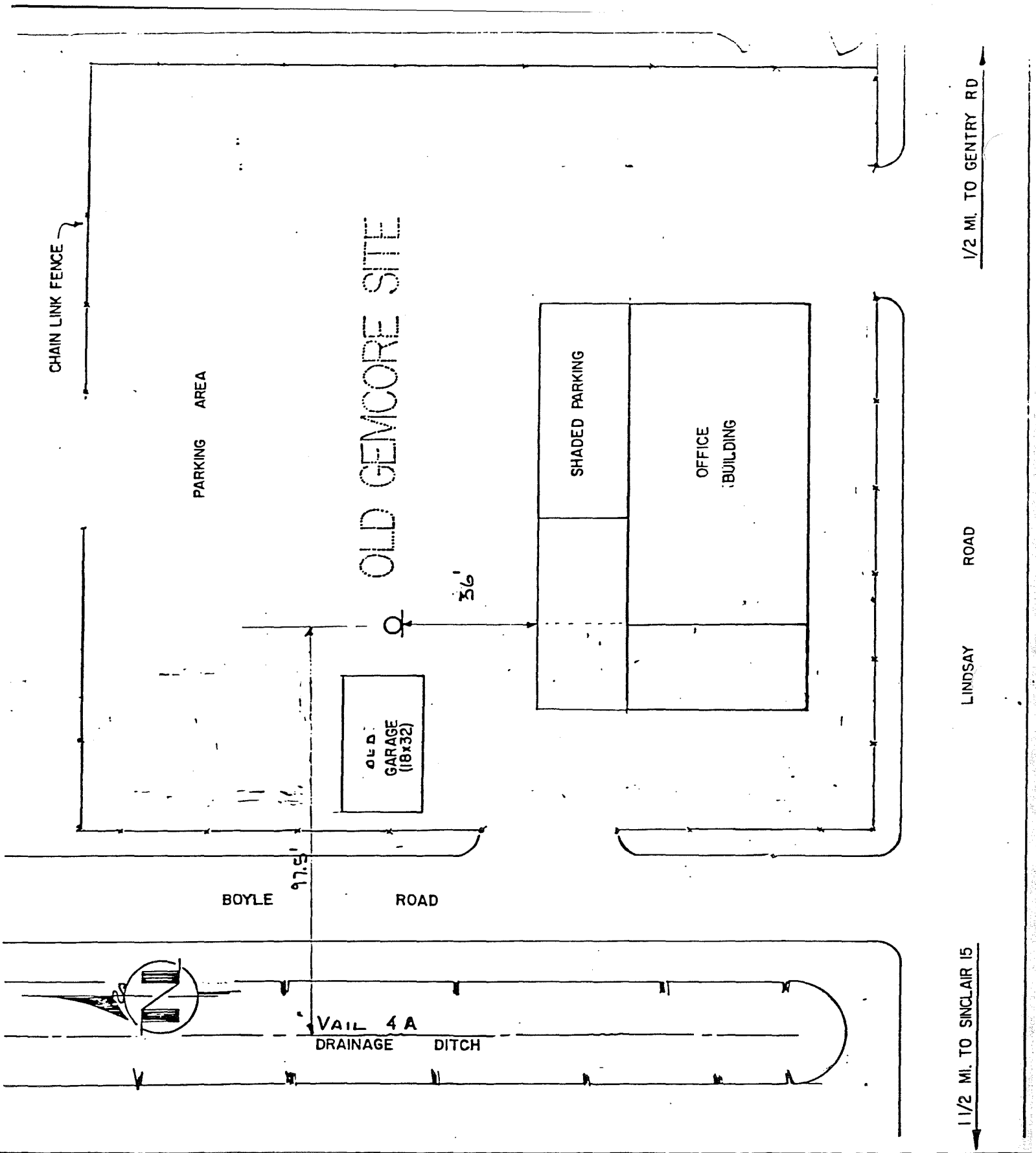
$$\frac{(\text{net ml } AgNO_3) \times (N\ AgNO_3) \times 35{,}450 \times (100 - \%\ \text{Non-Cond.})}{\text{Weight of Sample} \times 100}$$

_____ ppm | _____ p

ERNIE W. KING
JAN 14 1982

J. L. KUHN
JAN 14 1982

Analysis By: TACKER & MOORE

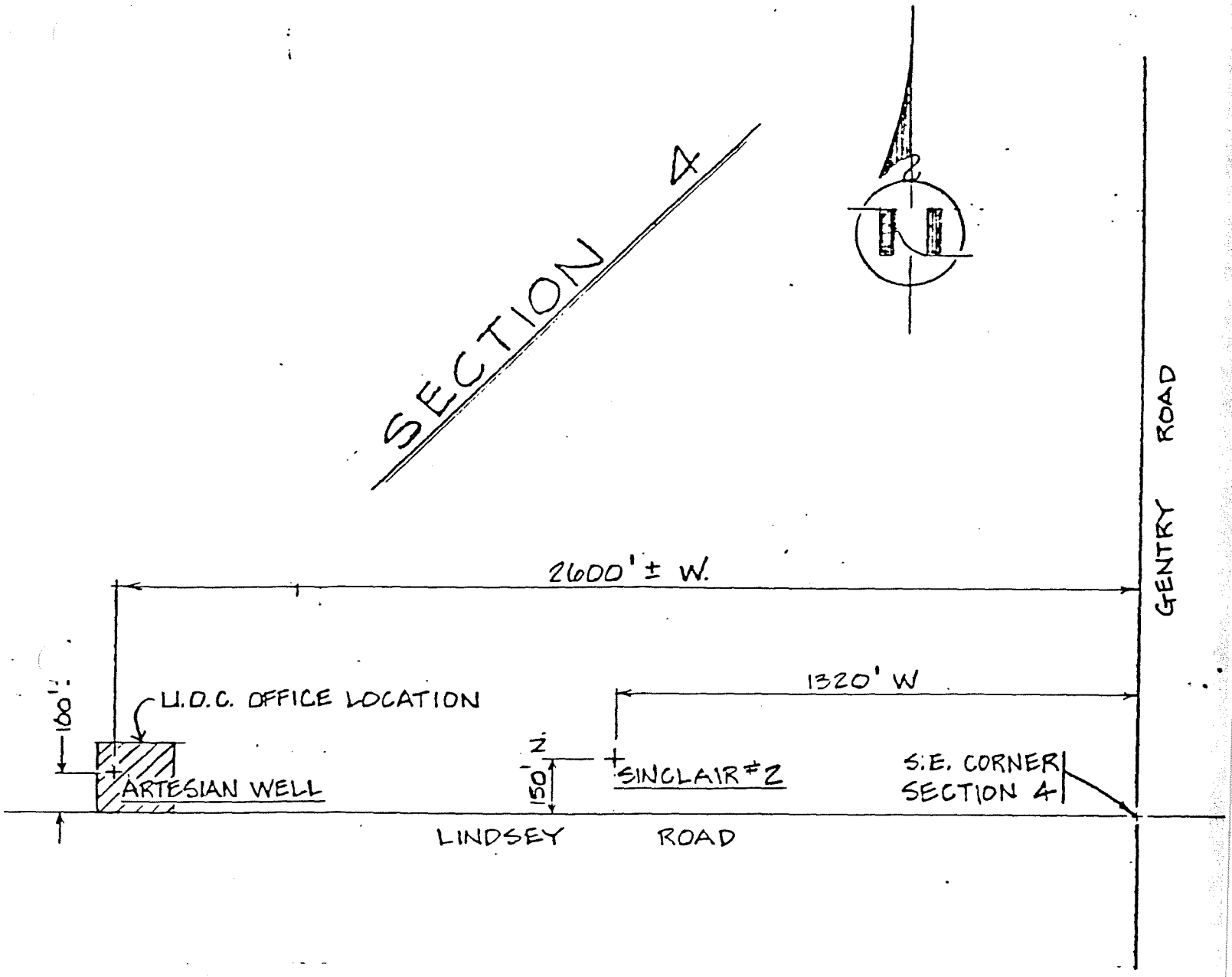


NO.	REVISIONS	DATE	BY

UNION OIL COMPANY GEOTHERMAL DIVISION

GENERAL LAYOUT OF
PROPOSED SALTON SEA AREA
OFFICE BUILDING SITE

DRAWN	DAT
FOR: WBB	11-14-
BY: G	11-14-
ACCT.	-304
SCALE 1" =	3
SH. 2 OF 2	
REV.	
DRAWING N	
IV 1031	



NO.	REVISIONS	DATE	BY

UNION 76

UNION OIL COMPANY OF CALIFORNIA

GEOTHERMAL DIVISION — IMPERIAL DISTRICT

LOCATION OF SINCLAIR #2 IN RELATION TO ARTESIAN WELL FOUND AT S.S. OFFICE LOCATION

DRAWN	DAT
FOR: J.P	1-19-
BY: GLP	1-19
AFE	
SCALE 1" = 40.	
SH. 1 OF	
REV.	
DRAWING NO IV-1046	

GHT LABORATORIES OF IMPERIAL VALLEY, INC.
106 SO. 8th STREET, BRAWLEY, CALIFORNIA 92227
344-2532

LABORATORY NO. 007099 E

REPORTED 1-8-82

FOR UNION OIL

SAMPLED

SAMPLE WATER (1)

RECEIVED 1-6-82

IDENTIFICATION 200 FT WELL AT FIELD OFFICE
LINDSAY RD.

Based on sample --- drawn by this laboratory ☐

delivered to us - - - ☒

RESULTS OF ANALYSIS

SODIUM (Na)	10,000 Mg/l
CALCIUM (Ca)	890 Mg/l
MAGNESIUM (Mg)	3750 Mg/l
POTASSIUM (K)	270 Mg/l

JOSE PEREZ

JAN 11 1982

GHT LABORATORIES OF IMPERIAL VALLEY

JAN 11 1982

Steven Wade

STEVEN WADE

SHALLOW WELLS

NEAR SURFACE WATER SOURCE INFORMATION

SOURCE	DATE	SAMPLE #	FLOW RATE #/HR	TEMP °F	REMARKS
SHALLOW GROUND WATER - USBR WELL	780000?	USBR-1	—	—	SAMPLE FROM UNKNOWN DEPTH (~400'?), SECTION 3, T11S, R13E
UNIT-3 SOIL BORE HOLE	870428	U3-1	—	~80°F	SAMPLE FROM ~50' DEPTH AT UNIT 3 SITE
215' HOLE NEAR SALTON SEA OFFICE	811231	SSOO-1	—	—	SUSPECTED TO BE SINCLAIR-2 BORE HOLE
VON-1 GROUT HOLE #1	870511	V1-1	—	150°F	FLOWED FROM PERFS @ 305-340' (WOULD BE CONTAMINATED)
IID-9 GROUT HOLE #1	870422	I9-1	—	—	SAMPLE FROM WATER SHUT-OFF TEST. (PERFS @ 459-457')
IID-10 - Collected while fishing @ 670'	880206	I10-1	—	170	SAMPLE FROM ABOVE 600'? WELL FLOWED WHILE PUMPING AWAY MUD
PIONEER DEVELOPMENT CO. #3	?	PDC-3-1	—	—	SAMPLE FROM WELL - TD = 1473'?

ORIGINAL FLUID ANALYSES

SAMPLE #	units	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
USBR-1	mg/lit?	NA	<0.01	NA	1026	NA	0.50	56	1.28	826	2.32	4700	NA
U3-1	ppm	NA	NA	6.3	3040	NA	0.30	99	NA	3210	NA	10400	NA
SSOO-1	mg/lit	NA	NA	NA	890	NA	NA	270	NA	3750	NA	10000	NA
V1-1	mg/lit	NA	<0.01	19	4300	NA	2.1	350	NA	3150	1.9	25100	1.0
I9-1	ppm	NA	NA	66	2320	NA	170	536	NA	409	NA	51600	NA
I10-1	ppm	<0.33	<3.33	33.9	2374	<0.42	14.7	525	11.1	450	8.2	31240	3.66
PDC-3-1	ppm				16000						4000	20400	

ORIGINAL FLUID ANALYSES

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO_4	NH_3	ΣCO_2	TDS	pH	sg. gas	ISOTOPES $\delta^{18}O$	ISOTOPES δD	SiO_2
USBR-1	<0.04	NA	0.094	NA	8898	NA	NA	3962	NA	NA	—	7.15	NA	NA	NA	19
US-1	NA	NA	NA	200	28900	NA	NA	2700	NA	1330	54600	7.3	NA	-7.9	-87.5	28.2
SSOO-1	NA	NA	NA	NA	22525	NA	NA	109	NA	NA	est 37544	NA	NA	NA	NA	
VI-1	<0.8	114	NA	NA	55600	NA	NA	NA	NA	566	98400	6.3	NA	NA	NA	
I9-1	NA	NA	NA	540	94100	NA	NA	1000	NA	270	160000	6.9	NA	-2.03	-46.9	90.7
I10-1	<1.67	67	<0.42	45.2	53900	0.36	3.5	558	118	287	89593	6.4	—	-3.47	-56.4	109
PDC-3-1					68000			200		300	110000					

SHALLOW WELLS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

DENSITY WAGNER	SAMPLE #	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
-	USGS-1	-	<0.01	-	1026	-	0.50	56	1.28	826	2.32	4700	-
-	U3-1	-	-	6.5	3040	-	0.30	99	-	3210	-	10400	-
1.02	S50-1	-	-	-	873	-	-	265	-	3676	-	9804	-
1.06	V1-1	-	<0.01	17.9	4057	-	2.0	330	-	2972	1.8	23679	0.9
	E4-1	-	-	66	2320	-	170	536	-	409	-	5160	-
	E10-1	<0.33	<3.33	33.9	2374	<0.42	14.7	525	11.1	450	8.2	31240	3.66
	PDC3-1	-	-	-	16000	-	-	-	-	-	4000	20700	-

SHALLOW WELLS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO4	NH_3	ΣCO_2	SiO_2	TDS	ISOTOPES	
													$\delta^{18}O$	δD
USGR-1	<0.04	–	0.094	–	8898	–	–	3462	–	–	19	EST 19491	–	–
U3-1	–	–	–	200	28905	–	–	2700	–	1330	28.2	54600	-7.9	-81.5
SSOS 1	–	–	–	–	22085	–	–	107	–	–	EST –	EST 36308	–	–
V1-1	<0.8	108	–	–	52453	–	–	–	–	534	–	92830	–	–
I9-1	–	–	–	540	94100	–	–	1000	–	270	90.7	160000	-2.03	-46.9
I10-1	<1.67	67	<0.42	45.2	53900	0.36	3.5	558	118	287	109	91543	-3.47	-56.4
MC3-1	–	–	–	–	68000	–	–	200	–	300	–	110000	–	–

WELL DATA SOURCES

WELL	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
SBR-1	?								EIR # 211-78	JUNE, 1979		
1.3-1	Dellavalle lab.						Sm-Cl					
500-1	GHT LABS									Perez, 1982		
11-1	S&T									SHEN, 1987		
9-1	Dellavalle Labs.						Sm-Cl					
10-1	UCRL						Sm-Cl					
C-3-1	LLNL								UCRL 51976	Palmer, 1975		

TABLE 2-6

CHEMICAL QUALITY OF SHALLOW GROUNDWATER

CENTER OF S 1/2 SECTION 33, T11S, R13E, SBB&M
(1.4 Miles East of Power Plant Site)

Constituent	Concentration
Chloride (Cl)	8,898
Sulfate (SO_2)	3,962
Silicon (Si)	9.0
Silica (SiO_2)	19
Lithium	1.28
Sodium (Na)	4,700
Potassium (K)	56
Calcium (Ca)	1,026
Magnesium (Mg)	826
Iron (Fe)	0.50
Lead (Pb)	ND 0.04
Manganese (Mn)	2.32
Arsenic (As)	ND 0.01
Zinc (Zn)	0.094
pH	7.15
Specific Conductivity (micromhos/cm)	37,500

SOURCE: Environmental Impact Report No. 211-78 entitled "Forty-Nine Megawatt Geothermal Power Plant and Facilities, Niland Area", June 1979.

PAMELA J. IRVINE
FEB 03 1982

76

FILE

Brawley, California
January 20, 1982

TO: Walt Nellis

FM: Jose Perez

RE: Abandonment of A Water Hole
Located At the New Salton Sea Office Yard

On December 31, 1981 a hole in the ground of approximately 10-12 inches in diameter appeared across the shop area of the new building. Drawing IV-1031 shows the location of the hole in relation to the new building and Drawing IV-1046 shows this well in relation to Sinclair #2 geothermal well. Pictures 1, 2 and 3 show the physical aspect of the hole.

Ernie King, see attached report, notified Bruce Blaikie, Salton Sea Superintendent, of the problem. Bruce Blaikie in turn called Don Ash, District Drilling Superintendent, for abandonment procedures. Ernie King reported that the depth of the hole was approximately 215 feet with a water level of 30-40 feet from the surface.

Bruce Blaikie requested that the hole be cemented to the top with a cement slurry containing 1/4 inch gravel. Five yards of the cement slurry were dumped into the hole. Picture No. 4 shows the dumping of the cement slurry into the hole. Since the hole had apparently 175 feet of water, most of the cement slurry was displaced by the water. Picture 5 shows the cement slurry being displaced by the water in the hole.

In order to insure that the hole would be cemented solid, approximately 2000 lbs of cement (powder form) used in the drilling operations were dumped into the hole. The remaining water and cement slurry in the hole helped the cement (powder form) to harden in place.

In order to find out if the water found in the hole was of geothermal origin, a one gallon water sample was collected and sent to GHT Labs in Brawley. GHT Labs reported the following:

Ion	Concentration, mg/l
Sodium (Na)	10,000
Calcium (Ca)	890
Magnesium (Mg)	3,750
Potassium (K)	270
Chloride (Cl)	22,525
Sulfate (SO_4)	109

Based on a water quality study done by Lawrence Livermore Laboratory[1], the major ion concentration of this well can be compared to Salton Sea geothermal brine, Sinclair #4 geothermal well (Sinclair #4 is located approximately 250 feet northeast from the new hole) and Vail 4A (Vail 4A runs north-south and is approximately 98 feet to the west of the new hole) as follows:

Ion	Concentration, mg/l			
	New Hole	Sinclair 4	Vail 4A Drain	SS Geoth Brine
Sodium (Na)	10,000	58,442	970	52,000
Calcium (Ca)	890	26,992	437	24,000
Magnesium (Mg)	3,750	736	160	106
Potassium (K)	270	14,918	66	14,000
Chloride (Cl)	22,525	154,590	1870	145,000
Sulfate (SO_4)	109	19	1480	84
Ratios K/Na x 10	0.27	2.55	0.68	2.68
Ca/Mg	0.23	36.67	2.73	226.41
Cl/SO_4	206.65	8136.31	1.26	1726

The K/Na, Ca/Mg, and the Cl/SO_4 ratios indicate a much lower value for the new well when compared to Sinclair #4, Vail 4A drain and the Salton Sea geothermal brine. Based on the above data, it is concluded that the source of the water found in the new well is not of geothermal origin.

JP:sg
Attachments
cc: Bruce Blaikie

1 Pimentel, Kenneth D., Ireland, Robert R., and Tompkins, Gary A., "Chemical Fingerprints To Assess the Effects of Geothermal Development On Water Quality in Imperial Valley", Lawrence Livermore Laboratory, Reprint UCRL-81177.

CELLAR SPRINGS

NEAR SURFACE WATER SOURCE INFORMATION

SOURCE	DATE	SAMPLE #	FLOW RATE	TEMP °F	REMARKS
IID-5 CELLAR	831019	I5-1	—	—	
NEAR IID-5 CELLAR	831103	I5-2	—	64.4	ACTUAL SITE WAS 84-1 CELLAR
IID-9 CELLAR	840301	I9-1	—	—	
IID-9 CELLAR	840803?	I9-2	—	—	
IID-9 CELLAR	840807	I9-3	—	—	
IID-9 CELLAR	840814	I9-4	—	—	
IID-9 CELLAR	870421	I9-5	72 gal/day	—	
IID-9 CELLAR	870428	I9-6	1 qt/day	—	
IID-9 CELLAR	870511	I9-7	—	—	
IID-12 CELLAR	831101	I12-1	0.5-1.0 gpm	122	
VOA-1 CELLAR	870511	V1-1	—	98	

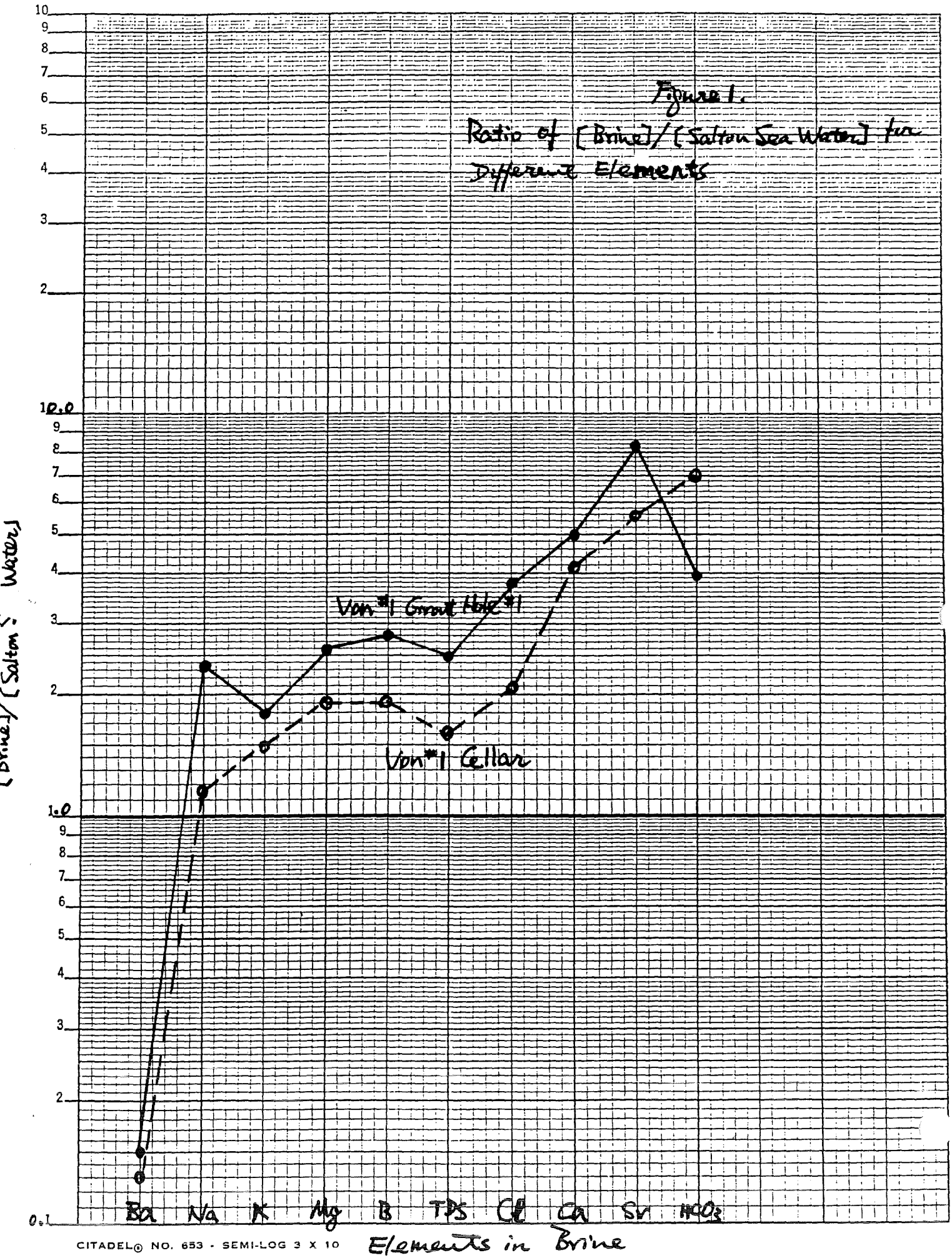
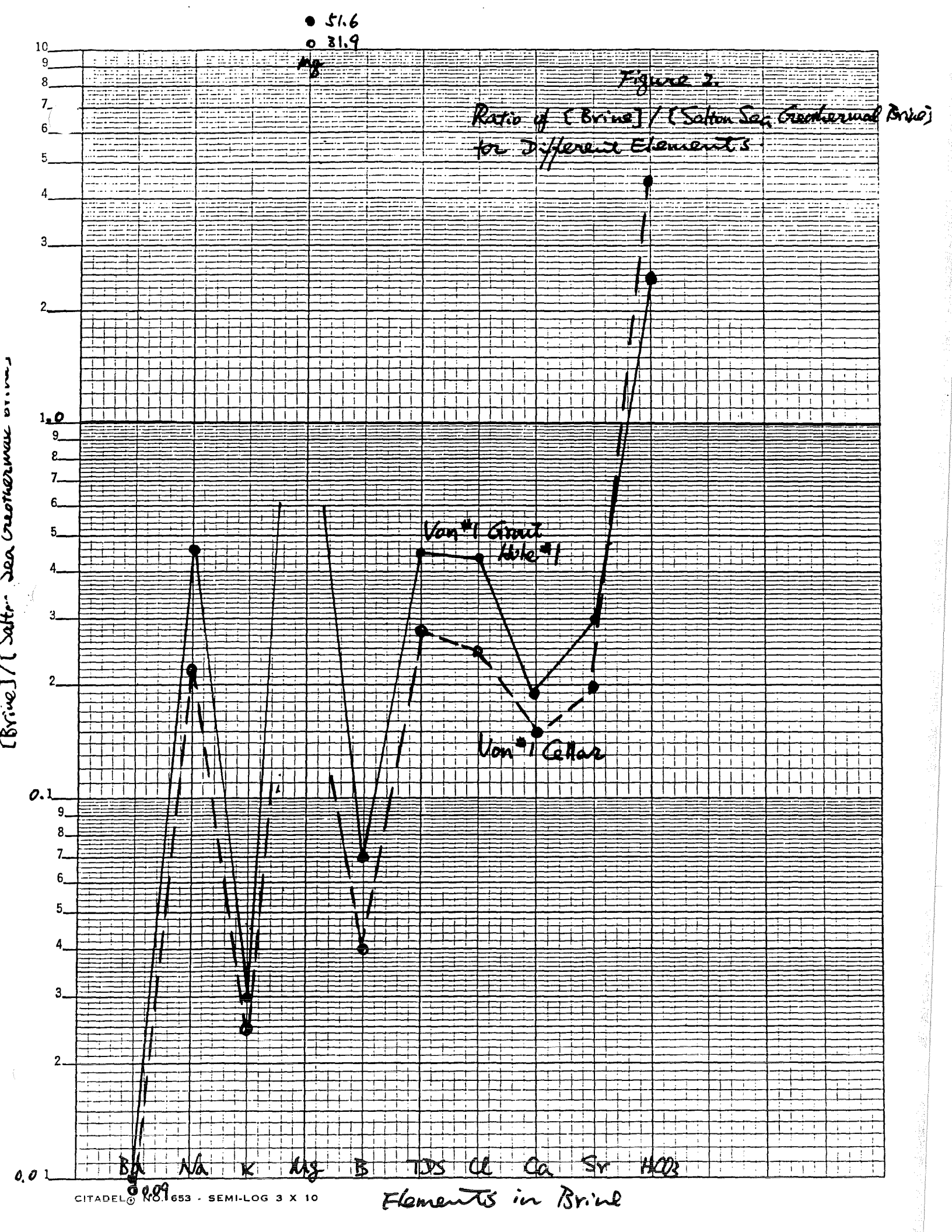


Figure 1.
Ratio of [Brine]/[Salton Sea Water] for
Different Elements
Von #1 Great Hole #1
Von #1 Cellar
[Brine]/[Salton Sea Water]
10
9
8
7
6
5
4
3
2
10.0
9
8
7
6
5
4
3
2
1.0
9
8
7
6
5
4
3
2
0.1
Ba
Na
K
Mg
B
TDS
Cl
Ca
Sr
HCO3
Elements in Brine
CITADEL® NO. 653 - SEMI-LOG 3 X 10

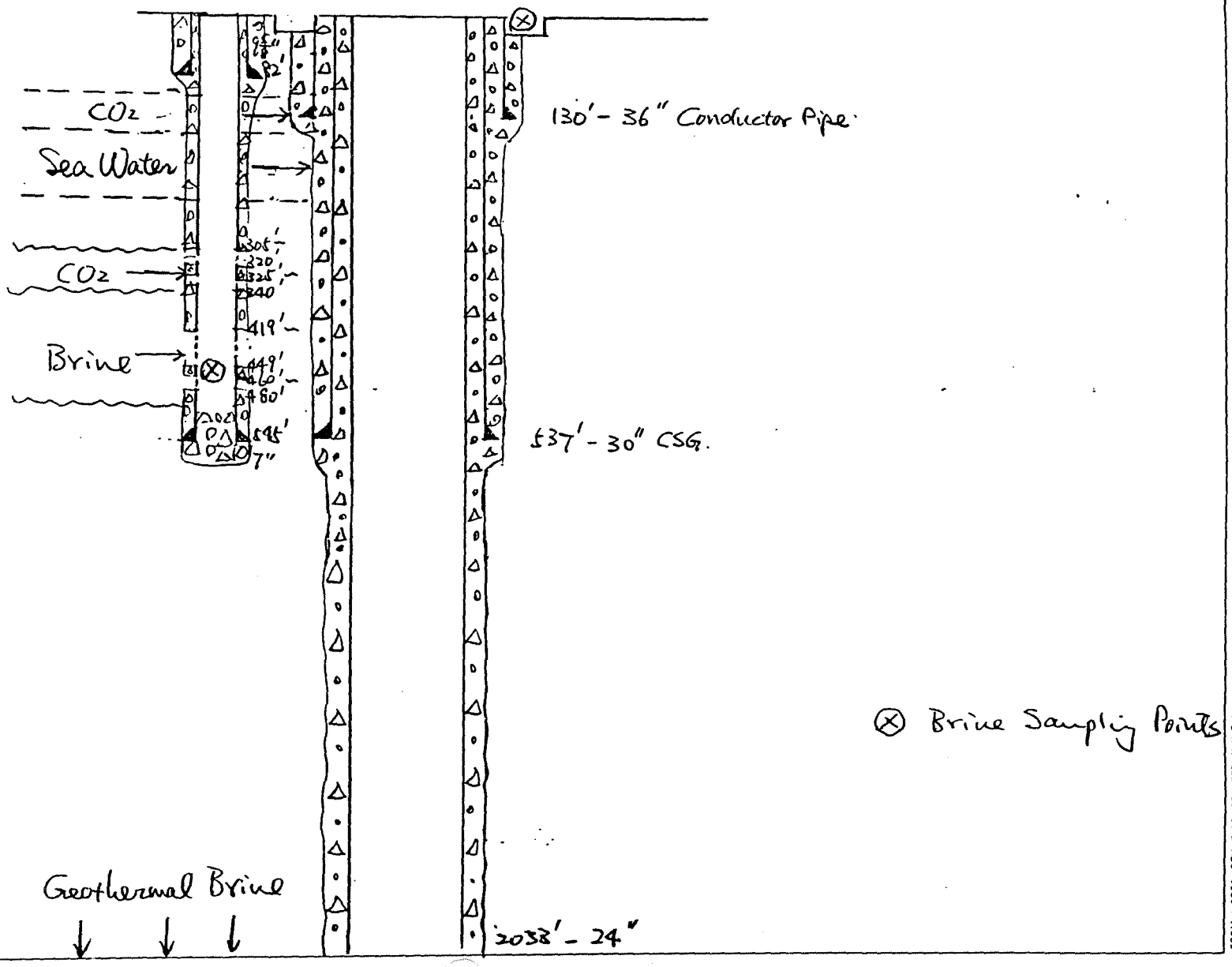

● 51.6
o 81.9
mg/l
Figure 2.
Ratio of [Brine] / [Salton Sea Geothermal Brine]
for Different Elements
10
9
8
7
6
5
4
3
2
1.0
9
8
7
6
5
4
3
2
0.1
9
8
7
6
5
4
3
2
0.01
[Brine] / [Salton Sea Geothermal Brine]
Von #1 Grout Hole #1
Von #1 Cellar
Br
Na
K
Mg
B
TDS
Cl
Ca
Sr
HCO3
0.09
Elements in Brine
CITADEL® NO. 653 - SEMI-LOG 3 X 10

Calculation Record

UNOCAL 76

Figure 3

Schematic of Possible Shallow Liquid and Gas Zones Near Von #1, Imperial Valley



FORM 1-2C50 (REV 3-86) PRINTED IN U.S.A.

SAMPLE TAKEN FROM IDD-12 CELLAR
ON NOVEMBER 1, 1983
ANALYZED BY GHT LABORATORIES

pH	6.35
	Concentration (mg/l)
TDS	70,400
Na^{+}	19,300
Ca^{++}	4,190
K^{+}	310
Mg^{++}	2,630
Cl^{-}	41,400
Boron	18
Lithium	8.4
CO_3^{--}	0
HCO_3^{-}	1,085
Fe total	49
Pb^{++}	Undetectable @ < 0.05
Silicon	51.2
Silica	109.4
SO_4^{--}	2,160

Brown sediment present in the sample container may be iron and/or silica.

