

8/11
ORMAT®



October 24, 1988

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OCT 27 1988

ENVIRONMENTAL
PROTECTION

Mr. Daniel Gross
Ground Water Protection
Division of Environmental Protection
State of Nevada
201 South Fall Street
Carson City, NV 89710

Dear Dan:

Attached please find the Third Quarterly Report for the Empire Geothermal Power Plant, San Emidio Desert KGRA, Washoe County, Nevada.

The report includes all parameters required by the State of Nevada Permit NEV#87041.

As always, if you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

Monte C. Morrison
Operations Coordinator
Nevada Power Plants

MCM:pkp
50322o
Attachments

AMOR II CORPORATION

610 East Glendale Ave., Sparks, Nevada 89431-5811 • Telephone (702) 356-9111 • Facsimile (702) 356-9125 • Telex 170030

THERMOCHEM

1140 (4-7)

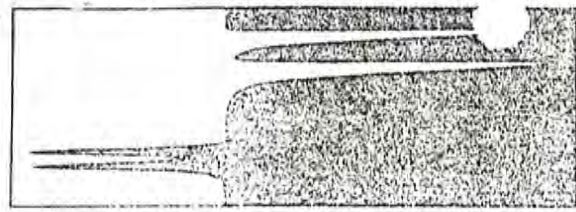
09-12-1988

Monty Morrison
Ormat, Inc.
610 East Glendale Avenue
Sparks, NV 89431

Report of Analysis

Lab Number: 1140-4
Descriptor: 43-21 08-09-88 14:00
266^oF 138 psig

<u>Analyte</u>	<u>mg/kg</u>	<u>Analyte</u>	<u>mg/kg</u>
Arsenic	<0.010	Chloride	2130
Mercury	0.0022	Fluoride	4.3
Boron	6.0	Bicarbonate	
Silica	165	Alkalinity	76.0
Sodium	1250	Carbonate	
Potassium	99.1	Alkalinity	<1.0
Calcium	143	Sulfate	192
Magnesium	1.0	Nitrate	<0.1
Iron	<0.02	Phosphate	<1.8
Aluminum	<0.61	Total Dissolved	
Lithium	2.1	Solids	4040
Strontium	8.2	Conductivity,	
Zinc	<0.060	umhos/cm	6600
Silver	<0.050	pH, units	6.60
Barium	<0.31		
Beryllium	<0.050		
Selenium	<0.00050		
Bismuth	<2.4		
Cadmium	<0.050		
Cerium	<0.24		
Cobalt	<0.020		
Chromium	<0.12		
Copper	<0.060		
Manganese	<0.24		
Molybdenum	<0.61		
Nickel	<0.12		
Lead	<0.24		
Tin	<0.12		
Antimony	<0.73		
Vanadium	<1.2		



THERMOCHEM

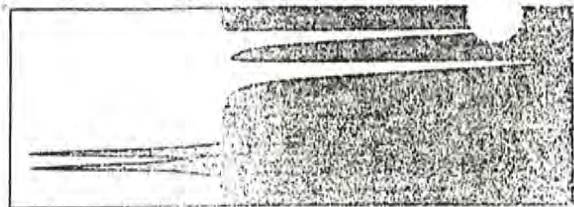
1140 (4-7)

09-12-1988

Report of Analysis

Lab Number: 1140-5
Descriptor: 52-21 08-09-88 13:30
280°F 150 psig

<u>Analyte</u>	<u>mg/kg</u>	<u>Analyte</u>	<u>mg/kg</u>
Arsenic	0.010	Chloride	2120
Mercury	0.0030	Fluoride	4.1
Boron	6.0	Bicarbonate	
Silica	174	Alkalinity	70.0
Sodium	1210	Carbonate	
Potassium	97.9	Alkalinity	<1.0
Calcium	137	Sulfate	192
Magnesium	0.87	Nitrate	<0.1
Iron	<0.020	Phosphate	<1.8
Aluminum	<0.61	Total Dissolved	
Lithium	2.0	Solids	3980
Strontium	7.8	Conductivity,	
Zinc	<0.060	umhos/cm	6600
Silver	<0.050	pH, units	6.49
Barium	<0.31		
Beryllium	<0.050		
Selenium	<0.00050		
Bismuth	<2.4		
Cadmium	<0.050		
Cerium	<0.24		
Cobalt	<0.020		
Chromium	<0.12		
Copper	<0.060		
Manganese	<0.24		
Molybdenum	<0.61		
Nickel	<0.12		
Lead	<0.24		
Tin	<0.12		
Antimony	<0.73		
Vanadium	<1.2		



