Environmental Analysis Laboratories
2030 Wright Avenue
Richmond, California 94804
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ANALYSIS REPORT

Customer: Jake M. Rudisill
Thermal Power Co.
601 California Street
San Francisco, CA 94108

Date: October 6, 1977
Samples Received: October 3, 1977
LFE Reference No.: 18100-2607
Purchase Order No.:

Analysis	Units	Gas sample 615-3-1
H_2	% (by volume)	0.42
O_2	% (by volume)	0.06
N_2	% (by volume)	9.2
CO_2	% (by volume)	78
H_2S	% (by volume)	<0.01
CH_4	% (by volume)	<0.01
H_2O	% (by volume)	3

Harry Gee
Harry Gee
Senior Chemist

Analysis are performed according to EPA or State of California recommended methods when applicable.
LFE Environmental is a State of California Approved Laboratory for complete chemical, bacteriological, and bioassay analyses.

Kathy File RH54
14-2

Battelle
Pacific Northwest Laboratories
Battelle Boulevard
Richland, Washington 99352
Telephone (509)
Telex 32-6345

July 14, 1978

Mr. Jacob M. Rudisill
Geothermal Operations
Thermal Power Company
601 California St.
San Francisco, CA 94108

Dear Jake:

Enclosed are the data for your Well 14-2 at Roosevelt Hot Springs, Utah. As I indicated to you on the telephone Friday, I would like to use the Mg, H_2S, S, As, B and Rn data for visual presentation at the Hilo, Hawaii meeting. I hope that you will be able to obtain clearance for this oral presentation. The data obtained is primarily from samples drawn from the second sampling port that we used near the well head. As you can see by the total dissolved solids contained in the brine sampled at each sampling port, there was considerable difference in the amount of phase separation that took place at these two sampling ports.

I will need to discuss with you at a later time the significance of these differences. Thanks for the opportunity of letting us sample at your well. I'll see you in Hilo next week.

Sincerely,

D. E. Robertson

David E. Robertson
Senior Research Scientist
Earth and Planetary Chemistry Section
PHYSICAL SCIENCES DEPARTMENT

DER:bg

Enclosures

CHEMICAL ANALYSES OF GEOTHERMAL GASES AT
ROOSEVELT HOT SPRINGS UTAH - THERMAL POWER COMPANY
Well #14-2, May 12, 1978

Non-Condensable Gases (% Vol.)

Carbon dioxide	99.80
Hydrogen sulfide*	0.186
Hydrogen	0.03
Methane	0.00
Propane	0.00
Ethane	0.00
Nitrogen	0.09
N-Butane	0.00
Water	0.00
Oxygen	0.00
Argon	0.01
Carbon monoxide	0.00
C_5 hydrocarbons & higher	0.00
Benzene	0.01
Radon	166; 175 pCi/liter
Mercury	

* Hydrogen sulfide measurements were made on-site on a real-time basis using an Interscan H_2S analyzer and dilution techniques.

NON-CONDENSABLE GAS, STEAM AND BRINE RATIOS
IN GEOTHERMAL FLUIDS AT ROOSEVELT HOT SPRINGS, UTAH
Thermal Power Company Well #14-2; May 12, 1978

Non-condensable gas/steam	54.6 liters/kg*
Brine/Steam	1.07 kg/kg
Temperature	433°F 223°C
Pressure	370 psig

*At top sampling port near well head

THERMAL POWER COMPANY
UTAH STATE 14-2 - ROOSEVELT HOT SPRINGS, UTAH
Flow Test 11/16-18/76 (48-hrs.)

(Sample 1 through 6)

Constituent (ppm)	1 1630* 11/16	2 2230* 11/16	3 0630* 11/17	4 1430* 11/17	5 0030* 11/18	6 0630* 11/18	Avg.	Std. Dev.
Sodium	2100.	2100.	2200.	2100.	2100.	2100.	2116	40.8
Potassium	410.	410.	420.	410.	410.	400.	410	6.3
Calcium	8.1	7.6	8.5	7.2	48.	7.1	7.7	.6
Magnesium	0.06	0.06	0.07	0.05	0.13	0.05	0.07	.03
Chloride	3600.	3500.	3500.	3600.	3500.	3600.	3550	55
Bicarbonate	385.	384.	403.	394.	612.	379.	426	91
Carbonate	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
Sulfate	75.	74.	76.	75.	73.	74.	74.5	1
Boron	26.	26.	26.	25.	25.	25.	25.5	.6
Nitrate (NO_3)	<.02	<.02	<.02	<.02	<.02	<.02	<0.02	
Ammonium (NH_4)	6.	5.	5.	5.	4.	5.	5	.63
Arsenic	3.2	2.6	2.2	3.6	0.79	3.1	2.6	1
pH	6.1	6.1	6.2	6.2	6.4	6.2	6.2	0.11
TDS (ppm)	6500.	6400.	6700.	6300.	6600.	6700.	6533	163
Conductivity $\left[\frac{mho}{cm} \times 10^{-3}\right]$	9.18	9.18	9.18	9.18	9.10	9.38	9.2	.09

*Time

CWM/JRM/tti 12/14/76