ORIGINAL FLUID ANALYSES

SAMPLE #	units	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
I5-1	mg/lit	NA	NA	40	3250	NA	5.25?	595	16.1	543	NA	42500	NA
I5-2	ppm	–	–	–	–	–	–	–	–	–	–	–	–
I9-1	mg/lit	–	–	55	3600	–	–	741	13.8	1360	–	33930	–
I9-2	mg/l	–	–	59	4319	–	3.75	822	26	1610	–	55000	–
I9-3	ppm	–	–	72	8437	–	5.12	1553	38	3750	–	111406	–
I9-4	ppm	–	–	270	14550	–	1.78	4255	99.2	8410	–	101250	–
I9-5	ppm	–	–	27	2280	–	1.4	314	–	1640	–	23900	–
I9-6	ppm	–	–	28	2190	–	0.7	314	–	1620	–	24200	–
I9-7	mg/l	–	<0.01	38	2560	–	3.5	340	–	1840	–	36000	0.9
I12-1	mg/l	–	–	18	4190	–	49	310	8.4	2630	–	19300	–
V1-1	mg/l	–	<0.01	13	3500	–	3.5	289	–	2250	3.2	12200	0.9

ORIGINAL FLUID ANALYSES

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO_4	NH_3	ΣCO_2	TDS	pH	sg. g/cc	ISOTOPES $\delta^{18}O$	ISOTOPES δD	SiO_2
I5-1	< 0.05	NA	NA	NA	71800	NA	NA	246	NA	355	GST-119350 NA	6.2	NA	NA	NA	33.7 ?
I5-2	—	—	—	—	—	—	—	—	—	—	63576	—	—	—	—	
I9-1	—	—	—	—	61842	—	—	525	—	794	102395	6.8	—	—	—	—
I9-2	0.83	—	—	—	89743	—	—	1100	—	551	GST 133236 —	6.7	—	—	—	—
I9-3	1.26	—	—	—	141026	—	—	1850	—	299	(FIELD) 194224	—	—	—	—	—
I9-4	11.7	—	—	—	206154	—	—	600	—	138	—	6.3	—	—	—	—
I9-5	—	—	—	260	59561	—	—	760	—	1140	82900	7.3	—	-2.73	-54.5	32.9
I9-6	—	—	—	330	47700	—	—	690	—	1250	82400	7.7	—	—	—	54.9
I9-7	< 2.0	97	—	—	63800	—	—	NA	—	740	109000	6.7	—	—	—	
I12-1	< 0.05	—	—	—	41400	—	—	2160	—	1085	70400	—	—	—	—	109.4
V1-1	< 4.0	75	—	—	30700	—	—	NA	—	1010	62400	6.6	—	—	—	

CELLAR SPRINGS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

DENSITY CORRECT.	SAMPLE #	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1.072	I S-1	–	–	37	3052	–	4.9?	555	15.0	507	–	39646	–
–	I-S-2	–	–	–	–	–	–	–	–	–	–	–	–
1.061	I 9-1	–	–	52	3393	–	–	698	13.0	1282	–	31979	–
1.093	I 9-2	–	–	54	3952	–	3.43	752	22.3	1473	–	50320	–
–	I 9-3	–	–	72	8437	–	5.12	1553	38	3750	–	111406	–
–	I 9-4	–	–	270	14550	–	1.78	4255	99.2	8410	–	101250	–
–	I 9-5	–	–	27	2280	–	1.4	314	–	1640	–	23900	–
–	I 9-6	–	–	28	2190	–	0.7	314	–	1620	–	24200	–
1.065	I 9-7	–	<0.01	35.7	2404	–	3.3	319	–	1728	–	33306	0.8
1.041	I 12-1	–	–	17.3	4025	–	47.1	298	3.07	2526	–	18340	–
1.036	V-1-1	–	<0.01	12.5	3378	–	3.4	279	–	2172	3.1	11776	0.9

CELLAR SPRINGS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO4	NH_3	ΣCO_2	SiO_2	TDS	ISOTOPES	
													$\delta^{18}O$	δD
E5-1	<0.05	–	–	–	66978	–	–	229	–	331	31.4?	EST 111334	–	–
E5-2	–	–	–	–	–	–	–	–	–	–	–	63576	–	–
I9-1	–	–	–	–	58287	–	–	495	–	748	–	96508	–	–
I9-2	0.76	–	–	–	82407	–	–	1006	–	504	–	EST 140198	–	–
I9-3	1.26	–	–	–	141026	–	–	1850	–	299	–	194224	–	–
I9-4	11.7	–	–	–	206154	–	–	600	–	138	–	EST 335740	–	–
I9-5	–	–	–	266	59561	–	–	760	–	1140	32.9	82900	-2.73	-54.5
I9-6	–	–	–	330	47700	–	–	690		1250	56.9	82400	–	–
I9-7	<1.9	91	–	–	59906	–	–	–	–	695	–	102347	–	–
I12-1	0.05	–	–	–	34769	–	–	2075	–	1042	105	67627	–	–
V-1-1	<3.9	72.4	–	–	29635	–	–	–	–	975	–	60234	–	–

WELL

DATA SOURCES

WELL	BRINE		STEAM		NCG		ISOTOPES		REFRENCE #1	AUTHOR	REFRENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
5-1	GHT LAB,											
25-2	FIELD	LAB										
29-1	ATS											
29-2	ATS											
29-3	ATS											
29-4	ATS											
29-5	Dellavalle Lab						SMCA			Rohrs 1988		
29-6	Dellavalle	Lab								Rohrs 1988		
29-7	S&T									Shen, 1987		
12-1	GHT LAB									Holligan, 1983		
11-1	S&T									Shen, 1987		

1105 Cellar

CHT LABORATORIES OF IMPERIAL VALLEY, INC.

406 SO. 8th STREET · BRAWLEY, CALIFORNIA 92227-2591
(619) 344-2532

PAMELA J. IRVINE
NOV 08 1983

LABORATORY NO.	009373 E	REPORTED	10-27-83
FOR	UNION OIL	SAMPLED	
SAMPLE	BRINE	RECEIVED	10-24-83
IDENTIFICATION	10-19-83 IID CELLAR 12:00 (IID#5) SALTON SEA		

BASED ON SAMPLE ☐ DRAWN BY THIS LABORATORY ☐ DELIVERED TO US

RESULTS OF ANALYSIS

pH	6.20
BICARBONATES (HCO3)	355 mg/l
CARBONATES (CO3)	0
SODIUM (Na)	42,500 mg/l
CALCIUM (Ca)	3,250mg/l
POTASSIUM (K)	595 mg/l
MAGNESIUM (Mg)	543 mg/l
CHLORIDE (Cl)	71,800 mg/l
BORON (B)	40 mg/l
LITHIUM (Li)	16.1 mg/l
LEAD (Pb)	ND LESS THAN 0.05 mg/l
SILICON	15.7
as SILICA	33.7 mg/l *
TOTAL IRON (Fe)	5.25 mg/l *
SULFATES (SO4)	246 mg/l

SILICA AND IRON FROM DILUTE SAMPLE

CHECKED OCT 27 1983

CHT LABORATORIES OF IMPERIAL VALLEY

Steven Wade Linda Conaway

STEVEN WADE signed by Linda L. Conaway

UNION 76

Salton Sea, California
November, 14, 1983

TO: Walt Nellis

84-1

FROM: Ernie King

RE: ~~IID~~ 14 Water Level
Sinc #14 (conductor pipe 50' N of 110-5).

On November 3, 1983 the cellar and conductor pipe were excavated by a backhoe. The bottom of the bottom cellar board and 6 inches below it were uncovered. Total depth of the hole was 6' 6".

Water started coming into the hole immediatley. The following day the water level had stabilized at 5' 10". On November 7, 1983, the water level was measured at 6' 4" and stable.

The metal lid on the conductor was cut open to determine the water level inside. The concrete was 2 feet from the top of the conductor and totally dry. The top of the conductor was 18 inches below ground level. On November 11, a sample of the water indicated a T.D.S. of 63,576 PPM with a temperature of 64.4° F.

The water level will be monitored daily as well as the level in IID 5 cellar and relative level and flow of the drain ditch directly west of the plant site.

cc: Bruce Blakie
Jim Kuhn

xc: WEN
SDP
PJ

UNION 76

Salton Sea, California
November, 14, 1983

TO: Walt Nellis

FROM: Ernie King

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The water level will be monitored daily as well as the level in IID 5 cellar and relative level and flow of the drain ditch directly west of the plant site.

cc: Bruce Blakie
Jim Kuhn

XC: WEN
SDP
PJ

Union Oil Company of Ca_ornia Santa Rosa

union 76

TOTAL DISSOLVED SOLIDS DETERMINATION

Sec 14

SAMPLE: NOV. 10 1983 (illegible) ~~TP 10~~
DATE TIME LOCATION

SAMPLE POINT: 155 = 64.4' °F. (illegible) psig (illegible) %
Temperature Pressure Level

SAMPLE SIZE: 5 ml FILTER SIZE: .45 um

% NON-CONDENSIBLES 0 %

	Trial I	Trial II	Trial III
Weight of Crucible & Sample	29.2050 g	29.4522 g	26.[illegible] g
-Weight of Crucible	24.0164 g	24.2946 g	21.7225 g
Weight of Sample	5.1916 g	5.1576 g	5.[illegible] g
Weight of Crucible & Dried Solids	24.3454 g	24.6226 g	22.0522 g
-Weight of Crucible	24.0164 g	24.2946 g	21.7225 g
Weight of Dried Solids	.3290 g	.3280 g	.3297 g

Avg. 63,576 p.p.m.

T.D.S. (ppm) 63,371 ppm 63,595 ppm 63,764 ppm

Wt. of Dried Solids _____ g X 10^6 (100 - % Non-Cond. _____ %) *

Wt. of Sample _____ g X 100

Analysis By: _____

* Assume % non-condensibles = 0 for brine samples

(drug out caliche filled up w/ water outside of conductor pipe.

NOV 11 1983

XC: WEN
SDP
PJI

GHT LABORATORIES OF IMPERIAL VALLEY, INC.
106 SO. 8th STREET, BRAWLEY, CALIFORNIA 92227
344-2532

LABORATORY NO. 7099 ADDITIONAL

REPORTED 1-18-82

FOR UNION OIL

SAMPLED

SAMPLE WATER

RECEIVED 1-6-82

IDENTIFICATION 200 FT WELL AT
FIELD OFFICE
LINDSAY RD

Based on sample --- drawn by this laboratory ☐

delivered to us - - - ☒

RESULTS OF ANALYSIS

CHLORIDE (Cl)	22,525 Mg/l
SULFATE (SO4)	109 Mg/l

GHT LABORATORIES OF IMPERIAL VALLEY

Steven Wade LLC

STEVEN WADE

SAMPLE COLLECTED WHILE FISHING AT 670'
(WELL FLOWED WHILE PUMPING AWAY HEAVY MUD) DTR

****

UNOCAL
IID 10 BRINE 2/6/88

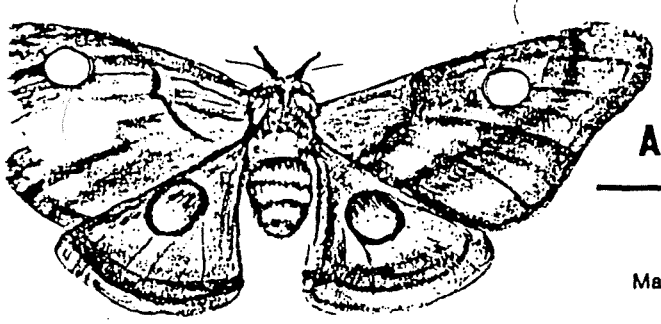
ID #: A:880157.UNC
DATE: 03-08-88

****

SPECIES	CONCENTRATION (ppm)	ANALYTICAL METHOD	DETECTION LIMITS	CONCENTRATION (MOL/L)
Na	31240.42	1	3.33	.136E+01
K	524.65	1	4.17	.134E-01
Ca	2374.07	1	1.25	.592E-01
Mg	450.07	1	1.08	.185E-01
Fe	14.73	1	.17	.264E-03
Al	N.D.	1	4.17	< .154E-03
SiO2	108.53	1	3.58	.181E-02
B	24.05	1	.33	.222E-02
Li	11.09	1	.25	.160E-02
Sr	66.95	1	.08	.764E-03
Zn	N.D.	1	.42	< .637E-05
Ag	N.D.	1	.33	< .309E-05
As	N.D.	1	3.33	< .445E-0
Au	N.D.	1	.67	< .338E-05
Ba	3.66	1	2.08	.267E-04
Be	N.D.	1	.01	< .925E-06
Bi	N.D.	1	16.67	< .797E-04
Cd	N.D.	1	.33	< .297E-05
Ce	N.D.	1	1.67	< .119E-04
Co	N.D.	1	.17	< .283E-05
Cr	N.D.	1	.83	< .160E-04
Cu	N.D.	1	.42	< .656E-05
La	N.D.	1	.83	< .600E-05
Mn	8.18	1	1.67	.149E-03
Mo	N.D.	1	4.17	< .434E-04
Ni	N.D.	1	.83	< .142E-04
Pb	N.D.	1	1.67	< .804E-05
Sn	N.D.	1	.83	< .702E-05
Sb	N.D.	1	5.00	< .411E-04
Te	N.D.	1	8.33	< .653E-04
Th	N.D.	1	16.67	< .718E-04
Ti	N.D.	1	.83	< .174E-04
U	N.D.	1	41.67	< .175E-03
V	N.D.	1	8.33	< .164E-03
W	N.D.	1	.83	< .453E-05
Zr	N.D.	1	.83	< .914E-05
NH4	118.00	5	.00	.654E-02
Cs	N.A.	10	.00	< .000E+(
Rb	N.A.	10	.00	< .000E+0

No adjustment for brine density required because sample was not diluted / acidified -
DTR

11D9 Cellar



AGRICULTURAL TECHNICAL SERVICE INC

ATS

3700 ROSEDALE HWY., BAKERSFIELD, CALIF. 93308

Mailing Address: P. O. BOX 9099, BAKERSFIELD, CA 93389

00986 4 E

UNION OIL

LIQUID

1245
IID 9 SALTON SEA

ATS Labs, Inc.
106 South 8th Street
Brawley, CA. 92227
(619) 344-2532

REPORTED: 3-22-84

RECEIVED: 3-1-84

Sample from Cellar
Fresh Sample after emptying w/ Vac truck

REPORTED IN MG/L

CALCIUM (Ca)	3600
MAGNESIUM (Mg)	1360
SODIUM (Na)	33,930
POTASSIUM (K)	741
BICARBONATES (HCO3)	794
CARBONATES (CO3)	LESS THAN 0.1
CHLORIDE (Cl)	61842
SULFATE (SO4)	525
BORON (B)	55
SILICA (Si)	87.3
LITHIUM (Li)	13.8
pH	6.8
TOTAL DISSOLVED SOLIDS	102,395
LANGLIER SCALE	1.63

S CABANAS signed by Linda L. Conaway

3-24-84 CHECKED

ANALYZED FOR GHT BY ATS LABS

XC: Steve Pyle, Ind
Pam Irvine, SR
IID #9 Chem File

RECD APR - 3 1984

AGRICULTURAL TECHNICAL SERVICE INC ATS

3700 ROSEDALE HWY., BAKERSFIELD, CALIF. 93308

Mailing Address: P. O. BOX 9099, BAKERSFIELD, CA 93389

ATS Labs, Inc.
106 South 8th Street
Brawley, CA. 92227
(619) 344-2532

00986 4 E

UNION OIL

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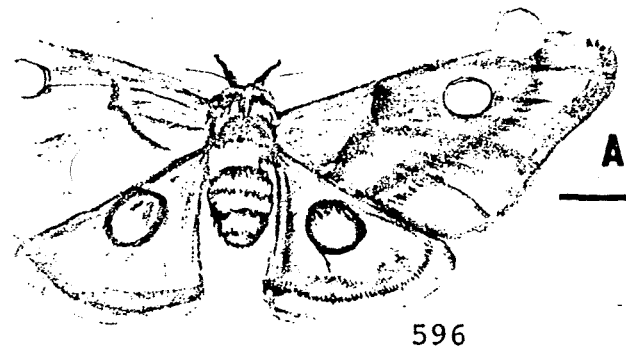
S CABANAS signed by Linda L. Conaway 3-24-84 CHECKED

ANALYZED FOR GHT BY ATS LABS

IID-9 well file
— copy to Bakersfield + John & Dave
Steve [illegible] Ind
Ron Irvine SR
IID#9 Chem File



AGRICULTURAL TECHNICAL SERVICE INC

ATS

106 SOUTH 8TH STREET, BRAWLEY, CALIF. 92227

(619) 344-2532

596

REPORTED: 8-29-84

UNION OIL

WATER

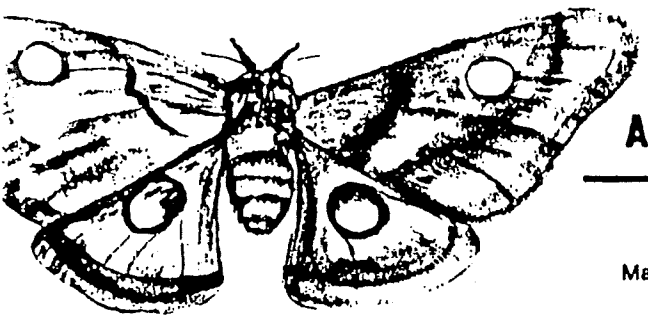
RECEIVED: 8-3-84

CELLAR IID 9

REPORTED IN MG/L

CALCIUM (Ca)	4,319
MAGNESIUM (Mg)	1,610
SODIUM (Na)	55,000
POTASSIUM (K)	822
BICARBONATE (HCO3)	551
CARBONATE (CO3)	0
CHLORIDE (Cl)	89,743
SULFATE (SO4)	1,100
IRON (Fe)	3.75
ALKALINITY	451
pH	6.7
LEAD (Pb)	0.83
LITHIUM (Li)	26
BORON (B)	59

S CABANAS signed by Linda L. Conaway CHECKED



AGRICULTURAL TECHNICAL SERVICE INC ATS

3700 ROSEDALE HWY., BAKERSFIELD, CALIF. 93308

Mailing Address: P. O. BOX 9099, BAKERSFIELD, CA 93389

106 S. 8th ST.
BRAWLEY, CA. 92227

614

REPORTED: 8-23-84

UNION OIL CO.

LIQUID

RECEIVED: 8-7-84

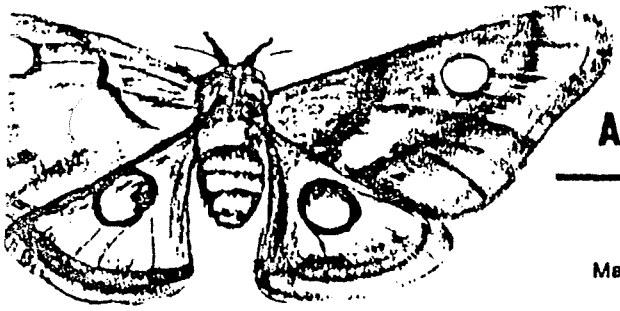
SALTON SEA IID 9 CELLAR 8-7-84
MIKE

IID-9 well file

SODIUM (Na)	111,406 ppm
CALCIUM (Ca)	8,437 ppm
POTASSIUM (K)	1,553 ppm
MAGNESIUM (Mg)	3,750 ppm
CHLORIDE (Cl)	141,026 ppm
BORON (B)	72.0 ppm
LITHIUM (Li)	38.25 ppm
CARBONATES (CO3)	0
BICARBONATES (HCO3)	299 ppm
SULFATE (SO4)	1850 ppm
IRON (Fe)	5.12 ppm
LEAD (Pb)	1.26 ppm

Linda L. Conaway 8-23-84

Linda L. Conaway CHECKED



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Linda L. Conaway 8-23-84
Linda L. Conaway CHECKED

JOHN D. BUSH

SEP 4 198

per E. King sampled after sucking cellar dry.

Union Oil Company of California

PAMELA J. IRVINE
AUG 24 1984

union 76

TOTAL DISSOLVED SOLIDS DETERMINATION

SAMPLE: 8-7-84 (DATE) 1100 (TIME) IID 9 cellar (LOCATION)

SAMPLE POINT: _____ °F. (Temperature) _____ psig (Pressure) _____ % (Level)

SAMPLE SIZE: 50 ml FILTER SIZE: .45 um

% NON-CONDENSIBLES _____ %

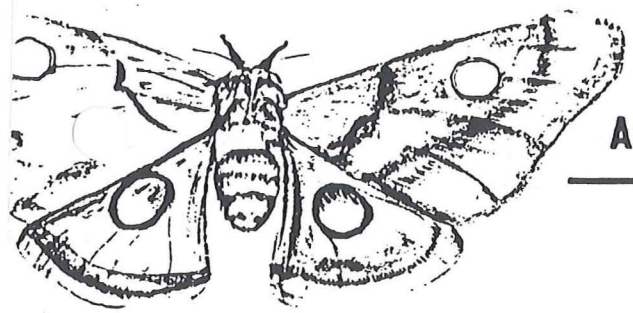
	Trial I	Trial II	Trial III
Weight of Crucible & Sample	_____ g	118.4405 g	118.9538 g
-Weight of Crucible	_____ g	61.3192 g	61.7342 g
eight of Sample	_____ g	57.1213 g	57.2196
Weight of Crucible & Dried Solids	_____ g	72.3654 g	72.8959 g
-Weight of Crucible	_____ g	61.3192 g	61.7342 g
Weight of Dried Solids	_____ g	11.0462 g	11.1617 g
T.D.S. (ppm)	194,224 ppm Avg. ppm	193,381 ppm	195,068 ppm

Wt. of Dried Solids _____ g X 10^6 (100 - % Non-Cond. _____ %)*

Wt. of Sample _____ g X 100

Analysis By: Moore

Assume % non-condensibles = 0 for brine samples



AGRICULTURAL TECHNICAL SERVICE INC

ATS

106 SOUTH 8TH STREET, BRAWLEY, CALIF. 92227

(619) 344-2532

639

REPORTED: 8-27-84

UNION OIL

LIQUID

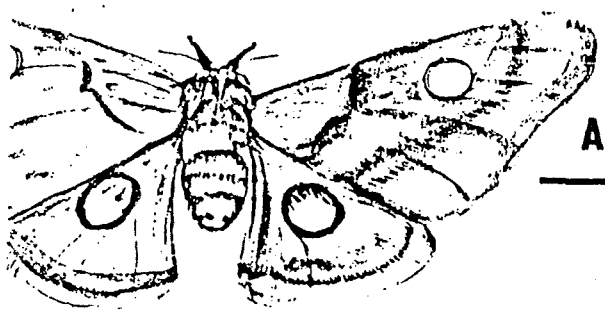
RECEIVED: 8-14-84

SALTON SEA
IID 9 CELLAR UNFILTERED
8-14-84

110-9
well file

SODIUM (Na)	101,250 ppm
CALCIUM (Ca)	14,550 ppm
POTASSIUM (K)	4,255 ppm
MAGNESIUM (Mg)	8,410 PPM
CHLORIDES (Cl)	206,154 ppm
BORON (BØ	270 ppm
LITHIUM (Li)	99.2 ppm
SULFATE (SO4)	600 ppm
CARBONATES	LESS THAN 0.1
BICARBONATES (HCO3)	138 ppm
IRON (Fe)	1.78 ppm
LEAD (Pb)	11.7 ppm
pH	6.3

S CABANAS signed by Linda L. Conaway CHECKED



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pH	6.3

JOHN D. BUSH

SEP 4 1984

S CABANAS signed by Linda L. Conaway CHECKED

per E. King – sampled after sweetening alkaline

DELLAVALLE Laboratory, Inc.
Chemists and Consultants
1910 W. McKinley, Suite 110 • Fresno, CA 93728 • (209) 233-6129

Report of General Mineral Analysis

BRANCH OFFICES:
• STOCKTON (20[illegible]-6097
• TULARE (209[illegible]-0608
• INDIO (619,[illegible]-5171

Unocal Geothermal Division
P.O. Box 1805
Indio CA 92201
01726

Lab No. 63955
Sampled
Submitted 04/30/87
Submitted By Dave Rohrs
Reported 06/17/87
Office Fresno
Ranch
cc: Unocal Santa Rosa, Dave Rohr

Identification

No.	Description	pH	EC	$CaCO_3$	HCO_3	CO_3	OH	Ca	Cl	K	Fe	Mg	Mn	Na	SO_4	B	SiO_2	TDS	Br**
			umhos/cm	ppm															mg/L
	*MCL----)		(500)						(250)		(0.3)		(0.05)		(250)			(500)	
01	IID-9-G-1-1 (4/21/87)	7.3			1140			2280	59561	314	1.4	1640		23900	760	27	32.9	82900	260
02	IID-9-G-1-2 (Drilling Fluid)	11.8			(0.1			1140	1770	42	0.1	0.2		826	300	0.4	4.3	4180	10
03	IID-9-G-1-3 (4/22/87)	6.9			270			2320	94100	536	170	409		51600	1000	66	90.7	160000	540
04	IID-9-G-1-4 (4/28/87)	7.7			1250			2190	47700	314	0.7	1620		24200	690	28	56.9	82400	330
05	U-3-BH (4/28/87)	7.3			1330			3040	28900	99	0.3	3210		10400	2700	6.3	28.2	54600	200
06	Salton Sea (4/28/87)	8.5			174			622	8570	134	0.1	722		5950	4800	5.6	23.1	22200	46

*MCL: Maximum Contaminant Level according to the California Domestic Water Quality and Monitoring Regulations. (Title 22)

**Additional Analysis

Yours truly,

Nat B. Dellavalle
Manager

NBD:aap

Enclosures

RESULTS

SAMPLE		18O/16O(V.SMOW)			D/H(V.SM
Salton Sea - 1	4.28.87	-5.40	-5.41	-61.0	-62.5
IID-10 brine	2.06.88 10.00	-3.47		-56.5	-56.3
IID-9-G-1 3I	4.22.87	-2.03		-46.5	-47.3
IID-9-G-1 2I drill fluid	4.22.87	-11.63		-98.3	-98.5
IID-10-2 brine #2	-- 16.30	0.75	0.77	-72.3	-73.1
IID-10-2 condensate #2	-- 16.30	-1.43		-60.4	-61.8
IID-9-G-1 1I	4.21.87	-2.73		-53.9	-55.1
IID-10-1 condensate #1	-- 13.30	-1.60		-62.7	-63.5
U-3-BH-I	4.28.87	-7.86		-86.9	-88.1
IID-10-1 brine #1	-- 13.30	0.58	0.61	-65.9	-64.1

Shell

UNION 76

0531d

November 8, 1983

TO: IID-12 Well File

FM: David Holligan

RE: Origin of Water Flowing into the Cellar

On November 1, 1983, I took a water sample from the IID-12 well cellar. This sample was submitted to the Salton Sea lab for a TDS analysis. The sample TDS was 70,500 ppm. A vacuum truck was then used to suck the water from the cellar, and the mud was cleaned from around the wellhead to find the water source. Water was flowing out of the south side of the 20" X 30" annulus, and appeared to be coming up adjacent to the 20" casing. The water temperature was measured with a laboratory thermometer at 45°C (122°F).

Two additional samples were taken. One was submitted to the Salton Sea laboratory for TDS analysis, and it confirmed the earlier TDS. The other sample was submitted to GHT Laboratories in Brawley for elemental analysis as shown on the attached data sheet. The water flow rate was calculated by measuring the level change in cellar over a 2 hour period. The calculated rate was estimated between 0.5 gpm and 1 gpm. It is assumed that no water was leaving the cellar during this period.

DH/lc
Encl.
cc: W. E. Nellis
D. S. Pye
W. B. Blaikie
J. L. Kuhn

Technical Memorandum

Unocal Science & Technology Division
Brea, California

UNOCAL 76

To:	Mr. J. D. Bush Indio	Memo:	E&PP 87-165M
From:	J. C. Shen	Date:	July 8, 1987
Department:	Exploration & Production Research	Project:	638-67207
Subject:	VONDERAHE #1 AND IID #9 SEEPAGE BRINE ANALYSIS	Supervisor:	P. J. Durning

cc: Library (2)
Patent
B. A. Gallinatti, Santa Rosa
G. C. Graham
G. A. Gritters, Indio
D. L. Hale, Indio
R. D. Hutchins
C. J. Mc Clanahan
D. S. Pye, UOC
D. T. Rohrs, Santa Rosa
R. N. Upadhyay
L. D. Weber

OBJECTIVES

Analyze brine samples collected on May 11, 1987, from IID #9 cellar and from Vonderahe #1 cellar and grout hole #1, Imperial Valley. Investigate methods to stop brine and gas seepage through set cement columns.

CONCLUSIONS

The analyses of Vonderahe #1 cellar and grout hole #1 brine samples indicate that there are at least two brine aquifers between ground surface and 550' depth. The deeper aquifer between the depth of 305' and 480' is more saline than the shallower one above 305'. The shallow aquifer is probably similar to the Salton Sea water in composition. Judging from the unusual distribution of bicarbonate concentration in the brines, there are probably at least two CO2 gas zones associated with the aquifers.

By comparing the analyses of the IID #9 cellar sample with another sample taken in March, 1984, it is evident that the composition of the IID #9 seepage brine has not changed much in three years.