THERMOCHEM

1140 (4-7)

09-09-1988

Report of Analysis

Lab Number: 1140-6
Descriptor: 53-21 08-09-88 16:45
270⁰F 145 psig

<u>Analyte</u>	<u>mg/kg</u>	<u>Analyte</u>	<u>mg/kg</u>
Arsenic	<0.010	Chloride	2120
Mercury	0.0055	Fluoride	4.1
Boron	6.2	Bicarbonate	
Silica	182	Alkalinity	68.0
Sodium	1250	Carbonate	
Potassium	101	Alkalinity	<1.0
Calcium	142	Sulfate	202
Magnesium	1.0	Nitrate	<0.1
Iron	<0.020	Phosphate	<1.8
Aluminum	<0.61	Total Dissolved	
Lithium	2.1	Solids	4050
Strontium	8.1	Conductivity,	
Zinc	<0.060	umhos/cm	6600
Silver	<0.050	pH, units	6.45
Barium	<0.31		
Beryllium	<0.050		
Selenium	<0.00050		
Bismuth	<2.4		
Cadmium	<0.050		
Cerium	<0.24		
Cobalt	<0.020		
Chromium	<0.12		
Copper	<0.060		
Manganese	<0.24		
Molybdenum	<0.61		
Nickel	<0.12		
Lead	<0.24		
Tin	<0.12		
Antimony	<0.73		
Vanadium	<1.2		

IN TRIPLICATE
(PLEASE PRINT OR TYPE)

NEVADA STATE HEALTH LABORATORY
NEVADA DIVISION OF HEALTH
1660 N. Virginia Street
Reno, Nevada 89503
(702) 789-0335

80124

WATER CHEMISTRY ANALYSIS:

Attn: Fees may apply to some types of samples.

All of the information below must be filled in
or the analysis will not be performed.

TYPE OF ANALYSIS:

- Check here for ROUTINE DOMESTIC ANALYSIS.
- Circle the constituents needed for PARTIAL ANALYSIS.

State NV County WASHOE
Township 29N Range 23E Section 21
General Location EMPIRE GEOTHERMAL WELL 53-
Source Address 5355 ST RTE 447

SAMPLING INSTRUCTIONS:

The sample submitted must be representative of the source. Spring and surface water samples should be as free of dirt and debris as possible. Wells should be pumped thoroughly before sampling, changing the water in the casing at least three times. Product water from filters should be sampled after running for about ten (10) minutes.

Sampled by AT CLARK/MCM Date 6/29/88
Owner MORRIS II Phone 356-9111
Address GIOE GLENDALE
City SPARKS State NV

REASON FOR ANALYSIS:

- Loan
- Personal health reasons
- Purchase of the property
- Rental or sale of property
- Subdivision approval
- Other PERMIT COMP

USE OF WATER:

- Domestic drinking water
 - Geothermal
 - Industrial or mining
 - Irrigation
 - Other
- Initials _____

REPORT TO:

Name MONTY C. MORRISON
Address GIOE GLENDALE
City SPARKS
State NV Zip 89431

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SOURCE OF WATER:

- Filter Yes No
- Public Yes No
- Spring _____ Type _____
- Well Depth _____ ft. Name _____
- Hot Cold _____ Surface _____
- IN USE Yes No Casing diameter _____ in.
- Casing depth _____ ft.

The results below are representative only of the sample submitted to this laboratory.

FOR LABORATORY USE ONLY						PRINT OTHER DESIRED CONSTITUENTS BELOW	
Constituent	Value	Unit	Constituent	Value	Unit	Constituent	Value
T.D.S. @ 103° C.	4455		Iron	0.68	ppm	Color	5
Hardness	373		Manganese	0.09	ppm	Turbidity	1
Calcium	149		Copper	0.00	ppm	pH	8.05
Magnesium	0		Zinc	0.46	ppm	EC	7255
Sodium	1299		Barium	0.19	ppm		
Potassium	109		Boron	6.2	ppm		
Sulfate	190		Silica	201	ppm		
Chloride	2250	ppm					
Nitrate	0.0	ppm					
Alkalinity	48	ppm					
Bicarbonate	59	ppm					
Carbonate	0	ppm					
Fluoride	4.48	ppm					
Arsenic	<0.003	ppm					