CELLAR SPRINGS

NEAR SURFACE WATER SOURCE INFORMATION

SOURCE	DATE	SAMPLE #	FLOW RATE	TEMP °F	REMARKS
ID-5 CELLAR	831019	I5-1	—	—	
NEAR ID-5 CELLAR	831103	I5-2	—	64.4	ACTUAL SITE WAS 84-1 CELLAR
ID-9 CELLAR	840301	I9-1	—	—	
ID-9 CELLAR	840803?	I9-2	—	—	
ID-9 CELLAR	840807	I9-3	—	—	
ID-9 CELLAR	840814	I9-4	—	—	
ID-9 CELLAR	870421	I9-5	72 gal/day	—	
ID-9 CELLAR	870428	I9-6	1 gal/day	—	
ID-9 CELLAR	870511	I9-7	—	—	
ID-12 CELLAR	831101	I12-1	0.5-1.0 gpm	122	
VA-1 CELLAR	870511	V1-1	—	98	

WELL

DATA SOURCES

WELL	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
A-1	LLL									Pimentel et al., 1978		
SS-1	LLL									Pimentel et al., 1978		
SS-2	UURI									Potachnik, 1983	Br, SD, $\delta^{18}O$ from Mickibben et al., 1987	
SS-3	Dellevalle Labs						SMU					
IW-1	LLL									Pimentel et al., 1978		
IW-2	LLL									Pimentel et al., 1978		
IW-3	Dellavalle Labs						SMU					
OB-1A	UURI									Potachnik, 1983		
OB-1B	UURI									Potachnik, 1983		
OB-1C	UURI									Potachnik, 1983		

SURFACE WATERS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO4	NH_3	ΣCO_2	SiO_2	TDS	ISOTOPES	
													$\delta^{18}O$	δD
A-1	0.01	3.2	0.02	–	760	0.66	–	960	–	205	–	3000	–	–
SS-1	<0.1	13.2	0.03	–	14398	1.1	–	7933	–	202	–	37806	–	–
SS-2	<1.0	20.5	<0.50	EST 7.8	15083	2.4	–	8665	–	212	11.0	37280	EST -1.0	EST -38
SS-3	–	–	–	46	8570	–	–	4701	–	170	23.1	21743	-5.4	-61.8
IW-1	<0.01	1.3	0.02	–	158	0.5	–	357	–	167	–	928	–	–
IW-2	0.02	6.0	0.12	–	1870	0.05	–	1480	–	330	–	5970	–	–
IW-3	–	–	–	10	1770	–	–	300	–	<0.01	4.3	4180	-11.6	-98.3
OB-1A	<0.51	51.6	<0.26	–	23811	10.7	–	4209	–	247	57.1	44484	–	–
OB-1B	<0.51	32.0	<0.26	–	20663	9.7	–	6728	–	312	46.1	43491	–	–
OB-1C	<0.51	21.8	<0.26	–	15973	8.3	–	7823	–	362	39.2	38017	–	–

SURFACE WATERS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

DENSITY WGR.	SAMPLE #	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
–	A-1	–	0.007	0.76	201	0.014	0.045	15	0.23	120	0.035	607	0.12
1.021	SS-1	–	<0.01	6.7	833	0.08	0.24	191	3.1	1175	0.08	10382	0.07
1.021	SS-2	<0.20	<2.50	10.1	938	<0.25	<0.10	196	3.1	1257	<1.0	10990	–
~~1.017~~	SS-3	–	–	5.6	622	–	0.1	134	–	722	–	5950	–
–	EW-1	–	0.005	0.25	93	<0.005	0.03	6.3	0.08	35	0.01	168	0.09
–	EW-2	–	0.005	2.0	437	0.007	0.08	66	1.24	160	1.9	970	0.093
–	EW-3	–	–	0.4	1140	–	0.1	42	–	0.2	–	826	–
1.026	OB-1A	<0.1	<1.28	16.4	1825	<0.13	–	233	7.4	1667	10.4	12470	<1.28
1.026	OB-1B	<0.1	<1.28	17.1	1058	<0.13	0.4	226	6.5	1470	7.5	13079	<1.28
1.023	OB-1C	<0.1	<1.28	13.7	907	<0.13	1.8	180	3.8	1254	3.6	11613	<1.28

ALAMO RIVER
SALTON SEA
IRRIGATION WATER
OBSIDIAN BUTTE SPRINGS

ORIGINAL FLUID ANALYSES

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO_4	NH_3	ΣCO_2	TDS	pH	sg. g/cc	ISOTOPES $\delta^{18}O$	ISOTOPES δD	SiO_2
A-1	0.01	3.2	0.02	NA	760	0.66	NA	960	NA	205	3000	7.7	NA	—	—	—
SS-1	<0.1	13.5	0.03	NA	14700	1.1	NA	8100	NA	206	38600	8.8	—	—	—	—
SS-2	<1.0	20.93	<0.50	(8)	15400	2.4	NA	8847	NA	216	38063	8.2	—	(-1.0)	(-38)	11.0
SS-3	NA	NA	NA	46	8570	NA	NA	4800	NA	174	22200	8.5	NA	-5.4	-61.8	23.1
IW-1	<0.01	1.3	0.02	NA	158	0.5	NA	357	NA	167	928	8.2	—	—	—	—
IW-2	0.02	6.0	0.12	NA	1870	0.05	NA	1480	NA	330	5970	7.6	—	—	—	—
IW-3	NA	NA	NA	10	1770	NA	NA	300	NA	<0.1	4180	11.8	—	-11.6	-98.3	4.3
OB-1A	<0.52	52.9	<0.26	—	24430	11.0	—	4318	—	253	45641	6.9	—	—	—	58.6
OB-1B	<0.52	32.8	<0.26	—	21200	10.0	—	6903	—	320	44622	7.1	—	—	—	47.3
OB-1C	<0.52	22.3	<0.26	—	16346	8.5	—	8003	—	370	38891	7.1	—	—	—	40.1

ALAMO RIVER
SALTON SEA
IRRIGATION WATER
OBSIDIAN BUTTE SPRINGS

ORIGINAL FLUID ANALYSES

SAMPLE #	units	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
A-1	mg/lit	NA	0.007	0.76	201	0.014	0.045	15	0.23	120	0.035	607	0.12
SS-1	mg/lit	NA	<0.01	6.8	850	0.08	0.24	195	3.2	1200	0.08	10600	0.07
SS-2	mg/lit	<0.20	<2.50	10.3	958	<0.25	<0.10	200	3.23	1283	<1.0	11221	<2.50
SS-3	ppm	NA	NA	5.6	622	NA	0.1	134	NA	722	NA	5950	NA
IW-1	mg/l	NA	0.005	0.25	93	<0.005	0.03	6.3	0.08	35	0.01	168	0.09
IW-2	mg/l	NA	0.005	2.0	437	0.007	0.08	66	1.24	160	1.9	970	0.093
IW-3	ppm	NA	NA	0.4	1140	NA	0.1	42	NA	0.2	NA	826	NA
OB-1A	mg/l	<0.1	<1.29	16.8	1872	<0.13	NA	239	7.6	1710	10.7	12794	<1.29
OB-1B	mg/l	<0.1	<1.29	17.5	1085	<0.13	0.40	232	6.7	1508	7.7	13419	<1.29
OB-1C	mg/l	<0.1	<1.29	14.0	928	<0.13	1.8	184	3.9	1283	3.63	11880	<1.29

ALAMO RIVER
SALTON SEA
IRRIGATION WATER
OBSIDIAN BUTTE SPRINGS

NEAR SURFACE WATER SOURCE INFORMATION

SOURCE	DATE	SAMPLE #	FLOW RATE #/HR	TEMP °F	REMARKS
ALAMO RIVER	? 1978	A-1	—	—	UNKNOWN SAMPLE LOCATION
SALTON SEA	? 1978	SS-1	—	—	UNKNOWN SAMPLE LOCATION
SALTON SEA	830708	SS-2	—	81.9	NEAR OBSIDIAN BUTTE
SALTON SEA	870428	SS-3	—	—	NEAR UNIT-1 (POSSIBLE CONTAMINATION FROM IRRIGATION)
VAIL 4A CANAL	1978?	IW-1	—	—	UNKNOWN SAMPLE LOCATION
VAIL 4A DRAIN	1978?	IW-2	—	—	UNKNOWN SAMPLE LOCATION
CANAL WATER	870400	IW-3	—	—	UNKNOWN SAMPLE LOCATION - DRILLING WATER
OBSIDIAN BUTTE	830618	OB-1A	—	91.6	SPRINGS ON SOUTHERN SIDE IV 83-31
OBSIDIAN BUTTE	830618	OB-1B	—	91.0	" IV 83-32
OBSIDIAN BUTTE	830618	OB-1C	—	83.3	" IV 83-33

WELL

DATA SOURCES

WELL	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
ES-1	GHT LAB,											
ES-2	FIELD	LAB										
E9-1	ATS											
E9-2	ATS											
E9-3	ATS											
E9-4	ATS											
E9-5	Dellavalle Lab						SMCA			Rohrs, 1988		
E9-6	Dellavalle	Lab								Rohrs, 1988		
E9-7	S&T									Shen, 1987		
E12-1	GHT LAB									Holligan, 1983		
VH-1	S&T									Shen, 1987		

CELLAR SPRINGS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO4	NH_3	ΣCO_2	SiO_2	TDS	ISOTOPES	
													$\delta^{18}O$	δD
E5-1	<0.05	–	–	–	66978	–	–	229	–	331	31.4?	EST 111334	–	–
E5-2	–	–	–	–	–	–	–	–	–	–	–	63576	–	–
I9-1	–	–	–	–	58287	–	–	495	–	748	–	96508	–	–
I9-2	0.76	–	–	–	82107	–	–	1006	–	504	–	EST 140198	–	–
I9-3	1.26	–	–	–	141026	–	–	1850	–	299	–	194224	–	–
I9-4	11.7	–	–	–	206154	–	–	600	–	138	–	EST 335740	–	–
I9-5	–	–	–	260	59561	–	–	760	–	1140	32.9	82900	-2.73	-54.5
E9-6	–	–	–	330	47700	–	–	690	–	1250	56.9	82400	–	–
I9-7	<1.9	91	–	–	59906	–	–	–	–	695	–	102347	–	–
I12-1	0.05	–	–	–	39769	–	–	2075	–	1042	105	67627	–	–
V-1-1	<3.9	72.4	–	–	29633	–	–	–	–	975	–	60232	–	–

CELLAR SPRINGS

NEAR SURFACE WATERS
ADJUSTED TO PPM WT.

DENSITY CORRECT.	SAMPLE #	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1.072	I 5-1	–	–	37	3032	–	4.9?	555	15.0	507	–	39646	–
–	I-5-2	–	–	–	–	–	–	–	–	–	–	–	–
1.061	I9-1	–	–	52	3393	–	–	698	13.0	1282	–	31979	–
1.093	I9-2	–	–	54	3952	–	3.43	752	22.8	1473	–	50320	–
–	I9-3	–	–	72	8437	–	5.12	1553	38	3750	–	111406	–
–	I9-4	–	–	270	14550	–	1.78	4255	99.2	8410	–	101250	–
–	I9-5	–	–	27	2280	–	1.4	314	–	1640	–	23900	–
–	I9-6	–	–	28	2190	–	0.7	314	–	1620	–	24200	–
1.065	I-9-7	–	<0.01	35.7	2404	–	3.3	319	–	1728	–	33803	0.8
1.041	I-12-1	–	–	17.3	4025	–	47.1	298	8.07	2526	–	18540	–
1.036	V-1-1	–	<0.01	12.5	3378	–	3.4	279	–	2172	3.1	11776	0.9

ORIGINAL FLUID ANALYSES

SAMPLE #	Pb	Sr	Zn	Br	Cl	F	I	SO_4	NH_3	ΣCO_2	TDS	pH	sg. g/cc	ISOTOPES $\delta^{18}O$	ISOTOPES δD	SiO_2
I5-1	< 0.05	NA	NA	NA	71800	NA	NA	246	NA	355	EST-119350 NA	6.2	NA	NA	NA	33.7 ?
I5-2	—	—	—	—	—	—	—	—	—	—	63576	—	—	—	—	
I9-1	—	—	—	—	61842	—	—	525	—	794	102395	6.8	—	—	—	—
I9-2	0.83	—	—	—	89743	—	—	1100	—	551	EST 153236	6.7	—	—	—	—
I9-3	1.26	—	—	—	141026	—	—	1850	—	299	(FIELD) 194224	—	—	—	—	—
I9-4	11.7	—	—	—	206154	—	—	600	—	138	—	6.3	—	—	—	—
I9-5	—	—	—	260	59561	—	—	760	—	1140	82900	7.3	—	-2.73	-54.5	32.9
I9-6	—	—	—	330	47700	—	—	690	—	1250	82400	7.7	—	—	—	54.9
I9-7	< 2.0	97	—	—	63800	—	—	NA	—	740	109000	6.7	—	—	—	
I12-1	< 0.05	—	—	—	41400	—	—	2160	—	1085	70400	—	—	—	—	109.4
V1-1	< 4.0	75	—	—	30700	—	—	NA	—	1010	62400	6.6	—	—	—	

ORIGINAL FLUID ANALYSES

SAMPLE #	units	Ag	As	B	Ca	Cu	Fe	K	Li	Mg	Mn	Na	Ba
I5-1	mg/kg	NA	NA	40	3250	NA	5.25?	595	16.1	543	NA	42500	NA
I5-2	ppm	–	–	–	–	–	–	–	–	–	–	–	–
I9-1	mg/kg	–	–	55	3600	–	–	741	13.8	1360	–	33930	–
I9-2	mg/l	–	–	59	4319	–	3.75	822	26	1610	–	55000	–
I9-3	ppm	–	–	72	8437	–	5.12	1553	38	3750	–	111406	–
I9-4	ppm	–	–	270	14550	–	1.78	4255	99.2	8410	–	101250	–
I9-5	ppm	–	–	27	2280	–	1.4	314	–	1640	–	23900	–
I9-6	ppm	–	–	28	2190	–	0.7	314	–	1620	–	24200	–
I9-7	mg/l	–	<0.01	38	2560	–	3.5	340	–	1840	–	36000	0.9
I12-1	mg/l	–	–	18	4190	–	49	310	8.4	2630	–	19300	–
V1-1	mg/l	–	<0.01	13	3500	–	3.5	289	–	2250	3.2	12200	0.9

CELLAR SPRINGS

NEAR SURFACE WATER SOURCE INFORMATION

SOURCE	DATE	SAMPLE #	FLOW RATE	TEMP °F	REMARKS
IID-5 CELLAR	831019	I5-1	—	—	
NEAR IID-5 CELLAR	831103	I5-2	—	64.4	ACTUAL SITE WAS 84-1 CELLAR
IID-9 CELLAR	840301	I9-1	—	—	
IID-9 CELLAR	840803?	I9-2	—	—	
IID-9 CELLAR	840807	I9-3	—	—	
IID-9 CELLAR	840814	I9-4	—	—	
IID-9 CELLAR	870421	I9-5	72 gal/day	—	
IID-9 CELLAR	870428	I9-6	1 gal/day	—	
IID-9 CELLAR	870511	I9-7	—	—	
IID-12 CELLAR	831101	I12-1	0.5-1.0 gpm	122	
VSR-1 CELLAR	870511	V1-1	—	98	

WELL IID-9 DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFRENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
1	S+T		S&T		–		–		ARS 82-403M	WHEATLEY, 1982		
2	–		–		S&T		–		ARS 82-406M	WHEATLEY, 1982		
3	–		–		S&T		–		ARS 84-7M	BAUR, 1984		
4	S&T		S&T				–		REF: 83-101M	GALLUP, 1983		
5	UURI		UURI		TCM			SMC				
6	UURI		UURI		TCM			SMC				

WELL IID-9

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
1	–	–	–	–	
2	–	–	–	–	
3	–	–	–	–	
4	–	–	–	–	
5					
6					

WELL IFD-9 NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							PPM IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	PPM IN STM
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	0.92	—	0.00380	98.13	0.60	—	—	<0.01	0.21	1.04	9109	43.1	—	—	0	7.1	4.4	9164
3	0.70	—	0.00298	97.72	1.6	—	—	0.67	0.66	0.33	6923	87.8	—	—	30.2	17.0	1.1	7331
4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5	0.624	65.5	LAB 0.00541	90.7	0.836	8.18	0.009	0.036	0.168	0.0185	8580	61.2	299	0.075	3.36	5.79	0.03	8950
6	0.586	50.4	0.003535	90.0	0.780	8.66	0.001	0.173	0.339	0.077	7695	51.7	286	0.095	9.44	10.60	0.306	8055

WELL IID-9 SEPARATED BRINE ADJUSTED TO ppm WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
1	S	101/66	62	402	NA	68	126689	NA	<5.1	22	339	455	261824	
2	S	–	–	–	–	–	–	–	–	–	–	–	–	
3	S	–	–	–	–	–	–	–	–	–	–	–	–	
4	S	106/68	NA	NA	280	30	139358	0.8	<4.2	34	350	596	249835	
5	S	175/65	NA	373	256	91	131624	12.8	12.8	57	402	478	219010	
6	S	187/68.5	NA	385	266	96	136910	13.8	11.1	96.1	403	466	230770	

WELL IID-9 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	1.184	0.05	7.6	301	23986	NA	6.8	708	12838	177	80	785	59797
2	S	—	-	—	—	—	—	—	—	—	—	—	—	—
3	S	—	—	—	—	—	—	—	—	—	—	—	—	—
4	S	1.184	0.42	7.4	307	23902	NA	10.1	676	12331	162	NA	765	55152
5	S	1.1700	13.35?	12.5	293	20946	NA	3.1	551	11813	164	80	703	50735
6	S	1.176	<0.76	9.8	305	21915	NA	2.9	560	11979	167	104	717	56105

WELL IID-9

BRINE ANALYSES

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
1	119	78	73	476	NA	81	150000	NA	<6	26	401	539	310000	1.184
2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	126	81	NA	NA	331	35	165000	0.9	<5.0	40.3	414	706	249835	NA
5	205	76	NA	437	300	107	154000	15	15	67	470	559	256312	1.1700
6	220	80.5	NA	453	313	113	161006	16.2	13.0	113	474	548	271386	1.176

WELL ID-9 BRINE ANALYSES

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	mg/Liter	0.06	9	356	28400	NA	8.0	838	15200	209	95	929	70800
2	S	–	–	–	–	–	–	–	–	–	–	–	–	–
3	S	–	–	–	–	–	–	–	–	–	–	–	–	–
4	S	mg/liter	0.50	8.8	363	28300	NA	12	800	14600	192	NA	906	65300
5	S	mg/Liter	15.62?	14.61	343	24507	NA	3.6	645	13821	192	94	823	59594
6	S	mg/lit	<0.89	11.5	359	25772	NA	3.45	659	14087	196	122	843	65980

WELL IID-9

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	PH	
1	—	—	—	—	0.18	18	4.4	<0.5	1.6	327	22	—	
2	—	—	—	—	—	—	—	—	—	—	—	—	
3	—	—	—	—	—	—	—	—	—	—	—	—	
4	5.33	—	—	—	0.033	15	4	<2	3.10	322	2 -	6.80	
5	6.42	—	130459	219285	<0.49	16.75	15	<0.52	4.55	360	930	6.45	
6	5.95	—	133288	230066	0.44	14.2	3.8	1.1	1.0	312	904	6.35	

WELL IID-9

FLOW TEST FIELD DATA

SAMPLE #	DATE YYmmDD	TIME	STATUS DAYS	TYPE	WELL HEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
1	820715	–	P-12	S	412	450	403	450	403	–	33427	440461	473888	7.1	391
2	820820	–	P-49	S	405	449	369	455	369	448	42000	462000	504000	8.3	394
3	830913	–	P-67	S	396	456	342	448	342	443	47000	499000	546000	8.6	391
4	830916	–	P-70	S	402	457	343	448	343	443	46000	500000	546000	8.4	396
5	890113	1030	P-	S	370	450	365	450	365	445	72000	951000	1023000	7.04	400
6	890317	1000	P -	S	315	425	~275	~423	~275	~415	101000	935000	1036000	9.75	396

WELL IID-9 WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2000'	3000'	4000'	5000'	6000'	7000'	
1	1834	5626	5626															
2	1834	5626	5626															
3	1834	5626	4484															
4	1834	5626	4484									538						12/1/83
5	1834	5626	4484															
6	1834	5626	4484															

WELL ID-9

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
1	—	—	338	—	—	—	—	—	—	
2	756	3.6	—	—	0	0.59	0.37	—	—	
3	595	7.6	—	—	2.60	1.46	0.09	—	—	
4	—	—	347	—	—	—	—	—	—	
5	604	4.3	394	—	0.024	0.41	0.006			
6	750	5.0	392	0.009	0.92	1.03	0.030			

WELL IID-9 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO_2	TDS	
1	61	57	373	NA	64	117694	NA	<4.7	20.4	315	423	243235	
2	—	—	—	—	—	—	—	—	—	—	—	—	
3	—	—	—	—				—	—	—	—	—	
4	63	NA	NA	256	27.1	127652	0.7	<3.9	31.1	320	546	228849	
5	60	NA	347	238	85	122357	11.9	11.9	53	373	444	203648	
6	61.8	NA	348	240	87	123561	12.4	10.0	86.7	364	421	208270	

WELL IID-9 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1	0.05	7.1	279	22283	NA	6.3	658	11926	164	75	729	55552	93
2	–	–	–	–	–	–	–	–	–	–	–	–	–
3	–	–	–	–	–	–	–	–	–	–	–	–	–
4	0.39	6.8	281	21894	NA	9.3	619	11295	149	NA	701	50519	97
5	12.41?	11.6	273	19472	NA	2.9	512	10981	153	75	654	47349	163
6	<0.68	8.8	276	19778	NA	2.6	506	10811	150	93.6	647	50635	169

WELL IID-9 SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
820715	1	412	403	473888	7.1	391	—	—	261824	1834	5626	
820820	2	415	369	564000	8.3	394	0.92	0.076	—	1834	5626	
830913	3	396	342	546000	8.6	391	0.70	0.060	—	1834	4484	
830916	4	402	343	546000	8.4	396	—	—	249835 S	1834	4484	
840113	5	370	365	1023000	7.04	400	0.624	0.0439	219070 S	1834	4484	
840317	6	315	275	1036000	9.75	396	0.586	0.0571	230770 S	1834	4484	

WELL IID-12 SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
830325	1	464	410	562800	6.9	400	ASSUMED 0.6	0.041	238000 S	1624'	4512	
831130	2A	376	323	591000	9.2	403	0.75	0.069	240000 S	1624'	4512	
831100	2B	—	—	—	—	412.1	—	0.068	216000 FC	1624'	4512	
860929	3A	376	360	1034495	11.3	431	—	—	229072	1624'	4334	
860929	3B	376	360	1034495	11.3	431	—	—	235000 S	1624'	4334	
861013	4	392	368	932980	7.6	403	0.89	0.068	225916	1624'	4334	
861014	5	385	358	1002320	7.8	403	0.76	0.059	225079	1624'	4334	
861015	6	383	360	944100	~~7.8~~	403	2.80	0.062	—	1624'	4334	
861016	7	376	363	1005198	7.7	405	0.81	0.062	220564	1624'	4334	
861020	8	391	373	926080	7.4	403	0.82	0.061	224353	1624'	4334	
861027	9	376	349	1010020	8.1	406	0.86	0.070	225191	1624'	4334	
861103	10	350	310	1094400	8.6	400	0.84	0.072	223521	1624'	4334	
861110	11	322	225	1251900	11.2	400	0.64	0.072	224480	1624'	4334	
861118	12	281	137	1348857	13.3	387	—	—	238914	1624'	4334'	
870618	13	377	345	961900	9.0	411	0.81	0.073	223045	1624'	4216	
880422	14	420	405	603000	7.6	413	0.93	0.071	218785	1624'	4216	
880805	15	343	310	1011000	9.7	410	0.67	0.065	222148	1624'	4216'	
881109	16	325	258	1016000	11.1	409	0.64	0.071	225056	1624'	4094'	

WELL IID-12 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1	<0.31	5.0	291	22636	NA	6.6	637	11240	165	61.3	731	54233	86
2A	<0.08	6.1	278	22700	NA	10.0	604	11350	140	NA	673	50538	127
2B	<2.5	9.4	282	18100	NA	2.89	645	12400	175	55.5	615	42800	87
3A	<0.63	<7.9	262	19684	NA	2.3	535	10837	139	53.0	680	46269	172
3B	0.60	8.1	257	20339	9.8	3.1	556	10508	152	47.9	670	48018	108
4	<0.66	10.2	277	20738	NA	3.2	567	11375	146	61.1	706	48883	173
5	<0.66	10.7	275	20569	NA	3.1	572	11198	145	62.4	702	48349	171
6	—	—	—	—	—	—	—	—	—	—	—	—	—
7	<0.66	9.8	273	20350	NA	3.0	567	11152	144	63.3	694	47709	171
8	<0.66	13.9	276	20981	NA	2.8	574	11155	146	58.2	709	48311	174
9	<0.66	10.3	275	20568	NA	3.0	561	11343	147	70.6	705	48708	172
10	<0.66	13.6	274	20531	NA	2.6	553	10951	144	72.0	701	47763	171
11	<0.66	10.7	274	20430	NA	3.0	549	11173	145	77.3	689	48007	171
12	<0.66	10.5	276	20937	NA	2.7	565	11380	148	78.4	703	48986	173
13	0.66	8.8	303	20625	NA	3.0	557	11019	145	55.0	662	48557	169
14	<0.66	8.9	288	20589	NA	1.9	524	10812	152	55.5	675	47501	166
15	<1.0	12.2	281	19154	NA	2.8	528	11243	154	56.1	703	46775	167
16	<0.8	<8.3	267	19647	NA	2.8	499	11233	152	69.8	672	47787	171

WELL IID-12 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
1	61	50	369	267	73.1	135190	NA	ND	39.3	322	204	224578	
2A	61	NA	NA	253	78.2	126938	<21	3.5	29.0	323	502	217920	
2B	64	NA	362	262	70.6	126500	9.2	<0.5	10.1	398	NA	216000	
3A	44	NA	334	248	89.9	123379	6.1	11.4	40.8	286	113	203187	
3B	49	63.9	360	252	84.2	114423	NA	NA	<4.5	302	446	208445	
4	61	NA	351	264	97.1	124308	12.0	6.8	44.8	298	455	208746	
5	62	NA	346	259	82.9	123901	12.9	12.9	37.1	390	450	207523	
6	—	—	—	—	—	—	—	—	—	—	—	—	
7	61	NA	342	255	83.7	120740	11.2	10.6	46.6	543	432	203581	
8	61	NA	359	263	83.7	123784	12.9	9.0	49.8	364	417	207751	
9	62	NA	351	258	93.9	122848	12.8	7.3	42.8	339	476	206951	
10	60	NA	350	257	90.5	121636	12.4	8.4	37.6	310	459	204298	
11	61	NA	348	255	93.7	120751	13.4	1.50	43.9	314	449	203778	
12	62	NA	353	262	104	122244	13.2	9.2	39.6	448	412	207138	
13	58	NA	341	245	12.7	119667	14.0	1.20	40.6	105	430	202971	
14	60	NA	342	244	46.9	119969	9.5	10.3	72.3	323	334	202157	
15	60	NA	222	248	88.4	120142	11.6	4.8	12.4	335	377	200600	
16	62	NA	344	255	89.5	117958	14.0	2.9	3.7	414	427	200075	

WELL IID-12

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
1	429	2.17	345	–	1.48	1.18	0.052	--	—	
2A	695	—	320	–	–	–	–	–	—	
2B	723	1.27	398	–	2.02	1.68	0.117	–	–	
3A	–	–	–	–	–	–	–	–	–	
3B	–	–	–	–	–	–	–	–	–	
4	686	5.76	323	0.031	8.00	0.56	0.010	+1.05	-75.9	
5	644	5.62	415	0.005	1.64	0.38	0.005	+1.00	-75.4	
6	697	6.37	—	0.005	0.28	0.44	0.009	—	–	
7	634	5.66	570	0.002	0.048	0.094	<0.002	+0.99	-73.1	
8	721	5.42	390	0.016	0.360	0.668	0.014	+1.04	-76.0	
9	754	5.38	366	0.022	3.09	1.12	0.024	+0.98	-76.9	
10	802	5.50	338	0.014	0.632	1.05	0.013	+0.98	-80.6	
11	886	5.87	347	0.050	2.49	1.78	0.020	+0.91	-73.4	
12	446	2.31	486	0.130	7.64	2.05	0.027	+1.13	-78.2	
13	809	5.78	135	0.013	1.13	2.28	0.035	+0.98	-73.8	
14	866	5.81	349	0.021	1.38	1.90	0.018	+0.50	-71.7	
15	838	5.55	364	0.019	1.45	1.80	0.028	—		
16	907	5.11	444	0.020	1.79	2.03	0.045			

WELL IID-12 WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2000'	2500'	3000'	3500'	4000'	4500'	
1	1624'	4682'	4517'									535	539	541	542	543	541	1/25/83
2A	1624'	4682'	4512'															
2B	1624'	4682'	4512'															
3A	1624'	4682'	4334'															
3B	1624'	4682'	4334'															
4	1624'	4682'	4334'															
5	1624'	4682'	4334'															
6	1624'	4682'	4334'															
7	1624'	4682'	4334'															
8	1624'	4682'	4334'															
9	1624'	4682'	4334'															
10	1624'	4682'	4334'															
11	1624'	4682'	4334'															
12	1624'	4682'	4334'															
13	1624'	4682'	4216'	2000-2030	62	2850-2890	23	4200-4216	15									6/10/87
14	1624'	4682'	4216'															
15	1624'	4682'	4216'															
16	1624'	4682'	4094'															

WELL IID-12 FLOW TEST FIELD DATA

SAMPLE #	DATE YYMMDD	TIME	STATUS DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
1	830325	—	P-14	S	464	—	410	463	410	448	38 800	524000	562800	6.9	400
2A	831130	—	P-26	S	396?	455?	323	433	323	436	54400	536600	591000	9.2	403
2B	831100	—	P	FC	396?	455?	—	—	—	—	—	—	—	—	412.1
3A	860929	—	P-7	S	376	455	360	424	-	—	116856	917639	1034495	11.3	431
3B	860929	—	P-7	S	376	455	360	424	-	—	116856	917639	1034495	11.3	431
4	861013	—	P-14	S	392	463	368	455	—	—	71000	861980	932980	7.6	403
5	861014	—	P-1	S	385	460	358	455	—	—	78300	924020	1002320	7.8	403
6	861015	—	P-2	S	383	461	360	431	—	—	77639	916461	944100	7.8	403
7	861016	—	P-3	S	376	460	363	452	—	—	77702	927498	1005198	7.7	405
8	861020	—	P-7	S	391	465	373	456	—	—	68800	857280	926080	7.4	403
9	861027	—	P-7	S	376	457	349	451	—	—	81300	928720	1010020	8.1	406
10	861103	—	P-7	S	350	450	310	437	—	—	98000	996400	1094400	8.6	400
11	861110	—	P-7	S	322	439	225	414	—	—	139900	1112000	1251900	11.2	400
12	861118	—	P-0.5	S	281	419	137	—	—	—	179267	1169581	1348857	13.3	387
13	870618	—	P-2	S	377	455	345	430	—	—	86900	875000	961900	9.0	411
14	880422	0900	P-2	S	420	468	405	465	405	435	46000	557000	603000	7.6	413
15	880805	0930	P-110	S	343	452	310	—	310	425	98000	913000	1011000	9.7	410
16	881109	1030	P-	S	325	435	258	415	258	406	113000	903000	1016000	11.1	409

WELL IID-12

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	pH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH	
1	5.9	NA	NA	NA	0.03	18	6.4	<0.5	1.9	340	67	5.7	
2A	5.6	NA	NA	NA	<0.5	16	13.4	<5	4.6	320	42.6	6.8	
2B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
3A	5.66	NA	NA	NA	–	–	–	–	–	–	–	–	
3B	5.66	NA	NA	NA	–	–	–	–	–	–	–	–	
4	NA	NA	NA	NA	<0.52	11.9	2.29	<0.45	2.09	344	928	7.0	
5	NA	NA	NA	NA	<0.52	11.8	1.32	<0.45	2.52	345	918	8.0	
6	NA	NA	NA	NA	–	–	–	–	–	–	–	–	
7	NA	NA	NA	NA	<0.52	12.1	16.0	<0.45	2.52	372	947	7.5	
8	NA	NA	NA	NA	<0.52	11.9	3.0	<0.45	1.53	382	966	6.9	
9	NA	NA	NA	NA	<0.52	11.6	3.7	<0.45	1.93	331	902	6.7	
10	NA	NA	NA	NA	<0.52	9.9	2.4	<0.45	2.50	322	871	6.7	
11	NA	NA	NA	NA	<0.52	9.3	4.7	<0.45	4.70	295	810	6.5	
12	NA	NA	NA	NA	<0.52	30.8	14150	41.8	59.1	355	24684	5.0	
13	4.94	NA	131475	227819	<0.49	8.4	8.0	6.1	2.9	337	920	6.6	
14	NA	NA	132269	237881	<0.41	18.2	<1.0	2.0	3.2	333	941	7.0	
15	5.78	NA	136203	229819	<0.49	14.4	3.0	<0.52	4.55	380	992	6.8	
16	5.85	–	131850	227777	<0.49	12.9	19.7	<1.8	6.88	319	841	6.7	

WELL IID-12 BRINE ANALYSES

SAMPLE #	TYPE	CONCRN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	mg/lit	<0.4	6.3	370	28800	NA	8.4	810	14300	210	78	930	69000
2A	S	mg/lit	<0.1	8	363	29600	NA	13	788	14800	182	NA	878	65900
2B	FC	(see	analyses	adjusted to	reservoir	conditions								
3A	S	mg/lit	<0.83	<10.41	346.5	25987	NA	3.0	706	14307	184	70	898	61084
3B	S	ppm wt	0.67	9.1	290	22930	11.0	3.5	627	11847	171	54	753	54135
4	S	mg/lit	<0.83	12.88	350	26192	NA	4.0	716	14367	185	77.2	892	61738
5	S	mg/lit	<0.83	13.6	348	26035	NA	3.98	724	14173	183	79.0	889	61197
6	S	mg/lit	-	-	—	—	—	—	—	—	—	—	—	—
7	S	mg/lit	<0.83	12.3	344	25642	NA	3.82	715	14052	181.5	79.7	875	60115
8	S	mg/lit	<0.83	17.5	348	26442	NA	3.5	724	14058	183.4	73.4	894	60885
9	S	mg/lit	<0.83	13.1	349	26119	NA	3.83	712	14404	186.8	89.7	895	61852
10	S	mg/lit	<0.83	17.4	349	26191	NA	3.34	706	13970	184	91.9	894	60937
11	S	mg/lit	<0.83	14.1	361	26964	NA	3.92	724	14746	191	102	909	63361
12	S	mg/lit	<0.83	14.3	377	28568	NA	3.71	771	15528	202	107	959	66840
13	S	mg/lit	0.84	11.25	388	26405	NA	3.86	713	14107	185	70.4	847	62164
14	S	mg/lit	<0.83	11.17	363	25915	NA	2.36	660	13609	191	69.8	849	59788
15	S	mg/lit	<1.25	15.78	362	24712	NA	3.60	681	14505	199	72.4	907	60347
16	S	mg/lit	<1.04	<11.0	352	25917	NA	3.75	658	14818	201	92.1	887	63037

WELL IID-12

BRINE ANALYSES

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
1	110	77	64	470	340	93	172000	NA	ND	50	410	260	238000	1.1845
2A	166	80	NA	NA	330	102	139800(ppm)	<27.0	4.5	37.8	421	553(ppm)	240,000(ppm)	NA
2B	See analyses adjusted to reservoir conditions													
3A	227	58	NA	441	328	118.7	162882	8.02	15.1	53.9	377	149	268244	NA
3B	122	55	72	406	284	95	129000	NA	NA	<5.0	340	503	235000	NA
4	219	77	NA	443	333	122.6	157000	15.1	8.64	56.6	376.7	575	263644	NA
5	217	78.5	NA	438	328	104.9	156825	16.3	16.3	47.0	493.1	569	262667	
6	-	-	-	-	-	-	-	-	-	-	-	-	-	NA
7	215	76.7	NA	431	321	105.5	152135	14.1	13.4	58.7	684	545	256516	NA
8	219	76.7	NA	452	332	105.5	156000	16.2	11.4	62.7	459	525	261820	NA
9	219	79.1	NA	446	328	119.3	156000	16.2	9.3	54.4	430	604	262798	NA
10	218	76.6	NA	447	328	115.5	155173	15.8	10.7	48.0	396	585	260625	NA
11	226	80.5	NA	459	337	123.7	159370	17.7	1.94	58.0	415	592	268950	NA
12	236	84.7	NA	482	358	141.4	166799	18.0	12.5	54.0	611.5	562	282635	NA
13	216	74.6	NA	436	313.1	16.2	153200	17.9	1.50	52.0	135	550	259848	NA
14	209	75.4	NA	430	307	59.0	151000	12.0	13.0	91.0	406	421	254447	NA
15	216	77.8	NA	287	320	114.0	155000	15.0	6.20	16.0	432	486	258803	NA
16	225	81.5	NA	454	337	118.0	155601	18.5	3.8	4.9	546	563	263923	1.1727

WELL IRD-12 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	1.1845	<0.34	5.3	312	24314	NA	7.1	684	12073	177	66	785	58252
2A	S	1.184	<0.09	6.8	307	25000	NA	11.0	666	12500	154	NA	742	55659
2B	FC	see	analyses	adjusted	to	reservoir	conditions							
3A	S	1.171	<0.71	<8.9	296	22192	NA	2.6	603	12218	157	59.8	767	52164
3B	S	—	0.67	9.1	290	22930	11.0	3.5	627	11847	171	54	753	54135
4	S	1.167	<0.71	11.0	300	22444	NA	3.4	614	12311	159	66	764	52903
5	S	1.167	<0.71	11.7	298	22309	NA	3.4	620	12145	157	68	762	52440
6	S	—	—	—	—	—	—	—	—	—	—	—	—	—
7	S	1.163	<0.71	10.6	296	22048	NA	3.3	615	12083	156	69	752	51690
8	S	1.167	<0.71	15.0	298	22658	NA	3.0	620	12046	157	63	766	52172
9	S	1.167	<0.71	11.2	299	22381	NA	3.3	610	12343	160	77	767	53001
10	S	1.166	<0.71	14.9	299	22462	NA	2.9	605	11981	158	79	767	52257
11	S	1.172	<0.71	12.0	308	23007	NA	3.3	618	12582	163	87	776	54062
12	S	1.183	<0.71	12.1	319	24149	NA	3.1	652	13126	171	90	811	56500
13	S	1.165	0.72	9.7	333	22665	NA	3.3	612	12109	159	60	727	53360
14	S	1.163	<0.71	9.6	312	22283	NA	2.0	567	11702	164	60	730	51408
15	S	1.165	<1.1	13.5	311	21212	NA	3.1	585	12451	171	62	779	51800
16	S	1.1727	<0.89	<9.4	300	22100	NA	3.2	561	12636	171	79	756	53754

WELL IID-12 SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	
1	S	929/65	54	397	287	78.5	145209	NA	ND	42.2	346	220	238000	
2A	S	140/67.6	NA	NA	279	86.1	139800	<22.8	3.8	31.9	356	553	240000	
2B	FC	see analyses		adjusted to reservoir			conditions							
3A	S	194/50	NA	377	280	101	139096	6.85	12.9	46.0	322	127	229072	
3B	S	122/55	72	406	284	95	129000	NA	NA	<5.0	340	503	235000	
4	S	188/66	NA	380	285	105	134533	12.9	7.4	48.5	323	493	225916	
5	S	186/67	NA	375	281	90	134383	14.0	14.0	40.3	423	488	225079	
6	S	-	-	-	-	-	-	-	-	-	-	-	-	
7	S	185/66	NA	371	276	91	130813	12.1	11.5	50.5	588	469	220564	
8	S	188/66	NA	387	284	90	133676	13.9	9.8	53.7	393	450	224353	
9	S	188/68	NA	382	281	102	133676	13.9	8.0	46.6	368	518	225191	
10	S	187/66	NA	383	281	99	133081	13.6	9.2	41.1	340	502	223521	
11	S	193/69	NA	392	288	106	135981	15.1	1.7	49.5	354	505	229480	
12	S	199/72	NA	407	303	120	140997	15.2	10.6	45.6	517	475	238914	
13	S	185/64	NA	374	269	13.9	131502	15.4	1.3	44.6	116	472	223045	
14	S	178/65	NA	370	264	50.7	129837	10.3	11.2	78.2	349	362	218785	
15	S	185/67	NA	246	275	97.9	133047	12.9	5.3	13.7	371	417	222148	
16	S	192/69	NA	387	287	101	132686	15.8	3.2	4.2	466	480	225056	

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WELL IID-12 NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
1	ASSUME 0.6	NA	0.0026	97.8	0.64	–	–	0.53	0.74	0.26	6212	31.5	–	–	21.4	17.1	0.76	6341
2A	0.75	NA	0.0031	–	–	–	–	–	–	–	7557	–	–	–	–	–	–	7557
2B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3A	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	0.89	77	0.0042	88.90	0.97	8.32	0.00	1.65	0.20	0.029	9021	75.80	326	0.403	105.0	7.39	0.135	9541
5	0.76	73	0.0038	89.40	1.01	9.03	0.02	0.34	0.14	0.016	8253	72.10	323	1.34	21.0	4.88	0.068	8675
6	0.80	72	0.0041	89.45	1.05	9.23	0.00	0.06	0.16	0.02	8939	81.73	357	0.07	3.6	5.70	0.11	9392
7	0.81	75	0.0038	89.18	1.03	9.69	0.00	0.03	0.04	<0.01	8240	73.53	346	0.03	0.62	1.22	<0.03	8661
8	0.82	80	0.0045	90.40	0.88	8.36	0.00	0.07	0.23	0.039	9742	73.30	349	0.22	4.87	9.03	0.19	10182
9	0.86	71	0.0043	89.70	0.83	8.42	0.00	0.59	0.36	0.063	9307	66.40	338	0.27	38.09	13.82	0.30	9771
10	0.84	75	0.0043	90.60	0.80	8.06	0.00	0.11	0.33	0.033	9331	64.00	321	0.16	7.35	12.19	0.156	9732
11	0.64	55	0.0036	89.60	0.77	8.75	0.01	0.40	0.48	0.043	7908	52.40	298	0.45	22.27	15.85	0.18	8295
12	–	–	0.0018	70.00	0.30	24.80	0.04	3.17	1.42	0.158	3353	17.40	287	0.98	57.46	15.38	0.205	3737
13	0.81	52	0.0042	89.4	0.824	8.78	0.00	0.195	0.691	0.085	8990	64.2	342	0.14	12.5	25.3	0.392	9438
14	0.93	–	0.0051	91.4	0.794	7.02	0.00	0.228	0.552	0.042	11400	76.4	338	0.278	18.1	25.0	0.237	11810
15	0.67	–	0.00395	90.3	0.773	8.04	0.00	0.245	0.534	0.065	8640	57.2	297	0.197	14.9	18.6	0.287	9025
16	0.64	55	0.00372	90.7	0.66	7.76	0.00	0.280	0.559	0.098	8170	46.0	271	0.184	16.1	18.3	0.405	8522

WELL RRD-12 ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
1	–	–	–	–	
2A	–	–	–	–	
2B	–	–	–	–	
3A	–	–	–	–	
3B	–	–	–	–	
4	+1.20	-0.74	-76.8	-64.8	
5	+1.15	-0.78	-76.3	-64.4	
6	–	–	–	–	
7	+1.13	-0.73	-73.8	-64.2	
8	+1.18	-0.74	-76.9	-64.2	
9	+1.14	-0.80	-78.1	-63.8	
10	+1.15	-0.84	-82.2	-63.7	
11	+1.15	-0.96	-74.5	-64.3	
12	+1.44	-0.92	-79.4	-70.3	
13	+1.15	-0.77	-74.8	-63.5	
14	+0.61	-0.80	-72.3	-64.0	
15					
16					

WELL IID-12

DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFRENCE #1	AUTHOR	REFERENCE #2	AUTHOR
1	LAB	#	LAB	#	LAB	#						
1	S&T		S&T		S&T		—	—	ARS 83-256M	LARSON, 1983		
2A	S&T		S&T		S&T		—	—	REF: 84-01M	Gallup, 1984		
2B	EPRI	—	—	—	—	—	—	—	RP 741-1	CAREY ETAL, 1984		
3A	UURI		—	—	—	—	—	—				
3B	S&T		—	—	—	—	—	—	REF: 86-195M	GALLUP, 1986		
4	UURI		UURI		TCM		SMU					
5	UURI		UURI		TCM		SMU					
6	—		—		TCM		SMU					
7	UURI		UURI		TCM		SMU					
8	UURI		UURI		TCM		SMU					
9	UURI		UURI		TCM		SMU					
10	UURI		UURI		TCM		SMU					
11	UURI		UURI		TCM		SMU					
12	UURI		UURI		TCM		SMU					
13	UURI		UURI		TCM		SMU					
14	UURI		UURI		TCM		SMU					
15	UURI		UURI		TCM		SMU					
16												

. WELL VONDERAHE-1

DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
1	UURI		UURI		TCM		SMU					
2	UURI		UURI		TCM		SMU					
3	UURI		UURI		TCM		SMU					
4	UURI		UURI		TCM		SMU					
5	UURI		UURI		TCM		SMU					
6	UURI		UURI		TCM		SMU					
7	S&T		S&T		S&T		—		PMR 89-59m	GALLUP, 1989		
8	UURI		UURI		TCM		SMU					

WELL VONDERAHE -1

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
1	+1.99	+0.32	-77.7	-64.9	
2	+2.06	+0.16	-80.1	-64.2	
3	+1.98	+0.13	-75.7	-65.0	
4	+1.85	+0.10	-77.1	-63.4	
5					
6					
7					
8					

WELL VONDERAHE-1 NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							PPm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
1	2.10	134	0.00958	93.6	0.72	4.86	0.00	0.20	0.56	0.067	21405	126	421	0.24	30.4	48.3	0.73	22049
2	1.60	106	0.00731	91.7	0.74	6.95	0.00	0.13	0.39	0.048	16101	99	468	0.12	15.5	19.0	0.41	16711
3	2.20	138	0.01126	93.8	0.67	4.62	0.00	0.20	0.60	0.081	25158	138	476	0.24	32.5	57.5	0.98	25850
4	2.40	143	0.0111	94.0	0.68	4.72	0.00	0.14	0.45	0.048	24779	138	482	0.17	23.3	43.9	0.60	25504
5	2.25	139	0.0109	93.4	0.586	4.98	0.00	0.21	0.748	0.109	24200	118	500	0.186	35.1	70.7	1.29	24969
6	1.6438	116	0.00795	92.1	0.754	6.22	0.00	0.196	0.660	0.048	17600	111	458	0.11	23.7	45.8	0.357	18200
7	1.49	89		93.36	0.33	–	–	0.16	1.12	4.87								
8	1.46	107	0.00776	92.3	0.777	6.36	0.00	0.17	0.643	0.051	17146	112	458	0.065	20.5	43.6	0.438	17746

WELL VONDERAHE-1 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	1.187	2.33	12.6	402	25144	NA	3.02	951	14040	174	35.9	946	53605
2	S	1.193	0.85	12.7	412	25965	NA	3.26	1008	14438	180	37.7	961	55591
3	S	1.187	0.78	12.1	404	25193	NA	3.17	997	14146	176	33.8	944	54040
4	S	1.187	0.74	12.2	404	25204	NA	2.63	987	14077	175	33.0	943	54228
5	S	1.187	<0.87	14.1	335	26027	NA	<1.09	944	14665	190	30.8	939	56037
6	S	1.190	<0.87	13.0	427	25160	NA	3.33	903	14361	246	34.9	910	54944
7	S	1.202	0.22	16.6	330	25800	11.1	3.11	872	13100	170	32	865	51600
8	S													

WELL VONDERAHE-1 BRINE ANALYSES

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
1	272	98	NA	525	404	117	173441	13.4	10.1	17.5	435	596	288914	NA
2	278	100	NA	527	414	123	179464	14.2	13.0	18.0	421	632	299388	NA
3	284	97	NA	526	404	120	173000	13.5	13.2	19.0	426	567	288995	NA
4	271	97	NA	527	398	121	172100	12.8	11.0	14.0	433	554	288456	NA
5	272	99.3	NA	537	414.6	119	171000	20.3	4.0	52.5	500	565	291586	NA
6	265	97.4	NA	542	386	129	175700	25.3	15.0	60	375	665	293694	1.19
7	see analyses adjusted for flash													
8														

WELL VONDERAHE-1 BRINE ANALYSES

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
1	272	98	NA	525	404	117	173441	13.4	10.1	17.5	435	596	288914	NA
2	278	100	NA	527	414	123	179464	14.2	13.0	18.0	421	632	299388	NA
3	284	97	NA	526	404	120	173000	13.5	13.2	19.0	426	567	288995	NA
4	271	97	NA	527	398	121	172100	12.8	11.0	14.0	433	554	288456	NA
5	272	99.3	NA	537	414.6	119	171000	20.3	4.0	52.5	500	565	291586	NA
6	265	97.4	NA	542	386	129	175700	25.3	15.0	60	375	665	293694	1.19
7	see	analyses adjusted			for	blank								
8														

WELL VONDERAHE-1

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH	
1	5.68	NA	143400	244000	<0.42	15.7	4.0	<0.5	1.0	–	1329	6.8	
2	5.79	NA	147000	267000	<0.42	14.9	15.0	<0.5	12.0	–	1303	6.7	
3	5.60	NA	142500	245000	<0.42	16.5	3.0	0.6	1.9	–	1346	6.7	
4	5.20	NA	138000	237000	0.43	15.7	5.0	0.5	1.4	–	1351	6.5	
5	NA	NA	142864	244553	<0.49	19.9	15.0	0.81	2.72	600	15075	6.71	
6	5.85	–	145289	248641	0.42	22.1	4.0	<0.44	5.01	390	1216	6.75	
7	5.9	NA	–	–	0.6	0.02	10.0	0.3	0.2	390	19	6.6	
8	5.7	NA	145749	253520									

WELL VONDERAHE-1 FLOW TEST FIELD DATA

SAMPLE #	DATE YYMMDD	TIME	STATUS DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
1	870224	–	P-13	S	493	485	475	–	475	–	103000	1271000	1374000	7.5	413
2	870305	–	P-22	S	498	485	430	–	430	–	192306	1785446	1977752	9.7	414
3	870316	–	P-33	S	501	489	504	–	504	–	73279	921500	994779	7.4	418
4	870325	–	P-42	S	519	491	512	–	512	–	69800	816000	885800	7.9	422
5	880917	0900	P-35	S	516	488	500	487	500	480	81000	1106000	1187000	6.8	411
6	890224	1130	P	S	521	474	451	–	451	451	185500	1881000	2066500	8.98	420
7*	890426		P-2	S	485	478	470/410	451/440	470/410	451/440	197500	2332000	2529500	7.81	?
8	890609	1103	P	S	420	--	420/410	-- / --	420/410	442/441	210000	1972000	2182000	9.62	

* ... IN CHRONOLOGICAL SEQUENCE - CONFUSION WHETHER THESE DATA ARE FOR VON-1 OR SNL-10

WELL VONDERAHE-1 WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2000'	2500'	3000'	3500'	4000'	4500'	
1	2033'	5524'	4560?	2240	15	2650	7	3245	44	3925	34							2/86
2	2033'	5524'	4838	2230	22	3240	55	MATRIX	23									3/87
3	2033'	5524'	4838															
4	2033'	5524'	4838									534	560	563	565	566	563	4/8/87
5	2033'	5524'	4750															
6	2033	5524	4750															
7	2033	5524	4750															
8	2033	5524	4750															

WELL Umbrella-1

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
1	1605	9.45	371	0.018	2.28	3.62	0.055	+1.86	-76.7	
2	1562	9.60	364	0.012	1.50	1.84	0.040	+1.88	-78.6	
3	1862	10.2	367	0.018	2.41	4.26	0.073	+1.84	-74.9	
4	1958	10.9	374	0.013	1.84	3.47	0.047	+1.71	-76.0	
5	1646	8.02	426	0.013	2.39	4.81	0.088			
6	1580	9.97	328	0.010	2.13	4.11	0.032			
7	1340	7.8	320	-	-	-	-			
8										

WELL Vandenbe-1 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
1	76	NA	409	315	91.2	135158	10.4	7.9	13.6	339	464	225144	
2	76	NA	399	313	93.1	135839	10.7	9.8	13.6	319	478	226611	
3	76	NA	410	315	93.6	134960	10.5	10.3	14.8	332	442	225450	
4	75	NA	409	309	93.9	133533	9.9	8.5	10.9	336	430	223815	
5	77.8	NA	421	325	93.3	134039	15.9	3.1	41.2	392	443	228560	
6	74.5	NA	415	295	98.7	134388	19.4	11.5	45.9	287	509	224639	
7	71	68	400	300	NA	136300	0.9	NA	12.0	320	540	226200	
8													

WELL Honeybrake-1 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1	2.15	11.7	372	23258	NA	2.80	880	12987	161	33.2	875	49585	212
2	0.76	11.5	372	23446	NA	2.94	911	12956	163	34.1	868	50199	210
3	0.72	11.2	374	23329	NA	2.93	923	13099	163	31.3	875	50041	222
4	0.68	11.3	372	23213	NA	2.42	909	12965	161	30.4	868	49944	210
5	<0.31	13.2	312	24257	NA	<1.02	879	13668	177	28.7	875	52274	213
6	<0.80	11.9	389	22900	NA	3.03	821	13072	224	31.7	828	50010	202
7	0.20	15.3	280	23800	10.3	2.9	807	12100	160	30	800	47600	160
8													

WELL VONDERAHE -1 SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MRAS WT % NCG		TDS ppm wt.	PROD CSG SIZE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
870224	1	493	475	1374000	7.5	413	2.10	0.158	243318	2033	4560 ?	
870305	2	498	430	1977752	9.7	414	1.60	0.155	250454	2033	4838	
870316	3	501	504 ?	994779	7.4	418	2.20	0.163	243467	2033	4838	
870325	4	519	512	885800	7.9	422	2.40	0.190	243013	2033	4838	
880917	5	516	500	1187000	6.8	411	2.25	0.153	245236	2033	4750	
890224	6	521	451	2062500	8.98	420	1.6458	0.148	246802	2033	4750	
* 890216	7	485	470/410	2529500	7.81	?	1.49	0.116	245300	2033	4750	
890609	8	420	420/410	2181000	9.62		1.46	0.141		2033	4750	

* DIT OF [illegible] SEQUENCE - CONFUSION OVER WHETHER DATA ARE FOR VON-1 OR VON-1A

WELL VONDERAHE-1 BRINE ANALYSES

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	mg/lit	2.76	15.0	477	29846	NA	3.59	1129	16665	207	42.6	1123	63629
2	S	mg/lit	1.01	15.2	492	30976	NA	3.89	1203	17117	215	45.0	1147	66320
3	S	mg/lit	0.92	14.4	479	29904	NA	3.76	1184	16791	209	40.1	1121	64146
4	S	mg/lit	0.88	14.5	480	29917	NA	3.12	1172	16709	208	39.2	11.19	64369
5	S	mg/lit	<1.04	16.8	398	30946	NA	<1.30	1122	17437	>26	36.6	1116	66688
6	S	mg/lit	<1.04	15.5	508	29940	NA	3.96	1074	17370	293	41.5	1083	65383
7	S	ppm	see	overlaps	adjusted	for	flash							
8	S	mg/lit												

WELL SINCLAIR-10 SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
890109	1	—	450	1150000	10.3	416	1.1358	0.117	247115	1934	5000'	
890224	2	449	436	1301800	10.35	423	1.6213	0.168	244889	1934	5000'	
890216*	3	420	410	1304000	10.51	427	1.49	0.157	245000	1934	5000'	
890609	4	458	450	1420000	8.45		1.33	0.112		1934	5000'	

* NOT CHRONOLOGICAL SEQUENCE — CONFUSION WHETHER THESE DATA ARE FOR VON-1 OR SINC-10.

WELL

DATA SOURCES

IMPLE #	BRINE		STEAM		NCG		ISOTOPES		REFRENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
1	UOU FIELD		UOU FIELD		UOU FIELD							
2	UURI		UURI		TCM		SMU					
3	SFT		SFT		SFT				Gallup, 1989	PMR 89-59M		
4	UURI		UURI		TCM		SMU					
5	UURI		UURI		TCM		SMU					

WELL SIN-10

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
1	–	–	–	–	
2	0.52	0.36	-76.4	-64	
3	–	–	–	–	
4	1.9	0.30	-72.2	-63.0	
5					

WELL SINCLAIR-10 NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
1	1.358	125	0.0057	—	—	-	-	-	-	-	13924	125	-	-	-	-	-	14049
2	1.6213	129	0.0068	91.0	0.994	7.06	0.00	0.152	0.706	0.0772	14900	126	447	0.0373	15.8	42.1	0.58	15500
3	1.49	72		95.21	0.65	-	-	0.12	1.18	2.67								
4	1.33	124	0.00639	91.0	1.07	7.53	0.00	0.065	0.297	0.025	14000	127	448	0.008	6.32	1.66	0.176	14600
5	1.07	129	0.00567	90.6	1.07	8.03	0.00	0.041	0.219	0.019	12400	113	425	0.008	3.59	10.9	0.119	12900

WELL SIN-10

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
1	–	–	–	–	
2					
3					
4					

.. WELL SINCLAIR-10 NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							PPm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
1	1.358	125	0.0057	—	—	—	—	—	—	—	13924	125	—	—	—	—	—	14049
2	1.623	129	0.268	91.0	0.994	7.06	0.00	0.152	0.706	0.0772	14900	126	447	0.0373	15.8	42.1	0.58	15500
3	1.49	72		95.2	0.65	—	—	0.12	1.18	2.67								
4	1.33	124	0.00639	91.0	1.07	7.53	0.00	0.065	0.297	0.0025	14000	127	448	0.008	6.32	1.66	0.176	14600

WELL SINCLAIR-10 SEPARATED BRINE ADJUSTED TO ppm WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	
1	S	-/-	-	-	-	-	145102	-	-	-	-	-	247115	
2	S	229/83.8	NA	452	334	109	147152	20.9	12.6	31.8	340	542	244889	
3	S	220/81	72	450	350	NA	147000	0.4	NA	12	340	550	245000	
4	S													

WELL SINC-10 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	1.191	–	–	–	–	–	–	–	–	–	–	–	–
2	S	1.194	<0.87	16.1	333	24841	NA	273	1053	14250	192	40.2	940	53912
3	S	1.205	0.26	14.1	340	25900	10.8	2.4	1073	13300	170	37	910	52300
4	S													

WELL SINC-10 BRINE ANALYSES, ORIGINAL

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	273	100	NA	540	399	130	175700	25.0	15.0	38	406	647	292398	1.194
3	See analyses adjusted for flash													
4														

WELL SINC-10 BRINE ANALYSES, ORIGINAL

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	ppm	—	—	—	—	—	—	—	—	—	—	—	—
2	S	mg/kit	<1.04	19.2	398	29660	NA	3.26	1257	17015	229	48	1122	64371
3	S	ppm	See analyses adjusted for flash											
4	S	mg/kit												

WELL SINCLAIR-10

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)							
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH
1	6.03	—	145102	247115	—	-	—	—	—	-	—	-
2	5.84	-	144603	248729	0.49	22.5	5.0	<0.44	2.23	360	1138	6.7
3	5.80	-	-	—	0.7	18	5	<0.4	0.7	430	15	6.4
4	5.74	-	141616	249898								

.. WELL SINC-1D FLOW TEST FIELD DATA

SAMPLE #	DATE YY MM DD	TIME	STATUS DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
1	890109	1405	F	S	—	—	450	—	450	--	1180000	1032000	1150000	10.3	416
2	890224	1100	P	S	449	469	436	—	436	445	1348000	1167000	1301800	10.35	423
*3	890216	—	P-2	S	420	467	410	441	410	441	1370000	1167000	1304000	10.51	427
4	890609	1100	P	S	458	--	450	—	450	453	1200000	1300000	1420000	8.45	

* OUT OF SEQUENCE - CONFUSION WHETHER THESE DATA ARE FOR VUW-1 OR SINC-1D

WELL SINC-10 WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2000	2500	3500	4000	4500	5000	
1	1934	5000	5000'	2300		2650		4141				527	557	555	552			12/8/88
2	1934	5000	5000															
*3	1934	5000	5000															
4	1934	5000	5000															

NOTE REFERENCE - CONFUSION WHETHER THESE DATA ARE FOR UGN-1 OR SINC-10

WELL SINCLAIR-10

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
1	1434	12.9	–	–	–	–	–	–	–	ALL FIELD ANALYSES
2	1542	13.0	351	0.004	1.64	4.36	0.060			
3	1780	8.5	350	–	–	–	–			
4										

WELL SINC-10 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_3	SiO_2	TDS	
1	–	–	–	–	–	130156	–	–	–	–	–	221662	
2	75.1	NA	405	300	97.6	131922	18.8	11.3	28.5	305	486	219543	
3	73	65	400	310	NA	132000	0.4	NA	10	350	490	219300	
4													

WELL SINK-10 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1	–	–	–	–	–	–	–	–	–	–			–
2	<0.78	14.4	299	22270	NA	2.45	944	12776	172	36	842	48332	205
3	0.26	14.1	305	23200	9.7	2.1	963	11900	152	33	815	46800	200
4													

WELL — SINC-25, SINC-15, SINC-21, SINC-22, SINC-23

DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
S-1	S&T		S&T		S&T		GGC		PD 39m 80	Wong & Gallup, 1980		
S-2	S&T		S&T		S&T		GGC			Wong & Gallup, 1980		
S-3	S&T		S&T		S&T		GGC			Wong & Gallup, 1980		
S-4	S&T		S&T		S&T		GGC			Wong & Gallup, 1980		
S-5	S&T		S&T		S&T				REF: 81-016m	Anderson, 1981		
S-1	S&T		S&T		S&T		—		ARS 82-142M	Wheatley, 1982		Messer, 1982
S-2	S&T		S&T		S&T		—		ARS 82-142M	Wheatley, 1982		Messer, 1982
21-1												

WELL SINC-15 SINC-25 SINC-21 SINC-22 SINC-23

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
15-1	—	—	—	—	
15-2	—	—	—	—	
15-3	+1.74	-0.15	-76.0	-68.5	
15-4	+1.76	-0.10	-76.0	-70.0	
15-5	—	—	—	—	
25-1	—	—	—	—	
25-2	—	—	—	—	
21-1					

WELL SINC-15, SINC-25, SINC-21, SINC-22, SINC-23

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
15-1	3.1	337	0.0133	96.37	1.18	NA	NA	0.35	1.66	0.40	30226	287	434	31	69.9	190	5.75	31244
15-2	3.1	182	0.0133	94.66	1.16	NA	NA	2.12	1.59	0.42	29690	282	434	32	423	182	6.03	31059
15-3	3.75	418	0.0161	96.63	1.18	NA	NA	0.0	1.53	0.64	36662	347	460	0	0	212	11.12	37692
15-4	3.13	408	0.0134	96.68	1.14	NA	NA	0.03	1.51	0.60	30616	280	450	25	6.05	174	8.10	31560
15-5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25-1	2.19	—	0.0093	98.08	0.92	—	0	0	0.66	0.28	21732	158	400	—	0	53	2.84	22346
25-2	2.19	—	0.0093	94.19	0.93	—	0	0.60	2.85	1.41	20870	160	415	—	85	230	14.3	21774
21-1																		

WELL SINC-15, SINC-25, SINC-21, SINC-22, SINC-23

SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	
15-1	S	167/64	78	432	326	100	144407	0.8	4.2	NA	359	464	269000	
15-2	S	175/58	77	431	329	96	145000	0.5	4.2	NA	358	481	249000	
15-3	S	217/79	NA	438	329	100	143453	0.8	4.2	NA	360	517	252000	
15-4	S	217/77	NA	450	338	100	143333	0.5	3.3	NA	358	410	253000	
15-5	FC	see analyses corrected for flash												
25-1	S	209/63	74	438	324	83	152083	NA	<14	19	358	NA	287667	
25-2	S	205/59	72	436	324	84	149421	NA	<14	23	352	NA	305132	
21-1														

WELL SINC-15, SINC-25, SINC-21, SINC-22, SINC-23

SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
15-1	S	1.198	0.13	2.92	280	25459	12.5	1.3	1002	13856	209	53	885	54674
15-2	S	1.200	0.14	2.80	295	24167	12.5	0.7	1000	13167	200	51	908	51667
15-3	S	1.199	0.25	2.52	196	26105	13.3	1.0	1026	13761	175	48	951	57382
15-4	S	1.200	0.25	3.22	281	26083	13.3	0.8	975	13750	175	47.5	983	57333
15-5	FC	see	Analyses		corrected	for	Flash							
25-1	S	1.200	<0.25	1.3	310	26000	NA	4.8	979	14333	203	35	892	59000
25-2	S	1.208	<0.25	1.3	298	26407	NA	4.8	890	13742	199	24	886	56291
21-1														

WELL SINC-15 SINC-25 SINC-21 SINC-22 SINC-23

BRINE ANALYSES

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
15-1	20	77	94	517	390	120	173000	0.9	5	NA	430	556	ppm 269000	1.198
15-2	21	69	92	517	395	115	174000	0.64	5	NA	430	577	ppm 249000	1.200
15-3	260	95	NA	525	395	120	172000	0.9	5	NA	432	620	ppm 252000	1.199
15-4	260	92	NA	540	405	120	172000	0.6	4	NA	429	492	ppm 253000	1.200
15-5	see	analyses	incorrect	for	fresh									
25-4	251	76	89	525	389	99	182500	NA	<17	23	429	NA	345200	1.200
25-1	248	71	87	527	391	101	180500	NA	<17	28	425	NA	368600	1.208
21-1														

WELL SINC-15 SINC-25 SINC-21 SINC-22 SINC-23

BRINE ANALYSES

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
15-1	S	mg/kg	0.16	3.51	336	30500	15	1.6	1200	16600	250	64	1060	65500
15-2	S	mg/kg	0.17	3.36	354	29000	15	0.8	1200	15800	240	61	1090	62000
15-3	S	mg/kg	0.30	3.02	235	31300	16	1.2	1230	16500	210	57	1140	68800
15-4	S	mg/kg	0.30	3.87	337	31300	16	1.0	1170	16500	210	57	1180	68800
15-5	FL	See	quadpass	correction	for	flash								
25-1	S	mg/kg	<0.3	1.5	372	31200	NA	5.7	1175	17200	243	42	1070	70800
25-1	S	mg/kg	<0.3	1.6	360	31900	NA	5.8	1075	16600	240	29	1070	68000
21-1														

WELL SINC-15, SINC-25, SINC-21, SINC-22, SINC-23

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	PH	
15-1	5.1	–	–	–	0.069	NA	136	NA	51	434	210	5.70	
15-2	5.6	–	–	–	0.008	NA	2530	NA	100	434	4434	5.75	
15-3	5.75	–	–	–	0.072	NA	17	NA	6.7	460	100	5.75	
15-4	6.0	–	–	–	0.172	NA	77	NA	29	450	158	6.00	
15-5	–	–	–	–				–	–	–	–	–	
25-1	5.92	–	–	–	0.35	18	100	86	154	400	1325	–	
25-2	5.9	–	–	–	0.11	17	143	61	60	415	434	–	
21-1													

WELL SINC-15, SINC-25, SINC-21, SINC-22, SINC-23

FLOW TEST FIELD DATA

SAMPLE #	DATE YY mm DD	TIME	STATUS DAYS	TYPE	WELL HEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
15-1	800416	—	F-2	S	475	478	420	460	380	460	45522	450450	495972	9.2	406
15-2	800417	—	F-3	S	476	475	400	460	390	455	49182	456655	505837	9.7	415
15-3	800510	—	F-22	S	500	486	490	458	440	468	33780	331897	365677	9.2	424
15-4	800513	—	F-30	S	487	481	450	462	430	461	37972	358024	398779	10.2	426
15-5	800000	—	—	FL	—	—	—	—	—	—					
25-1	820210	—	F-3	S	417	—	320	—	320	—	44700	346000	390700	11.4	400
25-2	820211	—	F-4	S	417	—	320	—	320	—	44700	346000	390700	11.4	394
21-1															

SINC-15
SINC-25
SINC-21
SINC-22
SINC-23

WELL

WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2000	3000	4000	5000	5500	6000	
15-1	3282	6031	6031									392	498	553	560	559	–	4/9/80
15-2	3282	6031	6031															
15-3	3282	6031	6031															
15-4	3282	6031	6031															
15-5	3282	6031	6031															
25-1	3269	6349	6349									406	486	548	565	564	559	1/26/83
25-2	3269	6349	6349															
21-1																		

WELL SINC-15 SINC-25 SINC-21 SINC-22 SINC-23

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
15-1	2781	26.4	366	2.85	6.43	17.5	0.53	—	—	
15-2	2880	27.4	366	4.08	41.0	17.7	0.58	—	—	
15-3	3373	31.9	369	0	0	19.5	1.02	+1.56	-75.3	
15-4	3123	28.6	367	2.55	0.62	17.7	0.89	+1.57	-75.4	
15-5	3037	31.1	367	—	—	—	—	—	—	
25-1	2477	18.0	363	—	0	6.0	0.32	—	—	
25-2	2379	18.2	359	—	9.7	26.2	1.63	—	—	
21-1										