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CONSUMER HEALTH PROTECTION

Fee 147.50
Collected by AT
WS I.D. _____
DWA—Pri _____ Sec _____
1st _____ 2nd _____ 3rd _____
Date Rec'd 7.15.88
ppm = parts per million, milligrams per liter
U. = Standard Units

Remarks STD DRINKING WATER & TRACE METALS
AT
7.15.88
J. [Signature]

PRODUCTION AND INJECTION MONTHLY SUMMARIES
 QUARTERLY REPORT - JULY 1 TO SEPTEMBER 30, 1988
 EMPIRE GEOTHERMAL POWER PLANT

(b) MONTHLY SUMMARY OF PRODUCTION WELLS

	JUL	AUG	SEPT
PRODUCTION WELL #52-21			
TOTAL VOLUME (GAL/MONTH)	29,123,248	29,331,438	30,116,622
MEAN (GPM)	705	677	704
LOWEST PROD (GPM)	0	0	0
HIGHEST PROD (GPM)	800	750	720
PRODUCTION WELL #43-21			
TOTAL VOLUME (GAL/MONTH)	63,226,296	67,986,138	68,822,078
MEAN (GPM)	1,516	1,569	1,608
LOWEST PROD (GPM)	0	0	0
HIGHEST PROD (GPM)	1700	1610	1640
PRODUCTION WELL #53-21			
TOTAL VOLUME (GAL/MONTH)	0	0	0
MEAN (GPM)	0	0	0
LOWEST PROD (GPM)	0	0	0
HIGHEST PROD (GPM)	0	0	0

(c) MONTHLY SUMMARY OF INJECTION

INJECTION WELL #45-21

TOTAL VOLUME (GAL/MONTH)	7,903,958*	7,008,480*	8,044,464*
MEAN (GPM)	177	157	186
LOWEST PROD (GPM)	0	0	0
HIGHEST PROD (GPM)	-	-	-

(d) MONTHLY SUMMARY OF INJECTION PRESSURE

MEAN (PSIG)	21.1	9.7	19.3
LOWEST (PSIG)	0	0	0
HIGHEST (PSIG)	42.0	14.0	40.0

(e) MONTHLY SUMMARY OF INJECTION TEMPERATURE

MEAN (DEG.F)	185.5	178.2	176.0
LOWEST (DEG.F)	167.0	170.0	136.0
HIGHEST (DEG.F)	220.0	196.0	202.0

*Estimate

		JUL	AUG	SEPT
(c)	MONTHLY SUMMARY OF INJECTION			
	INJECTION WELL #42-21			
	TOTAL VOLUME (GPM)	77,673,600*	81,155,520*	85,503,600*
	MEAN (GPM)	1,740	1,818	1,979
	LOWEST PROD (GPM)	0	0	0
	HIGHEST PROD (GPM)	-	-	-
(d)	MONTHLY SUMMARY OF INJECTION PRESSURE			
	MEAN (PSIG)	60.1	53.1	52.9
	LOWEST (PSIG)	0	0	0
	HIGHEST (PSIG)	67.0	61.0	59.0
(e)	MONTHLY SUMMARY OF INJECTION TEMPERATURE			
	MEAN (DEG.F)	200.2	194.0	196.9
	LOWEST (DEG.F)	198.0	165.0	193.0
	HIGHEST (DEG.F)	220.0	217.0	207.0
(c)	MONTHLY SUMMARY OF INJECTION			
	INJECTION WELL #35-21			
	TOTAL VOLUME (GAL/MONTH)	6,441,552*	6,617,601*	9,172,200*
	MEAN (GPM)	144	148	212
	LOWEST PROD (GPM)	0	0	0
	HIGHEST PROD (GPM)	-	-	-
(d)	MONTHLY SUMMARY OF INJECTION PRESSURE			
	MEAN (PSIG)	37.4	41.6	42.0
	LOWEST (PSIG)	0	0	0
	HIGHEST (PSIG)	42.0	44.0	48.0
(e)	MONTHLY SUMMARY OF INJECTION TEMPERATURE			
	MEAN (DEG.F)	185.5*	178.2*	176.0*
	LOWEST (DEG.F)	167.0*	170.0*	136.0*
	HIGHEST (DEG.F)	220.0*	196.0*	202.0*

* ESTIMATE

INJECTION RATE (EST.) VS. TIME

JULY - SEPTEMBER 1988