WELL SINC-15 SINC-25 SINC-21 SINC-22 SINC-23

RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
15-1	58	71	392	296	91	131122	0.7	3.8	NA	326	421	244252	
15-2	52	69	389	297	87	130935	0.5	3.8	NA	324	434	224847	
15-3	72	NA	398	299	91	130255	0.7	3.8	NA	327	470	228816	
15-4	69	NA	404	303	90	128713	0.4	3.0	NA	321	368	227194	
15-5	63	70	397	300	90	130621	0.6	3.6	—	367	424	231917	
25-1	56	66	388	287	73	134745	NA	<13	17	317	NA	234872	(most TDS)
25-2	52	64	387	287	74	132387	NA	<13	21	312	NA	270347	
21-1													

SINC-15 SINC-24
SINC-25 SINC-22
SINC-23

WELL

RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
15-1	0.12	2.66	255	23117	11.4	1.2	910	12582	189	49	803	49644	15.2
15-2	0.13	2.53	266	21823	11.3	0.6	903	11890	181	46	820	46655	15.8
15-3	0.23	2.29	178	23703	12.1	0.9	931	12495	159	43	863	52102	197
15-4	0.22	2.90	252	23423	12.0	0.7	876	12348	157	43	883	51485	195
15-5	0.18	2.6	238	23063	11.7	0.9	936	12364	172	45	845	50119	106
25-1	<0.22	1.1	275	23036	NA	4.2	868	12700	179	31	790	52274	185
25-2	<0.22	1.2	264	23397	NA	4.3	788	12175	176	21	785	49874	182
21-1													

WELL SINC-15 SINC-25 SINC-21 SINC-22 SINC-23

SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
800416	15-1	475	420	495972	9.2	406	3.1	0.285	269000	3282	6031	
800417	15-2	476	400	505837	9.7	415	3.1	0.301	249000	3282	6031	
800510	15-3	500	490	365677	9.2	424	3.75	0.345	252000	3282	6031	
800513	15-4	487	450	398779	10.2	426	3.13	0.319	253000	3282	6031	
800000	15-5	—	—	—	—	—	—	0.304	231917 FS	3281	6031	
820210	25-1	417	320	390700	11.4	400	2.19	0.25	287667	3269	6349	
820211	25-2	417	320	390700	11.4	394	2.19	0.25	305132	3269	6349	
	21-1											

.. WELL IDD-5 IDD-6 IDD-11 SINC-13

DATA SOURCES

SAMPLE #	BRINE		STEAM		NCG		ISOTOPES		REFRENCE #1	AUTHOR	REFRENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
5-1	S&T		S&T		S&T				PD-35m-79	Samuelson, 1979		
5-2	S&T		S&T		S&T				"			
5-3	S&T		S&T		S&T				"			
5-4	S&T								REF: 81-01Gm	Anderson, 1981		
5-5							GGC					
5-6							GGC					
5-7	S&T								ARS-826m	Wheatley, 1982		
6-1												
11-1		-										
13-1	S&T		S&T		S&T				PD-41m 79	Samuelson, 1979		
13-2	S&T		S&T		S&T				"	"		
13-3	S&T		S&T		S&T				REF: 81-06m	Anderson, 1981		
13-4	S&T		S&T		S&T				PD 68m-80	Wong + Gallup, 1980		
13-5	S&T		S&T		S&T				"	"		
13-6	-		-		-							
13-7	-		-		-				PD 68m-80	Wong + Gallup, 1980		
13-8	S&T		S&T		S&T				"	"		
13-9	S&T		S&T		S&T							
13-10	-		-		S&T?					Grithers, 1983		

.. WELL IID-5 IID-6 IID-11 SINC-13

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
5-1	–	–	–	–	
5-2	–	–	–	–	
5-3	–	–	–	–	
5-4	–	–	–	–	
5-5	+1.2	−0.59	−76	−69	
5-6	+1.33	−0.62	−77	−69	
5-7	–	–	–	–	
6-1					
11-1					
13-1	–	–	–	–	
13-2	–	–	–	–	
13-3	–	–	–	–	
13-4	–	–	–	–	
13-5	–	–	–	–	
13-6	+1.23	−1.21	−77	−74	
13-7	+1.14	−1.10	−75	−71	
13-8	–	–	–	–	
13-9	–	–	–	–	
13-10	–	–	–	–	

WELL IID-5
IID-6
IID-11
SINC-13

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
5-1	1416	—	—	—	—	—	—	—	—	
5-2	1499	8.6	360	—	5.7	6.71	0.091	—	—	
5-3	1922	8.8	348	—	—	—	—	—	—	
5-4	1400	7.4	347	—	—	—	—	—	—	
5-5	—	—	—	—	—	—	—	+1.0	-75	
5-6	—	—	—	—	—	—	—	+1.1	-76	
5-7	—	—	—	—	—	—	—			
6-1										
11-1										
13-1	11160	23.3	349	—	—	—	—	—	—	
13-2	8045	15.0	357	—	—	—	—	—	—	
13-3	6216	16.8	353	—	—	—	—	—	—	
13-4	6908	12.0	359	—	26.5	27.8	0.39	—	—	
13-5	7140	11.8	356	125	27.3	27.6	0.27	—	—	
13-6	—	—	—	—	—	—	—	+0.8	-76.5	
13-7	—	—	—	—	—	—	—	+0.8	-74.4	
13-8	4809	4.9	346	3.21	15.0	17.4	0.52	—	—	
13-9	5793	11.9	348	1.72	12.0	20.9	0.62	—	—	
13-10	—	—	—	—	—	—	—	—	—	Bad steam flash value?

WELL IID-5 IID-6 IID-11 SINK-13 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH_3	SiO_2	TDS	
5-1	–	–	–	–	–	–	–	–	–	–	–	–	
5-2	70.6	77	359	250	94.7	121158	0.8	7.2	–	333	412	217847	
5-3	72	77	361	253	96	119026	0.7	4.7	–	321	423	214564	
5-4	72	77	360	297	95	118887	0.7	6	–	347	–	214313	
5-5	–	–	–	–	–	–	–	–	–	–	–	–	
5-6	–	–	–	–	–	–	–	–	–	–	–	–	
5-7	–	–	–	–	–	–	–	–	–	–	–	–	
6-1													
11-1													
13-1	46	57	328	259	77	107078	0.9	9.8	–	295	355	191954	
13-2	47	60	346	274	82	111781	1.12	9.8	–	309	333	196183	
13-3	48	48	334	254	57.5	111912	2	3.9	–	353	380	191769	
13-4	45	50	320	258	51	114127	0.49	3.7	3.0	306	346	196600	
13-5	49	49	332	259	52	115467	0.75	3.7	2.9	302	377	193378	
13-6	–	–	–	–	–	–	–	–	–	–	–	–	
13-7	–	–	–	–	–	–	–	–	–	–	–	–	
13-8	48	46	333	249	–	108743	3.2	–	5.1	289	341	189246	
13-9	50	47	335	250	69	109311	3.6	5.1	5.1	291	405	187854	
13-10	–	–	–	–	–	–	–	–	–	–	–	–	

WELL IDD-5 IDD-6 IDD-11 SINC-13

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
5-1	2.64	178	0.01123	–	–	–	–	–	–	–	–	–	–	–	–	–	–	27434
5-2	2.41	140	0.01023	97.71	–	–	0	0.58	1.20	0.13	24413	140	445	–	92.2	109.3	1.49	25201
5-3	2.95	119	0.0126	–	–	–	–	–	–	–	30754	"	"					30754
5-4				See analyses corrected for flash														
5-5																		
5-6																		
5-7																		
6-1																		
11-1																		
13-1	8.32	189	0.03759	98.42	–	–	–	–	1.09	0.32	90366	189	439	–	–	–	–	90994
13-2	6.63	132	0.02941	98.31	–	–	–	–	1.02	0.24	70628	132	425	–	–	–	–	71185
13-3				See analyses corrected for flash														
13-4	5.49	125	0.0241	97.95	0.22	–	–	0.59	1.08	0.12	54393	94.6	417	–	204	219	3.05	55336
13-5	5.37	156	0.0235	98.08	0.21	–	–	0.59	1.04	0.08	53288	88.3	406	932	204	206	1.49	55126
13-6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13-7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13-8	3.32	88	0.0142	98.05	0.13	–	–	0.48	0.97	0.23	32935	33.8	393	22	103	119	3.54	33609
13-9	4.08	96	0.0176	98.13	0.26	–	–	0.32	0.97	0.23	40507	83.1	397	12	84	146	4.35	41233
13-10	5.4	–	0.0236	99.08	0.29	–	–	0.01	0.30	0.31	54132	123	–	–	3.48	59.7	7.76	54326

..WELL IID-5 IID-6 IID-11 SINC-13

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	pH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH	
5-1	6.1	–	–	–	–	.	2	–	–	–	–	6.1	
5-2	6.1	–	–	–	0.044	14.0	2	<1	6.5	445	56.4	6.0	
5-3	5.8	–	–	–	0.2	15.0	14	<1	3.6	430	50.8	6.0	
5-4													
5-5													
5-6													
5-7	–	–	–	–	2.75	15	<0.03	–	–	404	431	–	
6-1													
11-1													
13-1	5.85	–	–	–	0.072	–	11	<1	2.5	439	28	5.8	
13-2	6.0	–	–	–	0.12	–	13	<1	1.5	425	26.8	5.8	
13-3													
13-4	5.5	–	–	–	0.081	–	43	–	13	417	66	5.65	
13-5	5.75	–	–	–	0.058	–	570	-	209	406	975	5.75	
13-6													
13-7													
13-8	5.25	–	–	–	0.207	–	6170	–	2290	393	10690	5.5	
13-9	5.3	–	–	–	0.161	–	32	–	8	397	53	5.8	
13-10	–	–	–	–	–	–	–	–	–	–	–	–	

WELL IID-5 IID-6 IID-11 SINC-13

SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
5-1	S	-/-	-	-	-	-	-	-	-	-	-	-	-	
5-2	S	228/74.5	81	378	264	99.8	127750	0.9	7.6	-	351	435	229700	
5-3	S	228/76.7	82	384	270	102	126813	0.8	5.1	-	341	451	228600	
5-4	FC	see analyses corrected for flash												
5-5	S	-/-	-	-	-	-	-	-	-	-	-	-	-	
5-6	S	-/-	-	-	-	-	-	-	-	-	-	-	-	
5-7	S	413/69	62	341	258	88	125426	0.3	4.3	-	324	-	215870	
6-1														
11-1														
13-1	S	186/52	65	375	296	88	122165	1.05	11.2	-	337	405	219000	
13-2	S	189/53	68	391	309	93	126150	1.26	11.1	-	348	376	221400	
13-3	FC	see analyses corrected for flash												
13-4	S	43/52	57	367	295	59	130730	0.56	4.2	3.4	351	454	225200	
13-5	S	186/56	56	384	299	60	133333	0.87	4.2	3.4	348	436	223300	
13-6	S	-/-	-	-	-	-	-	-	-	-	-	-	-	
13-7	S	-/-	-	-	-	-	-	-	-	-	-	-	-	
13-8	S	68/56	53	390	291	-	127334	3.7	-	5.9	339	400	221600	
13-9	S	26/58	55	391	292	81	127551	4.3	6.0	6.0	340	473	219200	
13-10	S	-/-	-	-	-	-	-	-	-	-	-	-	-	

WELL IID-5, IID-6, IID-11, SINC-13

SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
5-1	S	—	—	—	—	—	—	—	—	—	—	—	—	—
5-2	S	1.182	<0.17	5.7	314	20812	10.2	1.4	508	12690	162	419.1	802	52538
5-3	S	1.186	<0.17	6.2	313	22015	11.0	1.7	573	12816	167	46.4	820	54637
5-4	FC	See analyses corrected for flash												
5-5	S	—	—	—	—	—	—	—	—	—	—	—	—	—
5-6	S	—	—	—	—	—	—	—	—	—	—	—	—	—
5-7	S	1.172	1.5	10.9	272	21331	10.2	4.4	392	11519	1510	42	677	49488
6-1														
11-1														
13-1	S	1.164	<0.03	2-1	271	21134	10.3	1.7	376	11340	149	4.3	786	48540
13-2	S	1.174	<0.03	2.9	281	21635	11.1	1.4	373	12010	155	4.3	750	51022
13-3	FC	See analyses corrected for flash												
13-4	S	1.178	0.3	1.35	251	23939	10.2	2.01	369	11715	161	59	—	48891
13-5	S	1.1775	0.3	0.3	275	23354	10.2	2.0	378	13418	178	127	797	52739
13-6	S	—	—	—	—	—	—	—	—	—	—	—	—	—
13-7	S	—	—	—	—	—	—	—	—	—	—	—	—	—
13-8	S	1.178	<0.3	1.85	—	23260	10.2	2.0	375	12309	68	42	743	50170
13-9	S	1.176	0.4	1.48	240	22959	10.2	2.1	360	11565	162	204	744	48469
13-10	S	—	—	—	—	—	—	—	—	—	—	—	—	—

WELL IID-5 IID-6 IID-11 SINC-13

BRINE ANALYSES, ORIGINAL

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
5-1	–	–	–	–	–	–	149000	–	–	–	–	–	–	–
5-2	270	88	96	447	312	118	151000	1.04	9	–	415	514	229500 ppm	1.182
5-3	270	91	97	455.	320	121	150400	0.93	6	–	405	535	228600 ppm	1.186
5-4	see	analyses	corrected	for	flash									
5-5	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5-6	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5-7	1070	81	73	400	302	103	147000	0.4	5	–	380	–	253000	1.172
6-1														
11-1														
13-1	217	61	76	436	344	102	142600	1.22	13	–	392	471	219000 ppm	1.164
13-2	222	62	80	459	363	109	148100	1.48	13	–	409	441	224300 ppm	1.174
13-3	see	analyses	corrected	for	flash									
13-4	51	61	67	432	348	69	154000	0.66	5	4	413	535	225200 ppm	1.178
13-5	220	66	66	452	352	71	157000	1.02	5	4	410	513	223300 ppm	1.1775
13-6	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13-7	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13-8	80	66	63	460	343	–	150000	4.4	–	7	399	471	221600 ppm	1.178
13-9	30	68	65	460	343	95	150000	5.0	6	7	400	556	219200 ppm	1.176
13-10	–	–	–	–	–	–	–	–	–	–	–	–	–	–

WELL IID-5, IID-6, IID-11, SINL-13

BRINE ANALYSES, ORIGINAL

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
5-1	S	mg/lit	–	–	–	–	–	–	–	–	–	–		–
5-2	S	mg/lit	<0.2	6.7	371	24600	12	1.7	600	15000	192	58	948	62100
5-3	S	mg/lit	<0.2	7.4	371	26110	13	2.0	680	15200	198	55	972	64800
5-4	FC	–	see analyses		corrected for flash									
5-5	S	–	–	–	–	–	–	–	–	–	–	–	–	
5-6	S	–	–	–	–	–	–	–	–	–	–	–		
5-7	S	mg/lit	1.7	12.8	319	25000	12	5.2	459	13500	1770	49	793	58000
6-1	–													
11-1	–													
13-1	S	mg/lit	<0.03	2.4	316	24600	12	2.0	438	13200	174	5	915	56500
13-2	S	mg/lit	<0.03	3.4	330	25460	13	1.7	438	14100	182	5	880	59400
13-3	FC	–	see analyses		corrected for flash									
13-4	S	mg/lit	0.4	159	296	28600	12	2.5	435	13800	190	70	–	57000
13-5	S	mg/lit	0.4	0.37	324	27500	12	2.3	445	15800	210	150	938	62100
13-6	S	mg/lit	–	–	–	–	–	–	–	–	–	–	–	
13-7	S	mg/lit	–	–	–	–	–	–	–	–	–	–		–
13-8	S	mg/lit	<0.3	2.18	–	27400	12	2.3	442	14500	80	50	875	59100
13-9	S	mg/lit	0.5	1.74	282	27000	12	2.5	423	13600	190	240	875	57000
13-10	S	mg/lit	–	–	–	–	–	–	–	–	–	–	–	–

WELL IID-5 IID-6 IID-11 SINC-13

FLOW TEST FIELD DATA

SAMPLE #	DATE YYMMDD	TIME	STATUS DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
5-1	790606	1100	F-2	S	420	462	420	456	420	443	18800	345700	364500	5.16	390
5-2	790607	1000	F-3	S	408?	468	415	453	415	442	32200	492200	524400	6.14	397
5-3	790608	1730	F-4	S	425	465	423	457	423	442	33300	499550	532850	6.25	399
5-4	800000	446?	F	FC	—	—	—	—	—	—	—	—	—	—	
5-5	800304	446?	F-24	S	—	—	445	459	445	459	23733	234237	257970	9.2	425
5-6	800305	446?	F-30	S	—	—	429	456	435	459	35159	338876	374035	9.4	424
5-7	811125	—	F-30	S	370	441	—	—	—	—	—	—	273000	—	—
6-1	No Samples														
11-1	No Samples														
13-1	790626	1000	F-2	S	461	462	407	441	407	435	34800	247000	281800	12.35	443
13-2	790629	1030	F-5	S	365	450	318	437	318	416	37300	290100	327400	11.39	419
13-3	800000	—	—	FC	—	—	—	—	—	—	—	—	—	—	—
13-4	800623	—	F-5	S	359	450	282	—	282	425	42485	291381	333866	12.7	421
13-5	800624	—	F-6	S	350	442	270	—	270	419	42934	276703	319637	13.4	424
13-6	800709	—	F-2	S	296	425	195	—	195	376	47472	249231	296703	16.0	427
13-7	800709	—	F-2	S	296	425	195	—	195	376	47472	249231	296703	16.0	427
13-8	800716	—	F-3	S	320	437	251	—	251	411	38551	226188	264739	14.6	434
13-9	800717	—	F-4	S	335	442	290	—	290	419	39629	237741	277370	14.3	440
13-10	820809	—	F-28	S	380	459	363	—	363	431	9600	227000	236600	4.1	372

WELL IED-5 IED-6 IED-11 SINC-13 WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	1500	2000	2500	3000	3100	3500	
5-1	1882	3132	3132									444	477	481	549	–	–	2/27/79
5-2	"	"	"															
5-3	"	"	"															
5-4	"	"	"															
5-5	"	"	"															Recall 10/25/82
5-6	"	"	"									474	477	502	550	558		1/12/84
5-7	"	3254	3254															
												2000	2500	3000	3500	4000	4500	
6-1	1867	3500	–									504	515	525	3400' 534	–	–	5/4/79
B1-1	1438	4500	–									481	506	504	–	–	–	4/29/82
13-1	1868	2850																
13-2	"	"										1500	2000	2500	2700			6/16/82
13-3	"	"										469	483	485	494			
13-4	"	"																
13-5	"	"																
13-6	"	"																
13-7	"	"																
13-8	"	"																
13-9	"	"																
13-10	"	"										474	488	523	527	–	–	5/11/82
												2000	3000	3500	4000	4500	5000	Recall 4/10/83
												539	563	564	563	564	562	1/18/84

WELL IID-5 IID-6 IID-11 SINCLAIR

RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
5-1	–	–	–	–	–	–	–	–	–	–	–	–	–
5-2	<0.16	5.4	298	19738	9.6	1.4	481	12036	154	46.5	761	49827	217
5-3	<0.16	5.9	294	20663	10.3	1.6	538	12029	157	43.5	769	51283	214
5-4	<0.2	5.8	293	20640	10.3	1.6	537	12015	157	43	769	51222	214
5-5	–	–	–	–	–	–	–	–	–	–	–	–	–
5-6	–	–	–	–	–	–	–	–	–	–	–	–	–
5-7	–	–	–	–	–	–	–	–	–	–	–	–	–
6-1													
11-1													
13-1	<0.2	1.8	238	18524	9.0	1.5	330	9940	131	3.8	689	42545	163
13-2	<0.02	2.6	249	19171	9.8	1.3	331	10642	137	3.8	664	45211	168
13-3	0.3	1.1	222	20166	8.8	1.8	320	10567	123	93	654	43204	70
13-4	0.3	1.18	219	20899	8.9	1.9	322	10227	141	52	–	42760	38
13-5	0.3	0.3	238	20225	8.8	1.7	327	11620	154	110	690	45672	162
13-6	–	–	–	–	–	–	–	–	–	–	–	–	–
13-7	–	–	–	–	–	–	–	–	–	–	–	–	–
13-8	<0.21	1.58	–	19864	8.7	1.7	320	10512	60	36	634	42845	58
13-9	0.4	1.26	206	19676	8.7	1.8	308	9911	138	175	638	41538	22
13-10	–	–	–	–	–	–	–	–	–	–	–	–	–

IID-5
IID-6
IID-11
SINC-13

WELL SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
790606	5-1	420	420	364500	5.16	390	2.64	0.136	—	1882	3132	
790607	5-2	408?	415	524400	6.14	397	2.41	0.148	229700	1882	3132	
790608	5-3	425	423	532850	6.25	399	2.95	0.184	228600	1882	3132	
800000	5-4	446?	—	—	—	—	—	0.145	214313 FL	1882	3132	
800304	5-5	446?	445	257970	9.2	425	CALC 1.58	ASSUMED 0.145	ASSUMED 236000	1882	3132	
800305	5-6	446?	429	374035	9.4	424	CALC 1.54	ASSUMED 0.145	ASSUM. 236000	1882	3132	
811125	5-7	370	—	273000	—	—	—	—	215870	1882	3254	
No sample	6-1											
No sample	11-1											
790626	13-1	461	407	281800	12.35	443	8.32	1.028	219000	1868	2850	
790629	13-2	365	318	327400	11.39	419	6.63	0.755	221400	1868	2850	
800000	13-3	—	—	—	—	—	—	0.622	191769 FL	1868	2850	
800623	13-4	359	282	333866	12.7	421	5.49	0.70	225200	1868	2850	
800624	13-5	350	270	319637	13.4	424	5.37	0.72	223300	1868	2850	
800709	13-6	296	195	296703	16.0	427	—	—	—	1868	2850	
800709	13-7	296	195	296703	16.0	427	—	—	—	1868	2850	
800716	13-8	320	251	264739	14.6	434	3.32	0.48	224600	1868	2850	
800717	13-9	335	290	277370	14.3	440	4.08	0.58	219200	1868	2850	
820809	13-10	380	363	236600	4.1	372	5.4	0.22	—	1868	2850	

SINC-1
SINC-2
SINC-3
SINC-4

WELL

SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MRAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
?	1-1	—	—	—	—	—	—	—	—	243'	4692'	Perfed @ 3445-3376'
760000	1-2	—	—	—	—	—	—	—	~34000	243'	4692'	Perfed @ 3445-3370'
No Samples	2-1											No Samples
630423	2-1	—	—	—	—	—	—	—	FA 34093	1365'	6922'	
630521	3-2	185	152	414500	19.9	453	—	—	226000 S?	1365'	6922'	
630522	3-3	140	74	593000	11.6	337	—	—	220000 S?	1365'	6922'	
630715	3-4	—	—	—	—	—	—	—	FA 242656	1365'	6922'	
630000	3-5	—	—	—	—	—	—	—	—	1365'	6922	
640502	4-1	250	—	450000	20	—	—	—	—	1767	5306	
730000	4-2	—	—	—	—	—	—	—	—	1767	5306	
750403	4-3	22.0	—	—	—	—	—	—	—	1767	5306	
750409	4-4	43.0	—	—	(~10)	—	4.01	(~0.40)	—	1767	5306	
750414	4-5	440	—	—	—	—	—	—	—	1767	5306	
750423	4-6	445	—	—	~(10)	—	3.47	~(0.35)	—	1767	5306	

SINC-1
SINC-2
SINC-3
SINC-4

WELL

RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1-1	–	–	–	–	–	–	–	–	–	–	–	–	–
1-2	–	–	112	1172	–	–	71	414	–	42	–	7974	–
2-1													
3-1	NA	6.5	196	16135	NA	0.6	NA	9288	56	1363	714	35545	563
3-2	NA	NA	216	18255	NA	8.8	601	10093	157	191	881	40931	256
3-3	0.042	NA	274	20332	10.6	8.8	1061	11492	186	115	1149	41548	NA
3-4	<0.35	NA	344	20586	NA	2.0	1458	9214	128	513	991	35166	292
3-5	–	–	350	20945	–	2	1483	9375	131	522	1069	35780	2917
4-1	NA	8.0	266	21544	NA	NA	918	11934	NA	51	888	43200	NA
4-2	–	–	–	22050	–	4	1085	11690	–	56	938	51800	–
4-3	0.6	NA	NA	25700	NA	2.80	1350	12400	NA	64	1110	54000	NA
4-4	0.6	NA	NA	24200	NA	3.30	1260	12900	NA	76	1010	54000	NA
4-5	0.5	NA	NA	23800	NA	3.30	1260	11800	NA	60	1000	51000	NA
4-6	0.4	NA	NA	24500	NA	2.30	1220	13300	NA	60	1040	59000	NA

SINC-1
SINC-2
SINC-3
SINC-4

WELL.

RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH_4	SiO_2	TDS	
1-1	—	—	—	—	—	—	—	—	—	—	—	—	
1-2	—	—	64	—	—	14165	—	—	—	—	113	24127	
2-1													
3-1	143	NA	357	NA	NA	99430	3.7	NA	0	399	429	164506	
3-2	82	NA	328	NA	NA	105732	NA	NA	NA	NA	NA	181026	} too high if flash to atmosphere
3-3	72	59	371	318	NA	116688	NA	NA	NA	NA	701	194480	
3-4	58	NA	402	350	≥37	100307	NA	NA	<83	398	192	170523	
3-5	59	—	409	356	—	102058	—	—	—	285	420	173196	
4-1	NA	NA	347	NA	20	123672	11.2	10.4	15.2	354	NA	213248	
4-2	77	—	—	—	—	129500	—	—	—	—	416	217618	
4-3	94	NA	NA	NA	NA	151000	NA	NA	NA	NA	NA	246000	} too high if not corrected to reservoir temperature by ~1
4-4	86	NA	NA	NA	NA	140000	NA	NA	NA	NA	NA	234000	
4-5	78	NA	NA	NA	NA	136000	NA	NA	NA	NA	NA	225000	
4-6	85	NA	NA	NA	NA	139000	NA	NA	NA	NA	NA	239000	

SINC-1
SINC-2
SINC-3
SINC-4

WELL

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
1-1	–	–	–	–	–	–	–	–	–	
1-2	–	–	–	–	–	–	–	–	–	
2-1										
3-1	–	–	–	–	–	–	–	–	–	
3-2	–	–	–	–	–	–	–	–	–	
3-3	–	–	–	–	–	–	–	–	–	
3-4	–	–	–	–	–	–	–	–	–	
3-5	–	–	–	–	–	–	–	–	–	
4-1	–	–	–	–	–	–	–	–	–	
4-2	–	–	–	–	–	–	–	–	–	
4-3	–	–	–	–	–	–	–	–	–	
4-4	3920	1.2	–	–	–	–	–	–	–	} estimated gas concentrations
4-5	–	–	–	–	–	–	–	–	–	
4-6	3510	0.5	–		–	–	–	–	–	

SINC-1
SINC-2
SINC-3
SINC-4
~~SINC-1S~~
~~SINC-2S~~

WELL

WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2150	2750	3130	3300	4500	4600	
1-1	243'	4725	4692'									240	318	372	485	550	562	3½" csg @ 4694' Perfed @ 3445-3370'
1-2	243'	4725	4692															
2-1	304'	2368'	2368'															
												2000	2500	3000	4000	4500	5100	2/2/63
3-1	1365'	6922'	6922'									183	227	290	379	426	477	
3-2	1365'	6922'	6922'															
3-3	1365'	6922'	6922									2000	2500	3000	3500	4000	4500	
3-4	1365'	6922'	6922'									170	224	284	331	383	434	4/16/79
3-5	1365	6922	6922									2350	2600	2750'	3000	3300'	4000'	
4-1	1767'	5306	5306'?									250	300	351	399	450	500	
4-2	1767'	5306	5306															
4-3	1767'	5306	5306															
4-4	1767'	5306	5306															
4-5	1767'	5306	5306															
4-6	1767'	5306	5306															

WELL SINC-1 SINC-2 SINC-3 SINC-4

FLOW TEST FIELD DATA

SAMPLE #	DATE YY mm DD	TIME	STATUS DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
1-1	?	–	–	?	–	–	–	–	–	–	–	–	–	–	–
1-2	760000	–	–	FC	–	–	–	–	–	–	–	–	–	–	–
2-1	No samples														
3-1	630423	–	–	FA?	–	–	–	–	–	–	–	–	–	–	–
3-2	630521	–	–	FA?	185	390	152	372	148	374	82500	332000	414500	19.9	453
3-3	630522	–	–	FA?	140	377	74	324	73	321	69000	524000	593000	11.6	337
3-4	630715	–	–	FA	–	–	–	–	–	–	–	–	–	–	–
3-5	630000	–	–	FC	–	–	–	–	–	–	–	–			
4-1	640502	–	–	?	250	–	–	–	–	–	90,000	360000	450000	20	–
4-2	730000	–	–	FC	–	–	–	–	–	–	–	–	–	–	–
4-3	750403	–	–	TB	220	410	–	–	–	–	–	–	–	–	–
4-4	750409	–	–	TB	430	462	–	–	–	–	–	–	–	–	–
4-5	750414	–	–	TB	440	477	–	–	–	–	–	–	–	–	–
4-6	750423	–	–	TB	445	491	–	–	–	–	–	–	–	–	–

SINC-1
SINC-2
SINC-3
SINC-4

WELL

FIELD ANALYSES AND STREAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STREAM ANALYSES (mg/liter)								
	pH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH	
1-1	–	–	–	–	–	–	–	–	–	–	–	–	
1-2	–	–	–	–	–	–	–	–	–	–	–	–	
2-1													
3-1	–	–	–	–	–	–	–	–	–	–	–	–	
3-2	–	–	–	–	–	–	–	–	–	–	–	–	
3-3	–	–	–	–	–	–	–	–	–	–	–	–	
3-4	–	–	–	–	–	–	–	–	–	–	–	–	
3-5	–	–	–	–	–	–	–	–	–	–	–	–	
4-1	–	–	–	–	–	–	–	–	–	–	–	–	
4-2	–	–	–	–	–	–	–	–	–	–	–	–	
4-3	–	–	–	–	–	–	–	–	–	–	–	–	
4-4	–	–	–	–	–	–	–	–	–	–	–	–	
4-5	–	–	–	–	–	–	–	–	–	–	–	–	
4-6	–	–	–	–	–	–	–	–	–	–	–	–	

SINC-1
SINC-2
SINC-3
SINC-4

WELL

BRINE ANALYSES

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1-1	S	ppm	see analyses corrected to ppm, wt											
1-2	FL	ppm	see analyses adjusted for flash											
2-1														
3-1	FA	mg/kit	–	11	330	27100	–	1	–	15600	94	2290	1200	59700
3-2	FA	ppm	NA	NA	270	22790	NA	11	750	12600	196	239	1100	51100
3-3	FA	ppm	0.047	NA	310	23000	12	10	1200	13000	210	130	1300	47000
3-4	FA	mg/kit	<0.6	–	590	35300	–	3.5	2500	15800	220	880	1700	60300
3-5	FL	see analyses corrected for flash												
4-1	?	ppm	NA	10	332	26992	NA	NA	1148	14918	287	736	1025	58443
4-2	FL	ppm	see analyses adjusted for flash											
4-3	TB	ppm	0.60	NA	NA	25700	NA	2.80	1350	12400	NA	64	1110	54000
4-4	TB	ppm	0.60	NA	NA	24200	NA	3.30	1260	12900	NA	76	1010	54000
4-5	TB	ppm	0.50	NA	NA	23800	NA	3.30	1260	11800	NA	60	1000	51000
4-6	TB	ppm	0.40	NA	NA	24500	NA	2.30	1220	13300	NA	60	1040	59000

SINC-1
SINC-2
SINC-3
SINC-4

WELL

BRINE ANALYSES

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP GRAV. g/cc
1-1	see	analyses	adjusted	to ppm	wt.									
1-2	see	analyses	adjusted	for	flash									
2-1														
3-1	670	240	–	600	–	–	167000	6.2	–	0	670	720	mg/lit 276300	1.1803
3-2	320	102	NA	410	NA	NA	132000	NA	NA	NA	NA	NA	226000	NA
3-3	NA	82	67	420	360	NA	132000	NA	NA	NA	NA	793	220000	1.169
3-4	500	100	–	690	600	≥64	172000	–	–	<100	480	330	mg/lit 292400	1.205
3-5	see	analyses	corrected	for	flash									
4-1	NA	NA	NA	434	NA	25	154590	14	13	19	442	NA	266560	1.22
4-2	see	analyses	adjusted	for	flash									
4-3	NA	94	NA	NA	NA	NA	151000	NA	NA	NA	NA	NA	246000	NA
4-4	NA	86	NA	NA	NA	NA	140000	NA	NA	NA	NA	NA	234000	NA
4-5	NA	78	NA	NA	NA	NA	136000	NA	NA	NA	NA	NA	225000	NA
4-6	NA	85	NA	NA	NA	NA	139000	NA	NA	NA	NA	NA	239000	NA

SINC-1
SINC-2
SINC-3
WELL SINC-4

SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1-1	S	–	NA	NA	500	314	NA	NA	7530	1160	NA	24	NA	6620
1-2	S	–	see analyses adjusted for flash											
2-1														
3-1	FA	1.1803	NA	9.3	280	22960	NA	0.85	NA	13217	79.6	1940	1017	50580
3-2	FA	NA	NA	NA	270	22790	NA	11	750	12600	196	239	1100	51100
3-3	FA	–	0.047	NA	310	23000	12	10	1200	13000	210	130	1300	47000
3-4	EA	1.205	<0.5	NA	489	29295	NA	2.9	2075	13112	183	730	1411	50041
3-5	Rec	analyses corrected for flash												
4-1	?	– see analyses adjusted for flash												
4-2	FC	see analyses adjusted for flash												
4-3	TB	see analyses adjusted for flash												
4-4	TB	see analyses adjusted for flash												
4-5	TB	see analyses adjusted for flash												
4-6	TB	see analyses adjusted for flash												

SINC-1
SINC-2
SINC-3
SINC-4

WELL

SEPARATED BRINE ADJUSTED TO ppm WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
1-1	S	NA	NA	NA	NA	NA	11893	NA	NA	120	NA	NA	33921	
1-2	FC	see	analyses	adjusted	for	flash								
2-1														
3-1	FA	568/203	NA	508	NA	NA	141489	5.3	NA	0	568	610	234093	
3-2	FA	320/102	NA	410	NA	NA	132000	NA	NA	NA	NA	NA	226000	
3-3	FA	NA/82	67	420	360	NA	132000	NA	NA	NA	NA	793	220000	
3-4	FA	415/83	NA	573	498	≥53	142739	NA	NA	<83	398	274	242656	
3-5	FC	see	analyses	adjusted	for	flash								
4-1	?	see	analyses	adjusted	for	flash								
4-2	FC	see	analyses	adjusted	for	flash								
4-3	TB	see	analyses	adjusted	for	flash								
4-4	TB	see	analyses	adjusted	for	flash								
4-5	TB	see	analyses	adjusted	for	flash								
4-6	TB	see	analyses	adjusted	for	flash								

SINK-1
SINK-2
SINK-3
SINK-4

WELL

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
1-1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1-2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2-1																		
3-1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3-2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3-3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3-4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3-5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
4-1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4-3	–	–	–	–	–	–	–	–	–	–	450	12	–	–	–	–	–	–
4-4	–	–	0.0164	97.2	–	–	–	–	–	–	39200	2	–	–	–	–	–	39202
4-5	–	–	–	94.3	–	–	–	–	–	–	1760	8	–	–	–	–	–	–
4-6	–	–	0.0147	97.0	–	–	–	–	–	–	35100	5	–	–	–	–	–	35105

SINK-1
SINK-2
SINK-3
SINK-4

WELL

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
1-1	–	–	–	–	
1-2	–	–	–	–	
2-1					
3-1	–	–	–	–	
3-2	–	–	–	–	
3-3	–	–	–	–	
3-4	–	–	–	–	
3-5	–		–	–	
4-1	–	–	–	–	
4-2	–	–	–	–	
4-3	–	–	–	–	
4-4	–	–	–	–	
4-5	–	–	–	–	
4-6	–	–	–	–	

SINC-1
SINC-2
SINC-3
SINC-4

·WELL

DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
1	?								FILES			
2	S&T								REF 81-016m	ANDERSEN, 1981		
1												
1	GHT		-		-.		-		PURE OIL RPT 63-517	BOULET, 1963		
2	USGS								LETTER TO WESTERN GEOTHERMAL BY →	MIDDLETON, 1963 OF THERMAL POWER	USGS	Don White
3	SHELL		-		-		-					
4	POCO		-		.		-		PURE OIL RPT-63-517	BOULET, 1963		
5	S&T								REF-81-016m	Anderson, 1981		
-1	?		?		?		-		UCRL-51976	PALMER, 1975	UCR THESIS	FRECKMAN, 1978
-2	?		?		?		-		REF 81-016m	ANDERSEN, 1981	.	
-3	LLL		LLL		LLL		-		UCRL 77544	HILL & MORRIS, 1975		
-4	LLL		LLL		LLL		-		UCRL 77544	HLLL & MORRIS 1975		
-5	LLL		LLL		LLL		-		UCRL 77544	HILL & MORRIS, 1975		
-6	LLL		LLL		LLL		-		UCRL 77544	HILL & MORRIS, 1975		

.. WELL

DATA SOURCES

WELL	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
	UOU FIELD		UOU FIELD		UOU FIELD							
2	UURI		UURI		TCM		SMCL					
3	S&T		S&T		S&T		-		PMR 89-59M	Gallup, 1989		
4	UURI		UURI		TCM		SMCL					

84-1
84-2
WELL 85-1

SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
841213	41-1	50	50	31935	2.6	256	14.27	0.37	115985 EST	78'	315'	Perfed 285-265'
841143	41-2	50	50	31935	2.6	255	14.27	0.37	120370	78	315	"
841213	41-3	50	48	29668	1.9	248	14.27	0.27	118576 EST	78	315	"
841143	41-4	50	48	29668	1.9	239	14.27	0.27	153218	78	315	"
841143	41-5	50	47	27509	2.1	244	14.27	0.30	135780	78	315	"
841213	41-6	50	47	27509	2.1	249	14.27	0.30	116577 EST	78	315	"
850130	41-7	52	48	28017	1.7	251	12.96	0.22	101408	78	315	"
850130	41-8	53	48	28022	1.8	251	—	—	101408	78	315	"
850116	42-1	-	-	475	0	—	—	—	2400	70'	310'	PERFED @ 297-277' - (CONTAMINATED BY FRESH WATER)
851214	51-1	1	1	209	100	713	38	38	—	282	601	Perfed @ 558-538'
851214	51-2	1	1	209	100	713	38	38	—	282	601	Perfed @ 558-538
851214	51-3	1	1	209	100	—	100	100	—	282	601	Perfed @ 558-538
851214	51-4	1	1	209	100	—	100	100	—	282	601	Perfed @ 558-538
851221	51-5	26	16	26127	0.75	197	6.42	0.05	129000 S	282	601	Perfed @ 326-306'
851224	51-6	26	15.5	25284	0.78	196	6.24	0.05	124000 S	282	601	Perfed @ 326-306

WELL 84-1 84-2 85-1 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
41-1	NA	0.08	48.9	2761	NA	NA	14.5	697	15.4	268	NA	40734	8.2
41-2	NA	0.02	48.7	2688	NA	NA	8.1	703	15.3	265	NA	40583	7.5
41-3	NA	0.04	51.0	2703	NA	NA	7.9	728	16.4	271	NA	41861	7.1
41-4	NA	0.02	53.4	2668	NA	NA	4.7	712	16.0	267	NA	40023	6.8
41-5	NA	0.02	48.5	2596	NA	NA	10.8	683	15.3	267	NA	41316	7.5
41-6	NA	0.02	49.1	2645	NA	NA	10.0	691	15.5	271	NA	40905	7.5
41-7	NA	0.04	44.3	2335	NA	NA	0.4	628	14.8	249	NA	32490	46.2
41-8	NA	0.04	47.9	2443	NA	NA	0.5	636	15.7	240	NA	33194	45.2
42-1	NA	0.009	7.6	51	NA	NA	3.8	32	<1	12	NA	380	<0.5
51-1	–	–	–	–	–	–	–	–	–	–	–	–	–
51-2	–	–	–	–	–	–	–	–	–	–	–	–	–
51-3	–	–	–	–	–	–	–	–	–	–	–	–	–
51-4	–	–	–	–	–	–	–	–	–	–	–	–	–
51-5	NA	0.2	49.6	2769	<1.0	3.0	19.9	596	16.9	516	4.0	23125	3.0
51-6	NA	0.2	49.6	2798	<1.0	2.0	9.9	585	16.9	506	4.0	22225	5.0

WELL 84-1, 84-2, 85-1 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4 *	SiO2	TDS	
41-1	NA	NA	87.8	NA	<45	67800	1.4	NA	303	161	78	112970 EST	
41-2	NA	NA	83.9	NA	48.7	62589	1.8	NA	192	161	51	117241	
41-3	NA	NA	86.5	NA	68.3	64980	1.5	NA	308	168	65	116323 EST	
41-4	NA	NA	84.5	NA	48.0	68483	1.4	NA	190	166	51	150307	
41-5	NA	NA	54.8	NA	50.3	66734	1.3	NA	189	163	55	132928	
41-6	NA	NA	62.7	NA	<45	68994	1.3	NA	256	158	63	114128 EST	
41-7	<0.4	1.8	74.8	0.3	NA	62395	0.8	NA	249	152	168	99685	
41-8	<0.4	1.8	75.6	0.3	NA	62332	0.8	NA	252	151	168	99583	
42-1	NA	<1	<5	NA	<1	1290	0.6	NA	133	98	20	2400	
51-1	-	-	-	-	-	-	-	-	-	-	-	-	
51-2	-	-	-	-	-	-	-	-	-	-	-	-	
51-3	-	-	-	-	-	-	-	-	-	-	-	-	
51-4	-	-	-	-	-	-	-	-	-	-	-	-	
51-5	<0.5	1.0	109	1.0	<10	57764	<1	<3	323	-	312	128032	
51-6	<0.5	1.0	109	1.0	<10	59830	<1	<3	318	-	312	132955	

* NH_3 MEASURED IN BRINE ONLY.

- ... TOTAL DISCHARGE SEE NEXT PAGE.

WELL 84-1, 84-2, 85-1

SAMPLE #	GAS IN TOTAL DISCHARGE (ppm, wt)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
41-1	3684	2.6	167	—	—	10.9	0.34	—	—	
41-2	3684	2.6	167	—	—	10.9	0.34	—	—	
41-3	2695	1.5	173	—	—	7.9	0.24	-1.80	-51.2	
41-4	2695	1.5	171	—	—	7.9	0.24	—	—	
41-5	2982	1.9	168	—	—	8.9	0.27	—	—	
41-6	2982	1.9	163	—	—	8.9	0.27	—	—	
41-7	2191	0.5	156	—	2.0	6.2	0.16	-1.86	-52.2	
41-8	—	—	—	—	—	—	—	—	—	
42-1	396	<1	98	—	—	—	—	-1.75	-64	
51-1	377227	29.6	17.0	—	560	1087	19.3	—	—	
51-2	377494	29.6	17.0	—	438	1115	21.0	—	—	
51-3	986900	0	—	—	1600	8100	1000	—	—	
51-4	987100	0	—	—	2000	7700	1300	—	—	
51-5	482	0.07	—	—	0.37	0.42	0.05	—	—	
51-6	501	0.05	—	—	0.51	0.51	0.05	-1.48	-45.1	

84-1
84-2
WELL 85-1

WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	50'	100'	150'	200'	250'	300'	
41-1	78'	315'	285'															Perfed @ 285-265'
41-2	78	315	285									144	196	249	287	309	313	11/6/84
41-3	78	315	285															
41-4	78	315	285															
41-5	78	315	285															
41-6	78	315	285															
41-7	78	315	285															
41-8	78	315	285															
42-1	70'	310	297									97	117	137	158	175	(12/5/84)	Perfed @ 297-277'
51-1	282	610	601									100	200	300	400	500	590	Perfed @ 538-558'
51-2	282	610	601									185	234	280	303	342	382	12/9/85
51-3	282	610	601															
51-4	282	610	601															
51-5	282	610	601									50	100	150	200	250	300	Perfed @ 306-326'
51-6	282	610	601									134	178	207	228	251	262	

WELL 84-1 84-2 85-1

FLOW TEST FIELD DATA

SAMPLE #	DATE YYMMDD	TIME	STATUS DAYS	TYPE	WELL HEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
41-1	841213	1030	F-.01	S	50	297	50	—	50	265	829	3106	31935	2.6	256
41-2	841213	1030	F-.01	S	50	297	50	—	50	265	829	3106	31935	2.6	255
41-3	841213	1215	F-.08	S	50	297	48	—	47	265	572	29096	29668	1.9	248
41-4	841213	1215	F-.08	S	50	297	48	—	47	265	572	29096	29668	1.9	239
41-5	841213	1400	F-.17	S	50	297	47	—	47	265	572	26937	27509	2.1	244
41-6	841213	1400	F-.17	S	50	297	47	—	47	265	572	26937	27509	2.1	249
41-7	850130	1115	F-.04	S	52	298	48	—	46	287	488	27529	28017	1.7	251
41-8	850130	1302	F-.13	S	53	299	48	—	47	287	493	27529	28022	1.8	251
42-1	850116	1250	F-0.03	FC	—	90	—	—	—	—	0	475	475	0	—
51-1	851217	0830	F-.02	S	1	—	—	—	1	—	209	—	209	100	713
51-2	851217	0830	F-.02	S	1	—	—	—	1	—	209	—	209	100	713
51-3	851217	1045	F-.1	S	1	—	—	—	1	—	209	—	209	100	—
51-4	851217	1045	F-.1	S	1	—	—	—	1	—	209	—	209	100	—
51-5	851221	1200	F-.08	S	26	269	16	—	16	240	195	25932	26127	0.75	197
51-6	851221	1600	F-.2	S	26	270	15.5	—	15.5	240	197	25087	25284	0.78	196

WELL 84-1, 84-2, 85-1

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)							
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH
41-1	–	–	–	–	0.04	0.40	18.0	0.9	9.4	212	NA	NA
41-2	–	–	–	–	0.02	0.40	13.0	6.5	9.9	215	42	7.5
41-3	–	–	–	–	0.01	0.40	5.3	0.2	2.6	250	24	7.6
41-4	–	–	–	–	0.01	0.40	8.3	0.1	2.7	248	NA	NA
41-5	–	–	–	–	0.03	0.40	9.2	0.1	2.8	225	NA	NA
41-6	–	–	–	–	0.03	0.40	5.4	0.1	2.7	218	5	7.9
41-7	–	–	–	–	NA	NA	<10.0	NA	NA	251	6	7.5
41-8	–	–	–	–	NA	NA	<10.0	NA	NA	225	2	7.8
42-1	8.1	–	–	–	–	–	–	–	–	–	–	–
51-1	–	–	–	–	NA	NA	80	NA	NA	17	300	5.5
51-2	–	–	–	–	NA	NA	80	NA	NA	17	300	5.5
51-3	–	–	–	–	–	–	–	–	–	–	–	–
51-4	–	–	–	–	–	–	–	–	–	–	–	–
51-5	7.41	174	79089	133071	NA	NA	47	NA	NA	NA	NA	NA
51-6	7.16	174	77345	142636	NA	NA	4.8	NA	NA	NA	NA	NA

WELL 84-1
84-2
85-1

BRINE ANALYSES

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
41-1	S	mg/lit	NA	0.09	54.0	3050	NA	NA	16.0	770	17.0	296	NA	45000
41-2	S	mg/lit	NA	0.02	54.0	2980	NA	NA	9.0	780	17.0	294	NA	45000
41-3	S	mg/lit	NA	0.04	56.0	2970	NA	NA	8.7	800	18.0	298	NA	46000
41-4	S	mg/lit	NA	0.02	60.0	3000	NA	NA	5.3	800	18.0	300	NA	45000
41-5	S	mg/lit	NA	0.02	54.0	2890	NA	NA	12.0	760	17.0	297	NA	46000
41-6	S	mg/lit	NA	0.02	54.0	2910	NA	NA	11.0	760	17.0	298	NA	45000
41-7	S	mg/lit	NA	0.04	48.0	2530	NA	NA	0.4	680	16.0	270	NA	35200
41-8	S	mg/lit	NA	0.04	52.0	2650	NA	NA	0.5	690	17.0	260	NA	36000
42-1	FC	ppm	NA	0.009	7.6	51	NA	NA	3.8	32	<1	12	NA	380
51-1	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-2	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-3	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-4	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-5	S	ppm	NA	0.2	50	2790	<1.0	3	20	600	17	520	4	23300
51-6	S	ppm	NA	0.2	50	2820	<1.0	2	10	590	17	510	4	22400

WELL 84-1
84-2
85-1

BRINE ANALYSES

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
41-1	9.0	NA	NA	92.0	NA	<50.0	74900	1.5	NA	335	178	86	NA	–
41-2	8.3	NA	NA	93.0	NA	54.0	69400	2.0	NA	213	178	57	130000	–
41-3	7.8	NA	NA	95.0	NA	75.0	76900	1.6	NA	339	185	71	NA	–
41-4	7.6	NA	NA	95.0	NA	54.0	77000	1.6	NA	214	187	57	169000	–
41-5	8.3	NA	NA	61.0	NA	56.0	74300	1.5	NA	210	181	61	148000	–
41-6	8.2	NA	NA	69.0	NA	<50.0	75900	1.4	NA	282	174	69	NA	–
41-7	50.0	<0.40	2.0	81.0	0.30	NA	67600	0.9	NA	270	165	182	108000	–
41-8	49.0	<0.40	2.0	82.0	0.30	NA	67600	0.9	NA	273	164	182	108000	–
42-1	<0.5	NA	<1	<5	NA	<1	1290	0.6	NA	133	98	20	2400	1.01
51-1	–	–	–	–	–	–	–	–	–	–	–	–	–	–
51-2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
51-3	–	–	–	–	–	–	–	–	–	–	–	–	–	–
51-4	–	–	–	–	–	–	–	–	–	–	–	–	–	–
51-5	3	<0.5	1	110	1	<10	58200	<1	<3	325	–	314	129000 ppm	1.09
51-6	5	<0.5	1	110	1	<10	60300	<1	<3	320	–	314	134000 ppm	1.09

WELL 84-1, 84-2, 85-1 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
41-1	S	1.076	NA	0.08	50.2	2835	NA	NA	14.9	716	15.8	275	NA	41822
41-2	S	1.080	NA	0.02	50.0	2759	NA	NA	8.3	722	15.7	272	NA	41667
41-3	S	1.078	NA	0.04	51.9	2755	NA	NA	8.1	742	16.7	276	NA	42672
41-4	S	1.103	NA	0.02	54.4	2720	NA	NA	4.8	725	16.3	272	NA	40798
41-5	S	1.090	NA	0.02	49.5	2651	NA	NA	11.0	697	15.6	272	NA	42202
41-6	S	1.077	NA	0.02	50.1	2702	NA	NA	10.2	706	15.8	277	NA	41783
41-7	S	1.065	NA	0.04	45.1	2376	NA	NA	0.4	638	15.0	254	NA	33052
41-8	S	1.065	NA	0.04	48.8	2488	NA	NA	0.5	648	16.0	244	NA	33803
42-1	FC	see brine analyses adjusted for flash												
51-1	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-2	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-3	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-4	S	–	–	–	–	–	–	–	–	–	–	–	–	–
51-5	S	see brine analyses adjusted for flash												
51-6	S	see brine analyses adjusted for flash												

WELL 84-1, 84-2, 85-1 SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	
41-1	S	8.4/NA	NA	90.1	NA	<46	69610	1.4	NA	311	165	80	115985 EST	
41-2	S	7.7/NA	NA	86.1	NA	50.0	64259	1.9	NA	197	165	53	120370	
41-3	S	7.2/NA	NA	88.1	NA	69.6	71336	1.5	NA	314	172	66	118576 EST.	
41-4	S	6.9/NA	NA	86.1	NA	49.0	69810	1.5	NA	194	170	52	153218	
41-5	S	7.6/NA	NA	56.0	NA	51.4	68165	1.4	NA	193	166	56	135780	
41-6	S	7.6/NA	NA	64.1	NA	<46	70473	1.3	NA	262	162	52	116577 EST	
41-7	S	46.9/<0.4	1.9	76.1	0.3	NA	63474	0.8	NA	254	155	171	101408	
41-8	S	46.0/<0.4	1.9	77.0	0.3	NA	63474	0.8	NA	256	154	171	101408	
42-1	—	see brine analyses adjusted for flash												
51-1	—	—	—	—	—	—	—	—	—	—	—	—	—	—
51-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
51-3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
51-4	—	—	—	—	—	—	—	—	—	—	—	—	—	—
51-5	—	see brine analyses adjusted for flash												
51-6	—	see brine analyses adjusted for flash												

WELL 84-1 84-2 85-1

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							PPm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
41-1	14.27	196	0.0587	98.63	0.09	–	–	<0.5	0.80	0.20	141711	99.92	–	–	–	418	13	142242
41-2	14.27	196	0.0587	98.63	0.09	–	–	<0.5	0.80	0.20	141711	99.92	–	–	–	418	13	142242
41-3	14.27	196	0.0587	98.71	0.07	–	–	<0.5	0.80	0.19	141826	77.71	–	–	–	418	12.5	142334
41-4	14.27	196	0.0587	98.71	0.07	–	–	<0.5	0.80	0.19	141826	77.71	–	–	–	418	12.5	142334
41-5	14.27	196	0.0587	98.84	0.08	–	–	<0.5	0.81	0.20	142012	88.82	–	–	–	423	13	142537
41-6	14.27	196	0.0587	98.84	0.08	–	–	<0.5	0.81	0.20	142012	88.82	–	–	–	423	13	142537
41-7	12.96	137	0.0534	98.76	0.03	–	–	0.14	0.77	0.16	128872	30.25	251	–	116.25	365	9.6	129644
41-8	–	–	–	–	–	–	–	–	–	–	–	–	225	–	–	–	–	–
42-1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
51-1	38	NA	0.1565	98.67	0.01	–	–	0.23	0.78	0.11	377227	29.6	17.0	–	560	1087	19.3	378940
51-2	38	NA	0.1565	98.74	0.01	–	–	0.18	0.80	0.12	377494	29.6	17.0	–	438	1115	21.0	379115
51-3	100	NA	1.0	98.69	0.00	–	–	0.16	0.81	0.10	986900	0	NA	–	1600	8100	1000	1000000
51-4	100	NA	1.0	98.71	0.00	–	–	0.20	0.77	0.13	987100	0	NA	–	2000	7700	1300	1000000
51-5	6.42	8.9	0.0265	99.37	0.00	–	–	0.12	0.24	0.23	64233	8.9	NA	–	49.4	56.4	6.82	64354
51-6	6.24	6.5	0.0257	99.27	0.00	–	–	0.16	0.28	0.24	64168	6.5	NA	–	65.8	65.8	6.9	64313

WELL 84-1, 84-2, 85-1

ISOTOPIC ANALYSES

	SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
	41-1	–	–	–	–	
	41-2	–	–	–	–	
520	41-3	-1.73	-5.34	-51.0	-62.0	
	41-4	–	–	–	–	
	41-5	–	–	–	–	
	41-6	–	–	–	–	
521	41-7	-1.80	-5.35	-52.0	-61.0	
	41-8	–	–	–	–	
522	42-1	-1.75	–	-64	–	No steam
	51-1	–	–	–	–	
	51-2	–	–	–	–	
	51-3	–	–	–	–	
	51-4	–	–	–	–	
	51-5	–	–	–	–	
523	51-6	-1.45	-5.83	-45	-59	

WELL 84-1, 84-2, 85-1

DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
11-1	S&T		S&T		S&T		—		ARS-85-62m	BAUR, 1985		Reverante, 1984
11-2	S&T		S&T		S&T		—		ARS 85-62m	BAUR, 1985		Reverante, 1984
11-3	S&T		S&T		S&T		GGC		ARS 85-62m	BAUR, 1985		Reverante, 1984
11-4	S&T		S&T		S&T		—		ARS 85-62m	BAUR, 1985		Reverante, 1984
11-5	S&T		S&T		S&T		—		ARS 85-62m	BAUR, 1985		Reverante, 1984
11-6	S&T		S&T		S&T		—		ARS-85-62m	BAUR, 1985		Reverante, 1984
11-7	S&T		S&T		S&T		GGC		REF: 85-57m	GALLUP, 1985		Reverante, 1985
11-8	S&T		S&T		S&T		—		REF: 85-57m	GALLUP, 1985		Reverante, 1985
2-1	S&T		—		—		GGC		REF 85-18m	Gallup, 1985		Bush, 1985
1-1	S&T		S&T		S&T		—		REF 86-12m	Gallup, 1986		McFadden and Atkinson, 1986
1-2	S&T		S&T		S&T		—		REF 86-12m	Gallup, 1986		"
51-3	S&T		S&T		S&T		—		REF 86-12m	Gallup, 1986		"
51-4	S&T		S&T		S&T		—		REF 86-12m	Gallup, 1986		"
51-5	S&T		S&T		S&T		—		REF 86-12m	Gallup, 1986		"
51-6	S&T		S&T		S&T		GGC		REF 86-12m	Gallup, 1986		"

WELL 85-2 SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SIZE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
860305	1	63	37	36511 (est)	3.3 (est)	245	0.437	0.014	150500	274'	628'	Perfed at 322-302'
860305	2	71	61	30503 (est)	3.3 (est)	266	0.690	0.023	152400	274	628	"
860305	3	-	55	25725	3.2	261	0.174	0.006	153100	274	628	
860717	4	67	53	28389	2.8	242	0.68	0.019	109000 EST	274	628	
860717	5	67	53	28389	2.8	242	0.68	0.019	107253	274	628	
860717	6	67	52	26744	4.0	276	0.37	0.015	113819	274	628	
860717	7	67	52	26744	4.0	276	-	-	-	274	628	
860717	8	67	54	31331	3.8	275	0.21	0.008	116504	274	628	
860717	9	67	54	31331	3.8	275	-	-	-	274	628	
860717	10	67	55	30844	3.9	276	0.60	0.023	119564	274	628	
861202	11	-	65	29403	2.64	272	0.46	0.012	-	274	628	
861203	12	71	64	28033	3.15	276	0.72	0.023	-	274	628	
861203	13	71	65.5	28046	3.19	272	0.96	0.031	138151	274	628	
861204	14	71	64	27994	2.92	269	1.20	0.035	137039	274	628	
861204	15	70	45	34074	5.27	274	0.83	0.044	-	274	628	
861205	16	70	47	35768	5.21	275	1.07	0.056	142304	274	628	
861206	17	70	47.5	37347	5.15	275	1.10	0.057	-	274	628	
861207	18	70	48	36924	4.94	273	1.18	0.058	-	274	628	
861208	19	69	48	37463	5.05	274	1.14	0.058	141195	274	628	
861209	20	70.8	48	37864	4.95	274	1.23	0.061	-	274	628	
861210	21	-	47	37277	5.00	273	1.25	0.063	140852	274	628	
861211	22	71.1	47	36197	5.22	275	1.24	0.065	-	274	628	
861212	23	70.9	48	36610	5.18	276	1.09	0.056	141453	274	628	
861215	24	-	48	37041	5.14	275	1.25	0.064	-	274	628	

WELL 85-2 SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
861216	25	–	48	37041	5.14	276	1.26	0.065	–	274'	628'	Perfed @ 322-302'
861217	26	–	48	37033	5.10	275	1.27	0.065	140296	274	628	
861222	27	–	48	36992	5.09	275	1.50	0.076	138320	274	628	
861229	28	–	48	36561	5.10	276	1.50	0.077	–	274	628	
861230	29	–	48	36562	5.11	276	1.40	0.072	–	274	628	
861231	30	–	48	36136	5.16	276	1.23	0.063	138248	274	628	
870105	31	–	48	36542	5.05	275	1.34	0.068	137777	274	628	

WELL 85-2 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
1	<0.1	0.5	69	2601	NA	2.7	22.2	717	16.4	184	10.6	41291	6.8
2	0.3	0.3	68	2843	NA	2.2	16.4	703	16.4	182	10.6	35392	7.3
3	<0.1	0.2	71	2604	NA	3.3	19.4	717	16.5	173	10.6	36784	7.9
4	NA	NA	54	2126	NA	<0.5	4.6	690	NA	111	6.0	36336	7.4
5	<0.54	<6.8	64	2168	NA	<0.7	3.6	744	16.4	132	11.8	38217	8.2
6	<0.53	<6.6	63	2185	NA	<0.7	2.1	764	17.2	166	8.2	39972	13.6
7	—	—	—	—	—	—	—	—	—	—	—	—	—
8	<0.72	<9.0	63	2238	NA	<0.9	1.6	800	17.5	183	9.0	41410	14.5
9	—	—	—	—	—	—	—	—	—	—	—	—	—
10	<0.61	<7.6	64	2264	NA	<0.8	<0.3	802	17.9	187	9.4	42166	15.9
11	—	—	—	—	—	—	—	—	—	—	—	—	—
12	—	—	—	—	—	—	—	—	—	—	—	—	—
13	<0.73	<7.3	88	2670	NA	<0.9	2.9	922	20.9	228	11.3	49097	6.0
14	<0.73	<7.3	88	2663	NA	<0.9	2.3	911	20.9	235	11.5	49002	<4.5
15	—	—	—	—	—	—	—	—	—	—	—	—	—
16	<0.73	<7.3	91	2654	NA	<0.9	1.9	917	21.5	210	11.2	49879	<4.5
17	—	—	—	—	—	—	—	—	—	—	—	—	—
18	—	—	—	—	—	—	—	—	—	—	—	—	—
19	<0.73	<7.3	89	2633	NA	<0.9	1.0	903	21.0	209	10.8	49176	<4.5
20	—	—	—	—	—	—	—	—	—	—	—	—	—
21	<0.73	<7.3	90	2630	NA	<0.9	1.0	907	21.1	210	11.1	49160	<4.5
22	—	—	—	—	—	—	—	—	—	—	—	—	—
23	<0.73	<7.3	88	2666	NA	<0.9	0.9	917	21.3	218	11.4	49646	<4.5
24	—	—	—	—	—	—	—	—	—	—	—	—	—

WELL 85-2 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
25	—	—	—	—	—	—	—	—	—	—	—	—	—
26	<0.7	<6.9	85	2640	NA	<0.9	1.1	916	21.0	222	11.6	48817	<4.3
27	<0.7	<6.9	84	2617	NA	<0.9	0.6	906	20.5	225	11.8	47980	5.2
28	—	—	—	—	—	—	—	—	—	—	—	—	—
29	—	—	—	—	—	—	—	—	—	—			—
30	<0.7	<8.7	87	2632	NA	<0.9	2.7	904	20.5	236	12.2	47767	16.2
31	<0.7	<8.7	86	2638	NA	<0.9	5.8	898	20.4	243	12.3	47771	

WELL 85-2 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH_3	SiO_2	TDS	
1	<0.5	NA	98.6	2.4	72.5	78907	0.3	7.0	270	165	228	145534	
2	<0.5	NA	95.7	2.3	69.6	77400	0.3	9.7	237	164	213	147371	
3	0.8	NA	98.7	2.3	69.7	74246	0.4	9.7	240	166	243	148201	
4	<0.7	NA	79.7	<1.0	50.5	65860	NA	NA	245	154	155	105948 EST	
5	<2.7	NA	77.8	<1.4	52.1	62223	0.24	3.3	264	180	90.2	104250	
6	<2.6	NA	79.9	<1.3	50.2	65209	0.23	2.9	252	158	125	109266	
7	—	—	—	—	—	—	—	—	—	—	—	—	
8	<3.6	NA	83.2	<1.8	56.1	66661	0.25	2.8	244	178	133	112077	
9	—	—	—	—	—	—	—	—	—	—	—	—	
10	<3.0	NA	84.1	<1.5	55.8	68670	0.26	2.8	242	190	145	114901	
11	—	—	—	—	—	—	—	—	—	—	—	—	
12	—	—	—	—	—	—	—	—	—	—	—	—	
13	<3.6	NA	96.1	2.3	71.8	79913	0.34	9.4	230	197	180	133744	
14	<3.6	NA	96.9	2.2	74.7	79344	0.36	8.4	227	171	178	133038	
15	—	—	—	—	—	—	—	—	—	—		—	
16	<3.6	NA	96.1	1.7	75.3	80342	0.29	4.5	229	182	172	134892	
17	—	—	—	—	—	—	—	—	—	—	—	—	
18	—	—	—	—	—	—	—	—	—	—	—	—	
19	<3.6	NA	94.6	1.4	80.7	80265	0.40	10.1	231	168	169	134064	
20	—	—	—	—	—	—	—	—	—	—	—	—	
21	<3.6	NA	95.6	1.3	73.0	80033	0.35	8.9	231	169	167	133809	
22	—	—	—	—	—	—	—	—	—	—	—		
23	<3.6	NA	97.1	1.5	72.8	79808	0.31	8.9	232	166	166	134126	
24	—	—	—	—	—	—	—	—	—	—	—	—	

WELL 85-2 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
25	–	–	–	–	–	–	–	–	–	–	–	–	
26	<3.5	NA	98.1	1.5	73.8	79533	0.35	8.5	237	168	165	133085	
27	<3.5	NA	97.2	1.3	75.5	78655	0.30	8.0	233	175	162	131266	
28	–	–	–	–	–	–	–	–	–	–	–	–	
29	–	–	–	–	–	–	–	–	–	–	–	–	
30	<3.5	NA	97.3	<1.7	71.2	78677	0.31	9.0	237	172	167	131115	
31	<3.5	NA	96.5	1.8	71.3	78377	0.33	8.9	231	176	163	130820	

WELL 85-2

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
1	142	0.09	171	0	0	0	0.20	-1.26	-47.2	
2	226	0.16	170	0	0	0	0.25	—	—	
3	55	0.05	173	0	0	0	0.04	-1.30	-45.1	
4	—	—	—	—	—	—	—	—	—	
5	213	0.26	188	0.08	3.9	0.11	0.40	—	—	
6	254	0.48	168	0.08	5.8	0.13	0.22	-0.73	-46.2	
7	—	—	—	—	—	—	—	—	—	
8	—	—	—	—	—	—	—	—	—	
9	—	—	—	—	—	—	—	—	—	
10	282	0.52	197	0.03	2.0	0.33	0.11	<	—	
11	—	—	—	—	—	—	—	—	—	
12	282	0.88	—	0.04	1.4	0.36	0.03	—	—	
13	282	0.88	202	0.04	1.4	0.36	0.03	-0.35	-50.0	
14	412	1.12	176	0	0.42	0.67	0.04	-0.38	-51.0	
15	—	—	—	—	—	—	—	—	—	
16	761	1.73	190	0.05	1.12	0.98	0.04	-0.28	-50.2	
17	—	—	—	—	—	—	—	—	—	
18	—	—	—	—	—	—	—	—	—	
19	668	2.53	176	0.02	1.39	0.96	0.04	-0.27	-48.4	
20	—	—	—	—	—	—	—	—	—	
21	752	2.56	178	0	0.42	0.84	0.015	-0.31	-50.2	
22	—	—	—	—	—	—	—	—	—	
23	761	2.60	175	0.04	1.07	1.54	0.06	-0.31	-48.6	
24	—	—	—	—	—	—	—	—	—	

WELL 85-2

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
25	—	—	—	—	—	—	—	—	—	
26	775	2.7	176	0.05	1.7	1.6	0.06	-0.36	-51.1	
27	799	2.9	183	—	1.0	1.6	0.06	-0.41	-48.4	
28	—	—	—	—	—	—	—	—	—	
29	—	—	—	—	—	—	—	—	—	
30	857	3.1	181	—	0.9	1.8	0.06	-0.44	-50.3	
31	838	2.7	184	0.04	1.4	2.0	0.05	-0.48	-49.4	

WELL 85-2 WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	100'	200'	300'	400'	500'	575'	
1	274'	635'	628'															Perfed @ 322-302'
2	274	635	628									286	319	346	363	379	389	2/13/86
3	274	635	628															
4	274	635	628															INJECTION 3/6/86
5	274	635	628															
6	274	635	628															
7	274	635	628															
8	274	635	628															
9	274	635	628															
10	274	635	628															
11	274	635	628															
12	274	635	628															
13	274	635	628															
14	274	635	628															
15	274	635	628															
16	274	635	628															
17	274	635	628															
18	274	635	628															
19	274	635	628															
20	274	635	628															
21	274	635	628															
22	274	635	628															
23	274	635	628															
24	274	635	628															

WELL 85-2 WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	100'	200'	300'	400'	500'	600'	
25	274'	635'	628'															Perfed @ 322-302'
26	274	635	628															
27	274	635	628															
28	274	635	628															
29	274	635	628															
30	274	635	628															
31	274	635	628															

WELL 85-2

FLOW TEST FIELD DATA

SAMPLE #	DATE YYMMDD	TIME	STATUS DAYS	TYPE	WELL HEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
1	860305	1330	F-.13	S	63	345?	37	–	37	–	1166 (est)	35345	36511 (est)	3.3 (est)	245
2	860305	1516	F-.2	S	71	326	61	–	61	–	974 (est)	29529	30503 (est)	3.3 (est)	266
3	860305	1700	F-1	S	–	–	55	–	55	–	822	24903	25725	3.2	261
4	860717	1030	F-.04	S	67	–	53	–	53	–	789	27600	28389	2.8	242
5	860717	1030	F-.04	S	67	–	53	–	53	–	789	27600	28389	2.8	242
6	860717	1530	F-.23	S	67	–	52	–	52	–	1072	25672	26744	4.0	276
7	860717	1530	F-.23	S	67	–	52	–	52	–	1072	25672	26744	4.0	276
8	860717	2030	F-.44	S	67	–	54	–	54	–	1198	30133	31331	3.8	275
9	860717	2030	F-.44	S	67	–	54	–	54	–	1198	30133	31331	3.8	275
10	860717	2330	F-.63	S	67	–	55	–	55	–	1201	29643	30844	3.9	276
11	861202	–	F-.1	S	–	–	65	–	65	302	776	28627	29403	2.64	272
12	861203	–	F-1	S	71	–	64	–	64	302	883	27150	28033	3.15	276
13	861203	–	F-1.5	S	71	–	65.5	–	65.5	302	896	27150	28046	3.19	272
14	861204	–	F-2	S	71	–	64	–	64	303	817	27177	27994	2.92	264
15	861204	–	F-2.5	S	70	–	45	–	45	283	1796	32278	34074	5.27	274
16	861205	–	F-3	S	70	325	47	–	47	285	1865	33903	35768	5.21	275
17	861206	–	F-4	S	70	–	47.5	–	47.5	–	1922	35425	37347	5.15	275
18	861207	–	F-5	S	70	–	48	–	48	–	1825	35099	36924	4.94	273
19	861208	–	F-6	S	69	–	48	–	48	–	1891	35572	37463	5.05	274
20	861209	–	F-7	S	70.8	326	48	–	48	–	1874	35990	37864	4.95	274
21	861210	–	F-8	S	–	–	47	–	47	–	1863	35414	37277	5.00	273
22	861211	–	F-9	S	71.1	–	47	–	47	–	1888	34309	36197	5.22	275
23	861212	–	F-10	S	70.9	–	48	–	48	–	1895	34715	36610	5.18	276
24	861215	–	F-13	S	–	–	48	–	48	–	1905	35136	37041	5.14	275

WELL 85-2 FLOW TEST FIELD DATA

SAMPLE #	DATE YY mm DD	TIME	STATUS-DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
25	861216	–	F-14	S	–	–	48	–	48	–	1905	35136	37041	5.14	276
26	861217	–	F-15	S	–	–	48	–	48	–	1890	35143	37033	5.10	275
27	861222	–	F-20	S	–	–	48	–	48	–	1882	35110	36992	5.09	275
28	861229	–	F-27	S	–	–	48	–	48	–	1865	34696	36561	5.10	276
29	861230	–	F-28	S	–	–	48	–	48	–	1869	34693	36562	5.11	276
30	861231	–	F-29	S	–	–	48	–	48	–	1865	34271	36136	5.16	276
31	870105	–	F-34	S	–	–	48	–	48	–	1846	34696	36542	5.05	275

WELL 85-2

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)							
	pH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH
1	6.0	–	84149	145974	0.03	–	28.2	–	18.0	191	110	6.1
2	–	–	82888	141736	0.04	–	30.6	–	12.0	182	70	6.6
3	–	–	84277	148887	0.07	–	15.6	–	16.0	228	35	6.8
4	7.43	63	66447	130164	<0.01	2.1	30	1.3	16	268	–	6.6
5	7.43	63	66447	130164	<0.61	2.7	12.0	<0.52	19	295	336	–
6	7.38	97	72008	135303	<0.61	2.1	<1.0	<0.52	10.0	300	314	–
7	–	–	–	–	–	–	–	–	–	–	–	–
8	7.36	92.5	75331	144152	<0.61	3.1	<1.0	<0.52	15.0	223	241	–
9	–	–	–	–	–	–	–	–	–	–	–	–
10	7.27	81	76165	144608	<0.61	2.7	24.0	<0.52	23.0	238	289	–
11	7.14	–	79634	137613	–	–	–	–	–	–	–	–
12	7.04	–	80949	–	–	–	–	–	–	–	–	–
13	6.9	–	81808	–	<0.52	3.8	18.0	0.61	11.81	158	452	6.09
14	6.96	–	81345	137676	<0.52	2.2	20.0	0.55	10.5	178	473	6.56
15	7.1	–	82830	–	–	–	–	–	–	–	–	–
16	–	–	85216	142643	<0.52	5.6	130	0.51	59.3	161	625	6.08
17	7.05	–	80823	141945	–	–	–	–	–	–	–	–
18	6.97	–	82824	–	–	–	–	–	–	–	–	–
19	6.78	–	84323	143410	<0.52	5.1	85	<0.45	57.2	110	521	6.08
20	6.80	–	84560	141765	–	–	–	–	–	–	–	–
21	6.84	–	84358	141422	<0.52	3.62	40	<0.45	26.8	178	521	6.26
22	6.90	–	85731	142544	–	–	–	–	–	–	–	–
23	6.81	–	83634	141547	<0.52	4.4	52.0	<0.45	37.1	170	535	6.17
24	6.84	–	84371	–	–	–	–	–	–	–	–	–

WELL 85-2

FIELD ANALYSES AND STREAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STREAM ANALYSES (mg/liter)								
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	PH	
25	6.23	—	81989	141359	—	—	—	—	—	—	—	—	
26	6.78	—	82708	139416	<0.52	5.3	57.0	<0.45	56.7	178	574	6.23	
27	6.94	—	82229	145159	<0.52	3.2	58.0	<0.45	31.3	190	575	6.50	
28	6.97	—	84992	141929	—	—	—	—	—	—	—	—	
29	6.96	—	82214	140864	—	—	—	—	—	—	—	—	
30	6.83	—	83290	140633	<0.52	7.0	187	<0.45	118	165	754	5.75	
31	6.68	—	84454	137387	<0.52	6.7	226	0.60	132	162	804	5.68	

WELL 85-2 BRINE ANALYSES, ORIGINAL

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	ppm	<0.1	0.5	71	2690	–	2.8	23.0	741	17.0	190	11.0	42700
2	S	ppm	0.3	0.3	70	2940	–	2.3	17.0	727	17.0	188	11.0	36600
3	S	ppm	<0.1	0.2	73	2690	–	3.4	20.0	741	17.0	179	11.0	38000
4	S	ppm	NA	NA	56	2187	NA	<0.5	4.7	710	NA	114	6.2	37383
5	S	mg/liter	<0.59	<7.37	71	2355	NA	<0.74	3.9	808	17.8	143	12.8	41520
6	S	mg/liter	<0.59	<7.34	70	2447	NA	<0.73	2.35	855	19.3	186	9.2	44760
7	S	–	–	–	–	–	–	–	–	–	–	–	–	–
8	S	mg/liter	<0.81	<10.13	71	2506	NA	<1.01	1.83	896	19.6	205	10.1	46360
9	S	–	–	–	–	–	–	–	–	–	–	–	–	–
10	S	mg/liter	<0.68	<8.49	72	2540	NA	<0.85	<0.34	900	20.1	210	10.6	47300
11	S	–	–	–	–	–	–	–	–	–	–	–	–	–
12	S	–	–	–	–	–	–	–	–	–	–	–	–	–
13	S	mg/liter	<0.80	<8.0	99.5	3012	NA	<1.0	3.3	1040	23.6	257	12.8	55380
14	S	mg/liter	<0.80	<8.0	99.3	2996	NA	<1.0	2.6	1025	23.5	264	12.9	55120
15	S	–	–	–	–	–	–	–	–	–	–	–	–	–
16	S	mg/liter	<0.8	<8.0	105	3066	NA	<1.0	2.2	1059	24.8	243	12.9	57620
17	S	–	–	–	–	–	–	–	–	–	–	–	–	–
18	S	–	–	–	–	–	–	–	–	–	–	–	–	–
19	S	mg/liter	<0.8	<8.0	102	3034	NA	<1.0	1.14	1040	24.2	241	12.5	56660
20	S	–	–	–	–	–	–	–	–	–	–	–	–	–
21	S	mg/liter	<0.8	<8.0	103	3026	NA	<1.0	1.1	1044	24.3	242	12.8	56560
22	S	–	–	–	–	–	–	–	–	–	–	–	–	–
23	S	mg/liter	<0.8	<8.0	102	3076	NA	<1.0	1.0	1058	24.6	251	13.2	57280
24	S	–	–	–	–	–	–	–	–	–	–	–	–	–

WELL 85-2 BRINE ANALYSES, ORIGINAL

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
25	S	—	—	—	—	—	—	—	—	—	—	—	—	—
26	S	mg/liter	<0.8	<8.0	98	3042	NA	<1.0	1.32	1055	24.2	256	13.4	56340
27	S	mg/liter	<0.8	<8.0	97	3014	NA	<1.0	0.74	1043	23.6	259	13.6	55260
28	S	—	—	—	—	—	—	—	—	—	—	—	—	—
29	S	—	—	—	—	—	—	—	—	—	—	—	—	—
30	S	mg/liter	<0.8	<10.0	100	3030	NA	<1.0	3.11	1041	23.6	272	14.0	55000
31	S	mg/liter	<0.8	<10.0	99	3034	NA	<1.0	6.64	1033	23.5	280	14.2	54940

WELL 85-2 BRINE ANALYSES, ORIGINAL

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
1	7.0	<0.5	–	102	2.5	75	81600	0.3	7.2	279	171	236	150300 ppm	1.09
2	7.5	<0.5	–	99	2.4	72	77400	0.3	10.0	245	172	220	152400 ppm	1.09
3	8.2	0.8	–	102	2.4	72	76700	0.4	10.0	248	172	251	153100 ppm	1.09
4	7.6	<0.7	NA	82	<1	52	67757	NA	NA	252	158	159	NA	1.07
5	8.9	<2.95	NA	84.5	<1.47	56.7	67600	0.26	3.6	287	196	98	113259	–
6	15.2	<2.93	NA	89.5	<1.47	56.2	73020	0.26	3.2	282	177	140	122355	–
7	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	16.2	<4.05	NA	93.2	<2.03	62.8	74630	0.28	3.1	273	199	149	125475	–
9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	17.8	<3.40	NA	94.3	<1.70	62.6	77030	0.29	3.1	271	213	163	128890	–
11	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12	–	–	–	–	–	–	–	–	–	–	–	–	–	–
13	6.81	<4.0	NA	108.4	2.61	81.0	90140	0.38	10.6	259	222	203	150861	–
14	<5.0	<4.0	NA	109	2.53	84.0	89250	0.40	9.4	255	192	200	149647	–
15	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	<5.0	<4.0	NA	111	1.98	87.0	92810	0.34	5.2	264	210	199	155825	–
17	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	<5.0	<4.0	NA	109	1.64	93.0	92480	0.46	11.6	266	194	195	154467	–
20	–	–	–	–	–	–	–	–	–	–	–	–	–	–
21	<5.0	<4.0	NA	110	1.44	84.0	92080	0.40	10.2	266	194	192	153951	–
22	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	<5.0	<4.0	NA	112	1.71	84.0	92080	0.36	10.3	268	192	192	154750	–
24	–	–	–	–	–	–	–	–	–	–	–	–	–	–

WELL 85-2 BRINE ANALYSES, ORIGINAL

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
25	–	–	–	–	–	–	–	–	–	–	–	–	–	–
26	<5.0	<4.0	NA	113	1.68	85	91640	0.4	9.8	273	194	190	153344	–
27	6.0	<4.0	NA	112	1.49	87	90590	0.34	9.2	268	202	187	151184	–
28	–	–	–	–	–	–	–	–	–	–	–	–	–	–
29	–	–	–	–	–	–	–	–	–	–	–	–	–	–
30	18.7	<4.0	NA	112	<2.0	82.0	90590	0.36	10.4	273	198	192	150967	–
31	17.6	<4.0	NA	111	2.04	82.0	90140	0.38	10.2	266	202	187	150453	–

WELL 85-2 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
1	S	1.09	<0.1	0.5	71	2690	NA	2.8	23.0	741	17.0	190	11.0	42700
2	S	1.09	0.3	0.3	70	2940	NA	2.3	17.0	727	17.0	188	11.0	36600
3	S	1.09	<0.1	0.2	73	2690	NA	3.4	20.0	741	17.0	179	11.0	38000
4	S	1.07	NA	NA	56	2187	NA	<0.5	4.7	710	NA	114	6.2	37383
5	S	1.056	<0.6	<7.0	67	2230	NA	<0.5	3.7	765	16.9	135	12.1	39318
6	S	1.075	<0.6	<7.0	65	2276	NA	<0.7	2.2	795	18.0	173	8.6	41637
7	S	—	—	—	—	—	—	—	—	—	—	—	—	—
8	S	1.077	<0.8	<9.4	66	2327	NA	<0.9	1.70	832	18.2	190	9.4	43045
9	S	—	—	—	—	—	—	—	—	—	—	—	—	—
10	S	1.078	<0.6	<7.9	67	2356	NA	<0.8	<0.3	835	18.6	195	9.8	43878
11	S	—	—	—	—	—	—	—	—	—	—	—	—	—
12	S	—	—	—	—	—	—	—	—	—	—	—	—	—
13	S	1.092	<0.7	<7.3	91	2758	NA	<0.9	3.0	952	21.6	235	11.7	50714
14	S	1.092	<0.7	<7.3	91	2744	NA	<0.9	2.4	939	21.6	242	11.7	50476
15	S	—	—	—	—	—	—	—	—	—	—	—	—	—
16	S	1.095	<0.7	<7.3	96	2800	NA	<0.9	2.0	967	22.6	222	11.8	52621
17	S	—	—	—	—	—	—	—	—	—	—	—	—	—
18	S	—	—	—	—	—	—	—	—	—	—	—	—	—
19	S	1.094	<0.7	<7.3	93	2773	NA	<0.9	1.0	951	22.1	220	11.4	51792
20	S	—	—	—	—	—	—	—	—	—	—	—	—	—
21	S	1.093	<0.7	<7.3	94	2769	NA	<0.9	1.0	955	22.2	221	11.7	51747
22	S	—	—	—	—	—	—	—	—	—	—	—	—	—
23	S	1.094	<0.7	<7.3	93	2812	NA	<0.9	0.9	967	22.5	229	12.1	52358
24	S	—	—	—	—	—	—	—	—	—	—	—	—	—

WELL 852 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
25	S	—	—	—	—	—	—	—	—	—	—	—	—	—
26	S	1.093	<0.7	<7.3	90	2783	NA	<0.9	1.2	965	22.1	234	12.3	51546
27	S	1.093	<0.7	<7.3	89	2758	NA	<0.9	0.7	954	21.6	237	12.4	50558
28	S	—	—	—	—	—	—	—	—	—	—	—	—	—
29	S	—	—	—	—	—	—	—	—	—	—	—	—	—
30	S	1.092	<0.7	<7.3	92	2775	NA	<0.9	2.8	953	21.6	249	12.8	50366
31	S	1.092	<0.7	<7.3	91	2778	NA	<0.9	6.1	946	21.5	256	13.0	50311

WELL 85-2

SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	
1	S	7.0 / <0.5	NA	102	2.5	75	81600	0.3	7.2	279	171	236	150500	
2	S	7.5 / <0.5	NA	99	2.4	72	77400	0.3	10.0	245	172	220	152400	
3	S	8.2 / 0.8	NA	102	2.4	72	76700	0.4	10.0	248	172	251	153100	
4	S	7.6 / <0.7	NA	82	<1	52	67757	NA	NA	252	158	159	109000 EST	
5	S	8.4 / <2.8	NA	80	<1.4	53.7	64015	0.3	3.4	272	186	93	107253	
6	S	14.1 / <2.8	NA	83	<1.4	52.3	67926	0.24	3.0	262	165	130	113819	
7	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
8	S	15.0 / <3.8	NA	87	<1.9	58.3	69294	0.26	2.9	253	185	138	116504	
9	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
10	S	16.5 / <3.2	NA	87	<1.6	58.1	71456	0.27	2.9	251	198	151	119564	
11	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
12	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
13	S	6.2 / <3.7	NA	99	2.4	74.2	82546	0.35	9.7	237	203	186	138151	
14	S	<4.6 / <3.7	NA	99	2.3	76.9	81731	0.37	8.6	234	176	183	137039	
15	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
16	S	<4.6 / <3.7	NA	101	1.8	79.5	84758	0.31	4.7	241	192	182	142304	
17	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
18	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
19	S	<4.6 / <3.7	NA	100	1.5	85.0	84534	0.42	10.6	243	177	178	141195	
20	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
21	S	<4.6 / <3.7	NA	101	1.3	76.9	84245	0.37	9.3	243	177	176	140852	
22	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-
23	S	<4.6 / <3.7	NA	102	1.6	76.8	84168	0.33	9.4	245	176	176	141453	
24	S	- / -	-	-	-	-	-	-	-	-	-	-	-	-

WELL 85-2

SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
25	S	- / -	-	-	-	-	-	-	-	-	-	-	-	
26	S	<4.6 / <3.7	NA	103	1.5	77.8	83842	0.4	9.0	250	177	174	140296	
27	S	5.5 / <3.7	NA	102	1.4	79.6	82882	0.3	8.4	245	185	171	138320	
28	S	- / -	-	-	-	-	-	-	-	-	-	-	-	
29	S	- / -	-	-	-	-	-	-	-	-	-	-	-	
30	S	/ <3.7	NA	103	<1.8	75.1	82958	0.33	9.5	250	181	176	138248	
31	S	/ <3.7	NA	102	1.9	75.1	82546	0.35	9.3	244	185	171	137777	

WELL 85-2

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm (IN COMBINED) STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
1	0.437	18.5	0.00182	96.7	0.08	–	0.00	0.00	0.00	2.99	4299	2.8	–	0.00	0.00	0.00	6.1	4308
2	0.690	23.4	0.00288	97.32	0.09	–	0.00	0.00	0.00	2.36	6847	4.9	–	0.00	0.00	0.00	7.6	6860
3	0.174	23.5	0.00012	97.91	0.11	–	0.00	0.00	0.00	1.73	1722	1.5	–	0.00	0.00	0.00	1.4	1724
4	0.68	13.4	0.00284	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6857
5	0.68	13.4	0.00367	85.4	0.135	8.34	0.03	2.45	0.117	3.52	7600	9.3	287	2.73	139	3.80	14.4	8057
6	0.37	10.0	0.00303	86.3	0.213	8.62	0.03	3.08	0.122	1.61	6340	12.1	245	1.91	144	3.27	5.43	6751
7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
8	0.21	12.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	0.60	18.8	0.00327	91.4	0.218	6.31	0.012	1.0	0.29	0.744	7240	13.4	193	0.865	50.5	8.37	2.70	7509
11	0.46	16.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
12	0.72	30.0	0.00393	94.1	0.378	4.23	0.014	0.75	0.325	0.216	8950	27.8	156	1.17	45.4	11.3	0.943	9190
13	0.96	33.3	0.00393	94.1	0.378	4.23	0.014	0.75	0.325	0.216	8950	27.8	156	1.17	45.4	11.3	0.943	9190
14	1.20	38.9	0.0061	96.1	0.338	2.74	0.00	0.153	0.433	0.184	14100	38.5	156	0.00	14.3	23.1	1.24	14346
15	0.83	20.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	1.07	45.5	0.00641	96.3	0.278	2.72	0.00	0.219	0.335	0.115	14900	33.2	162	0.884	21.5	18.8	0.811	15088
17	1.10	33.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	1.18	33.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	1.14	40.1	0.00586	95.8	0.467	2.93	0.00	0.312	0.375	0.138	13500	51.1	160	0.412	28.0	19.3	0.893	13772
20	1.23	45.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
21	1.25	39.6	0.0062	96.3	0.424	2.87	0.00	0.0843	0.294	0.0408	14400	49.0	165	0.0843	8.01	16.0	0.279	14606
22	1.24	48.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	1.09	49.5	0.00636	95.8	0.424	2.84	0.00	0.212	0.533	0.153	14700	50.2	168	0.717	20.7	29.7	1.08	14934
24	1.25	54.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

WELL 85-2

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
25	1.26	53.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
26	1.27	54.3	0.00661	95.8	0.432	2.69	0.01	0.340	0.557	0.154	15200	53.2	165	1.0	34.3	32.2	1.12	15504
27	1.50	56	0.00683	96.0	0.441	2.71	0.00	0.195	0.533	0.149	15700	56.0	172	0.062	20.4	31.8	1.12	16026
28	1.50	55.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
29	1.40	56.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	1.23	61	0.00718	96.0	0.444	2.68	0.00	0.16	0.564	0.138	16600	59.3	179	0.06	17.4	35.4	1.09	16848
31	1.34	54.6	0.00721	96.1	0.404	2.47	0.00	0.257	0.634	0.131	16600	54.1	165	0.781	28.3	40.0	1.04	16934

WELL 85-N

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM
1	-1.15	-4.60	-47	-53
2	–	–	–	–
3	-1.20	-4.30	-45	-48
4	–	–	–	–
5	~~-0.3~~	–	~~-47~~	–
6	-0.6	-3.8	-46	-51
7	–	–	–	–
8	–	–	–	–
9	–	–	–	–
10	–	~~-3.6~~	~~-46.5~~	~~-53~~
11	–	–	–	–
12	–	–	–	–
13	-0.26	-3.21	-49.9	-52.4
14	-0.29	-3.34	-50.9	-53.6
15	–	–	–	–
16	-0.11	-3.36	-50.0	-54.1
17	–	–	–	–
18	–	–	–	–
19	-0.11	-3.36	-48.1	-55.0
20	–	–	–	–
21	-0.14	-3.46	-50.0	-54.4
22	–	–	–	–
23	-0.14	-3.47	-48.4	-53.0
24	–	–	–	–

WELL 85-2

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
25	–	–	–	–	
26	-0.21	-3.24	-50.9	-54.3	
27	-0.24	-3.61	-48.1	-54.0	
28	–	–	–	–	
29	–	–	–	–	
30	-0.28	-3.32	-50.1	-54.6	
31	-0.33	-3.36	-49.2	-53.0	

WELL 85-2

DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
1	S&T		S&T		S&T		GGC		REF 86-46M	Gallup, 1986		McFadden, 1986
2	S&T		S&T		S&T		—		REF 86-46M	Gallup, 1986		McFadden, 1986
3	S&T		S&T		S&T		GGC		REF 86-46M	Gallup, 1986		McFadden, 1986
4	S&T		S&T		—		—		REF 86-129M	Gallup, 1986		
5	UURI		UURI		TCM		GGC					
6	UURI		UURI		TCM		GGC					
7	—		—		—		—					
8	UURI		UURI		TCM		GGC					
9	—		—		—		—					
10	UURI		UURI		TCM		GGC					
11	—		—		—		—					
12	—		—		—		—					
13	UURI		UURI		TCM		SMU					
14	UURI		UURI		TCM		SMU					
15	—		—		—		—					
16	UURI		UURI		TCM		SMU					
17	—		—		—		—					
18	—		—		—		—					
19	UURI		UURI		TCM		TCM					
20	—		—		—		—					
21	UURI		UURI		TCM		TCM					
22	—		—		—		—					
23	UURI		UURI		TCM		TCM					
24	—		—		—		—					

WELL 85-2

DATA SOURCES

	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
25	–		–		–		–					
26	UURI		UURI		TCM		SMU					
27	UURI		UURI		TCM		SMU					
28	–		–		–		–					
29	–		–		–		–					
30	UURI		UURI		TCM		SMU					
31	UURI		UURI		TCM		SMU					

LANDERS-1 OH AND RD
LANDERS-2
WELL LANDERS-3

SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
770208	L-1-1	<5.0	—	135700 EST	23 EST	353	—	—	79199	5966	7705	OH
770404	L-1-2	31	—	278700 EST	23 EST	355	—	—	63132	5100	7060	RD
760226	L-2-1	—	—	—	—	—	—	—	4400	5947	6010	DST
760226	L-2-2	—	—	—	—	—	—	—	14683	5947	6010	DST
760226	L-2-3	—	—	—	—	—	—	—	20891	5947	6010	DST
760226	L-2-4	—	—	—	—	—	—	—	20772	5947	6010	DST
760226	L-2-5	—	—	—	—	—	—	—	23577	5947	6010	DST
760226	L-2-6	—	—	—	—	—	—	—	15079	5947	6010	DST
760303	L-2-7	—	—	—	—	—	—	—	15228	5947	7507	DST #2
760409	L-2-8	185	2.5	218400 EST	15.3	300	—	—	57874	5947	7567	
760409	L-2-9	185	5	260800 EST	18.1	328	—	—	54951	5947	7507	
760409	L-2-10	85	18	661100 EST	13.1	311	—	—	65577	5947	7507	
770504	L-2-11	213	4.2	182300	19.9	336	—	—	91919	5947	7507	
770512	L-2-12	158	4.2 EST	186300	23.1	365	15	3.47	71655	5947	7507	
770527	L-2-13	92	8.2	283160	20.9	346	—	—	104592	5947	7507	
761112	L-3-1	155	—	437700 EST	5 EST	208	—	—	25901	3114	4650	
770303	L-3-2	232	2.4	118800	5.4	210	—	—	26324	3114	4650	
770317	L-3-3	234	—	139881	4.3	204	40.7	1.75	—	3114	4650	

LANDERS-1 OH AND RD
LANDERS-2
LANDERS-3

WELL

RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
L-1-1	0.07	1.5	121	1945	–	0.11	79	1651	73	51	22	17250	73
L-1-2	–	–	–	867	–	–	0.07	6568	–	29	–	20261	–
L-2-1	–	–	2.4	38.2	–	–	0.55	98.0	–	37.6	–	1100	–
L-2-2	–	–	5.1	72.6	–	–	0.64	321	–	37.3	–	4464	–
L-2-3	–	–	22.1	53.1	–	–	21.8	436	–	28.5	–	6653	–
L-2-4	–	–	7.5	96.2	–	–	4.4	444	–	33.3	–	6337	–
L-2-5	–	–	10.9	60.9	–	–	4.2	443	–	30.8	–	8202	–
L-2-6	–	–	8.1	95.2	–	–	6.3	321	–	32.5	–	5079	–
L-2-7	–	–	59	476	–	–	193	655	–	49	1.5	3988	–
L-2-8	–	1.90	2.0	1391	–	0.08	0.9	1555	–	65	4.8	17186	–
L-2-9	–	2.43	1.7	1161	–	0.09	0.8	1352	–	33	3.7	15664	–
L-2-10	–	3.22	1.5	1412	–	0.03	49	1212	–	35	10.4	13787	–
L-2-11	0.15	0.86	114	3255	–	0.19	83	1158	326	757	6.7	19662	662
L-2-12	0.07	3.53	110	1803	–	0.15	48	1177	53	50	4.6	18581	442
L-2-13	–	–	–	3929	–	–	–	2439	–	104	–	25205	–
L-3-1	–	0.6	75	33	–	0.03	0.14	582	10.0	8.6	0.05	9387	–
L-3-2	–	–	101	9.1	–	–	0.09	439	42	11.7	–	8413	12.2
L-3-3	–	–	–	–	–	–	–	–	–	–	–	–	–

WELL LANDERS-1 OH & RD
LANDERS-2
LANDERS-3
RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
L-1-1	1.0	—	—	35	10.7	30536	1.9	—	<0.7	1.0	198	60983	
L-1-2	—	—	—	—	—	34733	—	—	37.5	—	—	48612	
L-2-1	—	—	—	—	—	272	2.0	—	550	—	72.8	4400	
L-2-2	—	—	—	—	—	6548	2.2	—	332	—	93.5	14683	
L-2-3	—	—	—	—	—	10991	1.6	—	112	—	225	20891	
L-2-4	—	—	—	—	—	9901	1.6	—	218	—	195	20772	
L-2-5	—	—	—	—	—	12154	1.6	—	77	—	232	23577	
L-2-6	—	—	—	—	—	7292	1.2	—	69	—	145	15079	
L-2-7	—	—	—	—	—	4960	3.8	—	2430	—	99	15228	
L-2-8	4.7	—	—	82	—	31752	0.71	—	1640	65.5	260	49020	
L-2-9	2.5	—	—	72	—	28466	1.16	—	1352	84.2	253	45035	
L-2-10	11.7	—	—	100	—	32253	1.30	—	1387	79	334	56986	
L-2-11	30	—	—	136	11.8	42397	1.24	—	0.4	0.92	258	73627	
L-2-12	12	—	—	110	9.3	32379	2.21	—	0.18	1.80	227	55102	
L-2-13	—	—	—	—	—	50410	—	—	—	—	262	82732	
L-3-1	<0.05	—	—	0.06	14.6	10608	6.6	—	70	<0.5	100	24606	
L-3-2	—	—	—	—	5.2	9348	1.07	—	15.2	0.17	88.4	24903	
L-3-3	—	—	—	—	—	—	—	—	—	—	—	—	

LANDERS-1 OH AND RD
LANDERS -2
WELL LANDERS -3

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
L-1-1	—	—	—	—	—	—	—	—	—	
L-1-2	—	—	—	—	—	—	—	—	—	
L-2-1	—	—	—	—	—	—	—	—	—	
L-2-2	—	—	—	—	—	—	—	—	—	
L-2-3	—	—	—	—	—	—	—	—	—	
L-2-4	—	—	—	—	—	—	—	—	—	
L-2-5	—	—	—	—	—	—	—	—	—	
L-2-6	—	—	—	—	—	—	—	—	—	
L-2-7	—	—	—	—	—	—	—	—	—	
L-2-8		—	—	—	—	—	—	—	—	
L-2-9	—	—	—	—	—	—	—	—	—	
L-2-10	—	—	—	—	—	—	—	—	—	
L-2-11	—	—	—	—	—	—	—	—	—	
L-2-12	33317	—	—	13.1	260	272	0.49	—	—	
L-2-13	—	—	—	—	—	—		—	—	
L-3-1	—	—	—	—	—	—	—	—	—	
L-3-2	—	—	—	—	—	—	—	—	—	
L-3-3	16466	—	—	15.4	604	85.6	0.26	—	—	

LANDERS-1 ON AND RD
LANDERS-2
WELL LANDERS-3

WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2500	3500	4500	5500	6500	7500	
L-1-1	5966	7705'	7705'									212	267	307	357	418	487	SLOTS 5745-7705'
L-1-2	5100	7000	7000									224	285	331	380	443		REDRILL SLOTS 5100-6998
L-2-1	5947	6010	6010															DST #1 5947-6010'
L-2-2	5947	6010	6010															DST #1
L-2-3	5947	6010	6010															DST #1
L-2-4	5947	6010	6010															DST #1
L-2-5	5947	6010	6010															DST #1
L-2-6	5947	6010	6010															DST #1
L-2-7	5947	7507	7507														SLOTS 5965-7507'	DST #2
L-2-8	5947	7507	7507															FLOW TESTS
L-2-9	5947	7507	7507															
L-2-10	5947	7507	7507															
L-2-11	5947	7507	7507															
L-2-12	5947	7507	7507															
L-2-13	5947	7507	7507															
												3000	3500	4000	4425			
L-3-1	3114	4650	4650									237	257	271	313			SLOTS 3013-4640'
L-3-2	3114	4650	4650															

LANDERS-1 OLD AND RD
LANDERS-2
WELL LANDERS-3

FLOW TEST FIELD DATA

SAMPLE #	DATE YY MM DD	TIME	STATUS-DAYS	TYPE	WELL HEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
L-1-1	770208	1600	F-1	FA	<5.0	–	–	–	–	–	31200 EST	104500	135700 EST	23 EST	353
L-1-2	770404	–	F-1	FA?	31	260	–	–	–	–	64100 EST	214600	278700 EST	23 EST	355
L-2-1	760226	–	*DP	DST	–	–	–	–	–	–	–	–	–	–	–
L-2-2	760226	–	DP	DST	–	–	–	–	–	–	–	–	–	–	–
L-2-3	760226	–	DP	DST	–	–	–	–	–	–	–	–	–	–	–
L-2-4	760226	–	DP	DST	–	–	–	–	–	–	–	–	–	–	–
L-2-5	760226	–	DP	DST	–	–	–	–	–	–	–	–	–	–	–
L-2-6	760226	–	DP	DST	–	–	–	–	–	–	–	–	–	–	–
L-2-7	760303	–	F?	DST	–	–	–	–	–	–	–	–	–	–	–
L-2-8	760409	1100	F-1	S	185	328	2.5	–	2.5	–	33400	185000 EST	218400 EST	15.3	300
L-2-9	760409	1330	F-1	S	185	344	5	–	5	–	47200	213600 EST	260800 EST	18.1	328
L-2-10	760409	1530	F-1	S	85	316	18	–	18	–	86600	574500 EST	661100 EST	13.1	311
L-2-11	770504	1707	F-1	S	213	351	4.2	–	4.2	–	36300	146000	182300	19.9	336
L-2-12	770512	1430	F-1	S	158	347	4.2 EST	–	4.2 EST	–	43000	143250	186300	23.1	365
L-2-13	770527	1800	F-1	S	92	326	8.2	–	8.2	–	59260	223900	283160	20.9	346
L-3-1	761112	1600	F-1	FA?	155	243	–	–	–	–	21700 EST	413000	437700 EST	5 EST	208
L-3-2	770303	1730	F-1	S?	232	226	2.4	–	2.4	–	6450	112,350	118800	5.4	210
L-3-3	770317	1630	F-1	S	234	228	–	–	–	–	6060	133821	139881	4.3	204

* DP = SAMPLE COLLECTED FROM DRILL PIPE AFTER FAILED DST

WELL LANDERS-1 OH AND RD
LANDERS-2
LANDERS-3

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	PH	
L-1-1	5.3	463	–	–	–	–	–	–	–	–	–	–	
L-1-2	7.5	601	–	–	–	–	–	–	–	–	–	–	
L-2-1	7.8	2180											
L-2-2	7.6	2060											
L-2-3	7.6	1620											
L-2-4	6.9	2040											
L-2-5	6.9	1940											
L-2-6	7.6	1780											
L-2-7	6.8	2500											
L-2-8	6.0	86											
L-2-9	6.1	102											
L-2-10	5.8	62											
L-2-11	5.9	93											
L-2-12	5.5	58.6											
L-2-13	5.0	–											
L-3-1	8.3	5840											
L-3-2	8.0	5001											
L-3-3													

LANDERS-1 OH AND RD

WELL LANDERS-2

LANDERS-3

BRINE ANALYSES, ORIGINAL

SAMPLE #	TYPE	CONCRN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
L-1-1	FA	mg/lit	0.1	2.08	165	2650	–	0.15	108	2250	100	70	30.0	23500
L-1-2	FA?	mg/lit	-	–	–	1168	–	-	0.10	8850	–	39	–	27300
L-2-1	DST	mg/lit			2.4	382			0.55	98.0		37.6		1100
L-2-2	DST	mg/lit			5.1	73.2			0.65	324		37.6		4500
L-2-3	DST	mg/lit			22.4	53.6			22.0	440		28.8		6720
L-2-4	DST	mg/lit			7.6	97.2			4.4	448		33.6		6400
L-2-5	DST	mg/lit			11.0	61.6			4.2	448		31.2		8300
L-2-6	DST	mg/lit			8.2	96			6.4	324		32.8		5120
L-2-7	DST	ppm			59	480		<0.1	195	660		49	1.5	4020
L-2-8	S	mg/lit		2.32	2.4	1700		0.10	1.1	1900		80	5.9	21000
L-2-9	S	mg/lit		3.05	2.2	1460		0.11	1.0	1700		42	4.7	19700
L-2-10	S	mg/lit		3.85	1.8	1690		0.10	59	1450		42	12.5	16500
L-2-11	S	mg/lit	0.2	1.14	150	4300		0.25	110	1530	431	1000	8.8	25970
L-2-12	S	mg/lit	0.1	4.80	150	2450		0.2	65	1600	72	68	6.25	25250
L-2-13	S	mg/lit				5300				3290		140		34000
L-3-1	FA?	mg/lit		0.60	80	35		0.03	0.15	620	10.6	9.2	0.05	10000
L-3-2	S?	mg/lit			108	9.7			0.10	470	45	12.5		9000
L-3-3	S													

WELL LANDERS-1 OH AND RJ
LANDERS-2
LANDERS-3

BRINE ANALYSES, ORIGINAL

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP GRAV. g/cc
L-1-1	100	1.4	–	–	48	14.6	41600	2.64	–	<1.0	1.4	269.5	83080	–
L-1-2	–	–	–	–	–	–	46800	–	–	50.5	–	–	65500	–
L-2-1							272	2.0		550		72.8	4400	
L-2-2							6600	2.2		335		94.2	14800	
L-2-3							11100	1.6		113		227	21100	
L-2-4							10000	1.6		220		197	20980	
L-2-5							12300	1.6		78		235	23860	
L-2-6							7350	1.2		70		146	15200	
L-2-7							5000	3.8		2450		100	15350	
L-2-8		5.8			100		38800	0.87		2004	80	318	59900	
L-2-9		3.1			90		35800	1.46		1700	106	318	56600	
L-2-10		14.0			120		38600	1.56		1660	95	400	68200	
L-2-11	875	39.0			180	15.6	56000	1.64		0.5	1.22	341	97250	
L-2-12	600	16			150	12.6	44000	3.0		0.25	2.44	308	74879	
L-2-13							68000					353	111600	
L-3-1		<0.05			0.06	15.4	11300	7.0		75	<0.5	106	26212	
L-3-2	13					5.6	10000	1.14		163	0.18	94.6	26640	
L-3-3														

WELL LANDERS-1 (1 OIL AND RI)
LANDERS-2
LANDERS-3

SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
L-1-1	FA	1.049	0.1	2.0	157	2526	–	0.14	103	2145	95	67	28.6	22402
L-1-2	FA ?	1.0375	–	–	–	1126	–	–	0.1	8530	–	38	–	26013
L-2-1	DST	1.0	–	–	2.4	38.2	–	–	0.55	98.0	–	37.6	–	1100
L-2-2	DST	1.008	–	–	5.1	72.6	–	–	0.64	321	–	37.3	–	4464
L-2-3	DST	1.01	–	–	22.1	53.1	–	–	21.8	436	–	28.5	–	6653
L-2-4	DST	1.01	–	–	7.5	96.2	–	–	4.4	444	–	33.3	–	6337
L-2-5	DST	1.012	–	–	10.9	60.9	–	–	4.2	443	–	30.3	–	8202
L-2-6	DST	1.008	–	–	8.1	95.2	–	–	6.3	321	–	32.5	–	5079
L-2-7	DST	1.008	–	–	59	476	–	–	193	655	–	49	1.5	3988
L-2-8	S	1.035	–	2.24	2.3	1643	–	0.1	1.1	1836	–	77	5.7	20290
L-2-9	S	1.03	–	3.0	2.1	1417	–	0.11	0.97	1650	–	41	4.6	19126
L-2-10	S	1.04	–	3.7	1.7	1625	–	0.1	57	1394	–	40	12.0	15865
L-2-11	S	1.058	0.2	1.08	142	4064	–	0.24	104	1446	407	945	8.3	24546
L-2-12	S	1.045	0.1	4.6	144	2344	–	0.20	62	1531	69	65	6.0	24163
L-2-13	S	1.067	–	–	–	4967	–	–	–	3083	–	131	–	31865
L-3-1	FA ?	1.012	–	0.60	79	35	–	0.03	0.15	613	10.5	9.1	0.05	9881
L-3-2	S ?	1.012	–	–	107	9.6	–	–	0.10	464	44	12.4	–	8893
L-3-3	S	–	–	–	–	–	–	–	–	–	–	–	–	–

WELL LANDERS-1 OLD AND RD
LANDERS-2
LANDERS-3

SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
L-1-1	FA	95./1.3	–	–	46	13.9	39657	2.5	–	<1.0	1.3	257	79199	
L-1-2	FA?	–/–	–	–	–	–	45108	–	–	48.7	–	–	63132	
L-2-1	DST	–/–	–	–	–	–	272	2.0	–	550	–	72.8	4400	
L-2-2	DST	–/–	–	–	–	–	6548	2.2	–	332	–	93.5	14683	
L-2-3	DST	–/–	–	–	–	–	10991	1.6	–	112	–	225	20891	
L-2-4	DST	–/–	–	–	–	–	9901	1.6	–	218	–	195	20772	
L-2-5	DST	–/–	–	–	–	–	12154	1.6	–	77	–	232	23577	
L-2-6	DST	–/–	–	–	–	–	7292	1.2	–	69	–	145	15079	
L-2-7	DST	–/–	–	–	–	–	4960	3.8	–	2430	–	99	15228	
L-2-8	S	–/5.6	–	–	97	–	37488	0.84	–	1936	72.3	307	57874	
L-2-9	S	–/3.0	–	–	87	–	34757	1.42	–	1650	103	309	54951	
L-2-10	S	–/13.5	–	–	115	–	37115	1.50	–	1596	91	385	65577	
L-2-11	S	827/37	–	–	170	14.7	52930	1.55	–	0.5	1.15	322	91919	
L-2-12	S	574/15	–	–	144	12.1	42105	2.88	–	0.24	2.33	295	71655	
L-2-13	S	–/–	–	–	–	–	63730	–	–	–	–	331	104592	
L-3-1	FA?	–/<0.05	–	–	0.06	15.2	11166	6.9	–	74	<0.5	105	25901	
L-3-2	S?	12.8/–	–	–	–	5.5	9881	1.13	–	16.1	0.18	93.5	26324	
L-3-3	S	–/–	–	–	–	–	–	–	–	–	–	–	–	

WELL LANDERS-1 OH AND RD
LANDERS-2
LANDERS-3

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
L-1-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L-1-2																		
L-2-1																		
L-2-2																		
L-2-3																		
L-2-4																		
L-2-5																		
L-2-6																		
L-2-7																		
L-2-8																		
L-2-9																		
L-2-10																		
L-2-11																		
L-2-12	15.0	-	0.0731	96.465	0	-	0.041	1.167	2.131	0.003	146397	0	-	56.5	1127	1179	0.21	148760
L-2-13																		
L-3-1	18.9*			98.82				0.12	1.02									
L-3-2																		
L-3-3	40.7	-	0.284	92.996	-	-	0.096	5.356	1.326	0.032	382940	-	-	359	14038	1990	6.04	

* SINGLE SAMPLE

LANDERS-1 OH AND RD

WELL LANDERS-2

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
L-1-1					
L-1-2					
L-2-1					
L-2-2					
L-2-3					
L-2-4					
L-2-5					
L-2-6					
L-2-7					
L-2-8					
L-2-9					
L-2-10					
L-2-11					
L-2-12					
L-2-13					
L-3-1					
L-3-2					
L-3-3					

LANDERS-1 OH AND RJ
WELL LANDERS-2

DATA SOURCES

WELL #	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
-1-1	Quality	Water Lab							Republic	Matlick, 1977		
-1-2	"	"							"	Matlick, 1977		
-2-1	Quality								Republic	TURNER, 1976a		
-2-2	"								"	"		
-2-3	"								"	"		
L-2-4	"								"	"		
L-2-5	"								"	"		
L-2-6	"								"	"		
-2-7	ORLANDO								"	TURNER, 1976B		
-2-8	Quality								Republic	Matlick, 1976		
-2-9	"								"	"		
-2-10	"								"	"		
-2-11	Quality								"	Matlick, 1977		
-2-12	"				WEST WAST				"	"		
-2-13	"								"	"		
-3-1	Quality				West Wast				"	Matlick, 1977		
-3-2	"								"	"		
L-3-3	"				West Coast				"	"		

WELL DEARBORN-1
DEARBORN-2
KALIN-1

DATA SOURCES

MPLE #	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
-1-1									Republic	Matlick		
-1-2										"		
-1-3										"		
-1-4										"		
-1-5										"		
-2-1										"		
-1-1										"		

WELL DEARBORN-1 DEARBORN-2 KALIN-1

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
D-1-1					
D-1-2					
D-1-3					
D-1-4					
D-1-5					
D-2-1					
K-1-1					

WELL DEARBORN-1, DEARBORN-2, KALIN-1

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							PPM IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
D-1-1																		
D-1-2																		
D-1-3																		
D-1-4																		
D-1-5																		
D-2-1				95.79	0			1.03	2.96									
K-1-1																		

WELL DEARBORN-1, DEARBORN-2, KALIN-1 SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	
D-1-1	DST	— / —	—	—	—	—	6238	—	—	—	—	—	19025	
D-1-2	DST	— / —	—	—	—	—	6040	1.81	—	139	—	—	18786	
D-1-3	DST	- / -	—	—	—	—	5150	1.41	—	125	—	242?	12800	
D-1-4	DST	- / -	—	—	—	—	4700	—	—	—	-	273?	13070	
D-1-5	S	- / -	—	—	0.02	0.31	6852	0.93	—	48	<0.2	—	16534	
D-2-1	S	— / <0.2	—	—	<0.01	9.9	7881	0.97	—	69	<0.2	117	21693	
K-1-1	S	— / 0.3	—	—	0.08	20.4	24757	1.7	—	42.7	—	314	51373	

WELL DEARBORN-1 DEARBORN-2 KALIN-1 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
D-1-1	DST	1.01	—		—	22	—	—	—	109	—	—	—	7376
D-1-2	DST	1.01	—	0.8	65	38.0	—	—	—	188	—	2.9	—	7376
D-1-3	DST	1.005	—	1.7	36	122	—	—	—	180	—	22	—	3230
D-1-4	DST	1.005	—	—	—	162	—	—	—	170	—	—	—	3580
D-1-5	S	1.007	—	2.1	53	14	—	<0.02	0.12	333	—	4.4	<0.02	4916
D-2-1	S	1.01	0.06	0.173	69.3	87	—	0.11	0.15	921	38	26.2	0.03	6931
K-1-1	S	1.03	0.09	1.28	81.6	796	—	0.1	0.8	3398	91	68	1.51	13107

WELL DEARBORN-1
DEARBORN-2
KALIN-1

BRINE ANALYSES, ORIGINAL

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
D-1-1	DST	mg/lit				32				110				7450
D-1-2	DST	mg/lit		0.8	66	38.4				190		2.9		7450
D-1-3	DST	mg/lit		1.7	36	122				180		22		3230
D-1-4	DST	mg/lit				162				170				3580
D-1-5	S	mg/lit		2.1	53	14.0		<0.02	0.12	335		4.4	<0.02	4950
D-2-1	S	mg/lit	0.06	0.175	70	88		0.11	0.15	930	38	26.5	0.03	7000
K-1-1	S	mg/lit	0.09	1.32	84	820	–	0.1	0.8	3500	94	70	1.56	13500

WELL DEARBORN-1
DEARBORN-2
KALIN-1

BRINE ANALYSES, ORIGINAL

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
D-1-1							6300					?	19215	
D-1-2							6100	1.83		140		?	18974	
D-1-3							5150	1.41		125		242?	12800	
D-1-4							4700					273?	13070	
D-1-5					0.02	0.31	6900	0.93		48	<0.2	?	16650	
D-2-1		<0.2			<0.01	10.0	7960	0.98		70	<0.2	118	21910	
K-1-1	–	0.3	–	–	0.08	21.0	25500	1.7	–	44	–	323	52914	

WELL DEARBORN-1, DEARBORN-2, KALIN-1

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	pH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	pH	
D-1-1	7.4	–											
D-1-2	7.4	7420											
D-1-3	7.3	4270											
D-1-4	7.3	-											
D-1-5	8.3	2110											
D-2-1	7.3	6590											
K-1-1	7.8	223											

WELL DEARBORN-1 DEARBORN-2 KALIN-1

FLOW TEST FIELD DATA

SAMPLE #	DATE YY MM DD	TIME	STATUS DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
D-1-1	760729	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-2	760729	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-3	760803	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-4	760803	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-5	760821		F-1	S	40	238	2.3	208	2.3	208	4900	103000	107900	4.54	223
D-2-1	770121	1000	F-1	S	159	213	0 EST	–	0 EST	–	11000	263000	274000	4	211
K-1-1	770113	–	F-1	S?	40 EST	290	5 EST	–	5	–	41200	254900	296100	13.9	305

WELL DEARBORN-1 DEARBORN-2 KALN-1

WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2500'	3500'	4500'	5500'	6500'	7500'	
D-1-1	—	3327	3327															DST #1 3236-3327
D-1-2	—	3327	3327															DST #1
D-1-3	4995	5044	5044															DST #2 4994-5044'
D-1-4	4995	5044	5044														-	DST #2
D-1-5	4995	8000	8000									197	236	279	320	362	402	SLOTS 5351-8000'
D-2-1	3087'	4564	4564										222	274				SLOTS 2882-4582'
K-1-1	5355'	8490	8490										245	287	334	388	439	SLOTS 5090-8490'

WELL DEARBORN-1
DEARBORN-2
KALIN-1

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
D-1-1	–	–	–	–	–	–	–	–	–	
D-1-2	–	–	–	–	–	–	–	–	–	
D-1-3	–	–	–	–	–	–	–	–	–	
D-1-4	–	–	–	–	–	–	–	–	–	
D-1-5	–	–	–	–	–	–	–	–	–	
D-2-1	–	–	–	–	–	–	–	–	–	
K-1-1	–	–	–	–	–	–	–	–	–	

WELL DEARBORN-1 / DEARBORN-2 / KALIN-1 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
D-1-1	—	—	—	—	—	6238	—	—	—	—	—	19025	
D-1-2	—	—	—	—	—	6040	1.81	—	139	—	—	18786	
D-1-3	—	—	—	—	—	5150	1.41	—	125	—	242?	12800	
D-1-4	—	—	—	—	—	4700	—	—	—	—	273?	13070	
D-1-5	—	—	—	0.02	0.31	6541	0.93	—	45.5	<0.2	—	15734	
D-2-1	<0.2	—	—	<0.01	9.5	7566	0.93	—	67	<0.2	112	20825	
K-1-1	0.25	—	—	0.07	17.6	21316	1.4	—	36.8	—	270	44232	

DEARBORN-1
DEARBORN-2

WELL KALIN-1

RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
D-1-1	–	–	–	22	–	–	–	109	–	–	–	7376	–
D-1-2	–	0.8	65	38.0	–	–	–	188	–	2.9	–	7376	–
D-1-3	–	1.7	36	122	–	–	–	180	–	22	–	3230	–
D-1-4	–	–	–	162	–	–	–	170	–	–	–	3580	–
D-1-5	–	2.0	50	13.3	–	<0.02	0.12	318	–	4.2	<0.02	4692	–
D-2-1	0.06	0.166	66.5	84	–	0.10	0.14	884	36	25.2	0.03	6653	–
K-1-1	0.07	1.10	70	685	–	0.08	0.7	2926	79	59	1.30	11285	–

WELL Dearborn-1, Dearborn-2, Kelin-1

SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
760729	D-1-1	—	—	—	—	—	—	—	19025	—	3327	DST
760729	D-1-2	—	—	—	—	—	—	—	18786	—	3327	DST
760803	D-1-3	—	—	—	—	—	—	—	12800	4995	5044	DST
760803	D-1-4	—	—	—	—	—	—	—	13070	4995	5044	DST
760827	D-1-5	40	2.3	107900	4.54	223	—	—	16534	4995	8000	
770121	D-2-1	159	atm?	274000	4	211	—	—	21693	3037	4564	
770113	IC-1-1	40	5 EST	296100	13.9	305	—	—	51373	5355	8490	

WELL DEARBORN-1
DEARBORN-2
KALIN-1

DATA SOURCES

WELL	BRINE		STEAM		NCG		ISOTOPES		REFERENCE #1	AUTHOR	REFERENCE #2	AUTHOR
	LAB	#	LAB	#	LAB	#						
-1-1									Republic	Matlick		
-1-2										"		
-1-3										"		
-1-4										"		
-1-5										"		
-2-1										"		
-1-1										"		

WELL DEARBORN-1 DEARBORN-2 KALIN-1

ISOTOPIC ANALYSES

SAMPLE #	$\delta^{18}O$ BRINE	$\delta^{18}O$ STEAM	δD BRINE	δD STEAM	
D-1-1					
D-1-2					
D-1-3					
D-1-4					
D-1-5					
D-2-1					
K-1-1					

WELL DEARBORN-1 DEARBORN-2 KALIN-1

NON-CONDENSIBLE GAS ANALYSES

SAMPLE #	FIELD WT% NCG	FIELD H_2S (ppm)	GAS/STM mole RATIO	Mole % IN Dry Gas							ppm IN COMBINED STEAM + CONDENSATE							Σ GAS
				CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	ppm IN STM
D-1-1																		
D-1-2																		
D-1-3																		
D-1-4																		
D-1-5																		
D-2-1				95.79	0			1.03	2.96									
K-1-1																		

WELL DEARBORN-1, DEARBORN-2, KALIN-1 SEPARATED BRINE ADJUSTED TO PPM WT. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	Ba/Pb	Rb	Sr	Zn	Br	Cl	F	I	SO_4	NH_4	SiO_2	TDS	
D-1-1	DST	— / —	—	—	—	—	6238	—	—	—	—	—	19025	
D-1-2	DST	— / —	—	—	—	—	6040	1.81	—	139	—	—	18786	
D-1-3	DST	— / —	—	—	—	—	5150	1.41	—	125	—	242?	12800	
D-1-4	DST	— / —	—	—	—	—	4700	—	—	—	—	273?	13070	
D-1-5	S	— / —	—	—	0.02	0.31	6852	0.93	—	48	<0.2	—	16534	
D-2-1	S	— / <0.2	—	—	<0.01	9.9	7881	0.97	—	69	<0.2	117	21693	
K-1-1	S	— / 0.3	—	—	0.08	20.4	24757	1.7	—	42.7	—	314	51373	

WELL DEARBORN-1 DEARBORN-2 KALIN-1 SEPARATED BRINE ADJUSTED TO ppm wt. (TYPE FC = FLASH CORRECTED)

SAMPLE #	TYPE	DENSITY ADJUSTMENT FACTOR	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
D-1-1	DST	1.01	–		–	22	–	–	–	109	–	–	–	7376
D-1-2	DST	1.01	–	0.8	65	38.0	–	–	–	188	–	2.9	–	7376
D-1-3	DST	1.005	–	1.7	36	122	–	–	–	180	–	22	–	3230
D-1-4	DST	1.005	–	–	–	162	–	–	–	170	–	–	–	3580
D-1-5	S	1.007	–	2.1	53	14	–	<0.02	0.12	333	–	4.4	<0.02	4916
D-2-1	S	1.01	0.06	0.173	69.3	87	–	0.11	0.15	921	38	26.2	0.03	6931
K-1-1	S	1.03	0.09	1.28	81.6	796	–	0.1	0.8	3398	91	68	1.51	13107

WELL DEARBORN-1
DEARBORN-2
KALIN-1

BRINE ANALYSES, ORIGINAL

SAMPLE #	TYPE	CONCEN. UNITS	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na
D-1-1	DST	mg/lit				22				110				7450
D-1-2	DST	mg/lit		0.8	66	38.4				190		2.9		7450
D-1-3	DST	mg/lit		1.7	36	122				180		22		3230
D-1-4	DST	mg/lit				162				170				3580
D-1-5	S	mg/lit		2.1	53	14.0		<0.02	0.12	335		4.4	<0.02	4950
D-2-1	S	mg/lit	0.06	0.175	70	88		0.11	0.15	930	38	26.5	0.03	7000
K-1-1	S	mg/lit	0.09	1.32	84	820	-	0.1	0.8	3500	94	70	1.56	13500

WELL DEARBORN-1, DEARBORN-2, KALIN-1

BRINE ANALYSES, ORIGINAL

SAMPLE #	Ba	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO_2	TDS	MEAS. SP. GRAV. g/cc
D-1-1							6300					?	19215	
D-1-2							6100	1.83		140		?	18974	
D-1-3							5150	1.41		125		242?	12800	
D-1-4							4700					273?	13070	
D-1-5					0.02	0.31	6900	0.93		48	<0.2	?	16650	
D-2-1		<0.2			<0.01	10.0	7960	0.98		70	<0.2	118	21910	
K-1-1	–	0.3	–	–	0.08	21.0	25500	1.7	–	44	–	323	52914	

WELL DEARBORN-1
DEARBORN-2
KALIN-1

FIELD ANALYSES AND STEAM ANALYSES

SAMPLE #	FIELD BRINE ANALYSES (ppm, wt)				LABORATORY STEAM ANALYSES (mg/liter)								
	PH	ALKALINITY	Cl	TDS	As	B	Cl	SiO_2	Na	NH_4	TDS	PH	
D-1-1	7.4	—											
D-1-2	7.4	7420											
D-1-3	7.3	4270											
D-1-4	7.3	-											
D-1-5	8.3	2110											
D-2-1	7.3	6590											
K-1-1	7.8	223											

WELL DEARBORN-1 DEARBORN-2 KALIN-1

FLOW TEST FIELD DATA

SAMPLE #	DATE YYMMDD	TIME	STATUS DAYS	TYPE	WELLHEAD		SEPARATOR				STEAM #/HR	BRINE #/HR	TOTAL FLOW #/HR	FLASH %	ENTHALPY BTU/LB
							BRINE		STEAM						
					PSIG	°F	PSIG	°F	PSIG	°F					
D-1-1	760729	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-2	760729	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-3	760803	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-4	760803	–	–	DST	–	–	–	–	–	–	–	–	–	–	–
D-1-5	760827		F-1	S	40	238	2.3	208	2.3	208	4900	103000	107900	4.54	223
D-2-1	770121	1000	F-1	S	159	213	0 EST	–	0 EST	–	11000	263000	274000	4	211
K-1-1	770113	–	F-1	S?	40 EST	290	5 EST	–	5	–	41200	254900	296100	13.9	305

WELL DEARBORN-1 DEARBORN-2 KALN-1

WELL CONFIGURATION DATA

SAMPLE #	PROD CSG DEPTH	ORIG. TMD	EFFECT. TD	SPINNER PRODUCTION ZONES								MEASURED TEMPERATURES						REMARKS
				INTERVAL	%	INTERVAL	%	INTERVAL	%	INTERVAL	%	2500'	3500'	4500'	5500'	6500'	7500'	
D-1-1	–	3327	3327															DST #1 3236-3327
D-1-2	–	3327	3327															DST #1
D-1-3	4995	5044	5044															DST #2 4994-5044'
D-1-4	4995	5044	5044														-	DST #2
D-1-5	4995	8000	8000									197	236	279	320	362	402	SLOTS 5351-8000'
D-2-1	3087'	4564	4564										222	274				SLOTS 2882-4582'
K-1-1	5355'	8490	8490										245	287	334	388	439	SLOTS 5090-8490'

WELL DEARBORN-1
DEARBORN-2
KALIN-1

SAMPLE #	GAS IN TOTAL DISCHARGE (PPM, WT)							ISOTOPES		
	CO_2	H_2S	NH_3	Ar	N_2	CH_4	H_2	$\delta^{18}O$	δD	
D-1-1	–	–	–	–	–	–	–	–	–	
D-1-2	–	–	–	–	–	–	–	–	–	
D-1-3	–	–	–	–	–	–	–	–	–	
D-1-4	–	–	–	–	–	–	–	–	–	
D-1-5	–	–	–	–	–	–	–	–	–	
D-2-1	–	–	–	–	–	–	–	–	–	
K-1-1	–	–	–	–	–	–	–	–	–	

WELL DEARBORN-1 / DEARBORN-2 / KALIN-1 RESERVOIR BRINE PPM, WT.

SAMPLE #	Pb	Rb	Sr	Zn	Br	Cl	F	I	SO4	NH4	SiO2	TDS	
D-1-1	–	–	–	–	–	6238	–	–	–	–	–	19025	
D-1-2	–	–	–	–	–	6040	1.81	–	139	–	–	18786	
D-1-3	–	–	–	–	–	5150	1.41	–	125	–	242?	12800	
D-1-4	–	–	–	–	–	4700	–	–	–	–	273?	13070	
D-1-5	–	–	–	0.02	0.31	6541	0.93	–	45.5	<0.2	–	15784	
D-2-1	<0.2	–	–	<0.01	9.5	7566	0.93	–	67	<0.2	112	20825	
K-1-1	0.25	–	–	0.07	17.6	21316	1.4	–	36.8	–	270	44232	

DEARBORN-1
DEARBORN-2

WELL KALIN-1 RESERVOIR BRINE, PPM, WT.

SAMPLE #	Ag	As	B	Ca	Cs	Cu	Fe	K	Li	Mg	Mn	Na	Ba
D-1-1	–	–	–	22	–	–	–	109	–	–	–	7376	–
D-1-2	–	0.8	65	38.0	–	–	–	188	–	2.9	–	7376	–
D-1-3	–	1.7	36	122	–	–	–	180	–	22	–	3230	–
D-1-4	–	–	–	162	–	–	–	170	–	–	–	3580	–
D-1-5	–	2.0	50	13.3	–	<0.02	0.12	318	–	4.2	<0.02	4692	–
D-2-1	0.06	0.166	66.5	84	–	0.10	0.14	884	36	25.2	0.03	6653	–
K-1-1	0.07	1.10	70	685	–	0.08	0.7	2926	79	59	1.30	11285	–

WELL Dearborn-1, Dearborn-2, Kelly-1

SUMMARY OF PRODUCTION DATA

DATE	SAMPLE #	WHP (PSIG)	SEP (PSIG)	TOTAL MASS #/HR	FLASH %	ENTHALPY BTU/LB	MEAS WT % NCG		TDS ppm wt.	PROD CSG SHOE	EFFECT. TOTAL DEPTH	
							STEAM	TOTAL				
760729	D-1-1	—	—	—	—	—	—	—	19025	—	3327	DST
760729	D-1-2	—	—	—	—	—	—	—	18786	—	3327	DST
760803	D-1-3	—	—	—	—	—	—	—	12800	4995	5044	DST
760803	D-1-4	—	—	—	—	—	—	—	13070	4995	5044	DST
760827	D-1-5	40	2.3	107900	4.54	223	—	—	16534	4995	8000	
770121	D-2-1	159	atm?	274000	4	211	—	—	21693	3037	4564	
770113	K-1-1	40	5 PSIG	296100	13.9	305	—	—	51373	5355	8490	