

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ORDER NO. 89-071

WASTE DISCHARGE REQUIREMENTS
FOR
ORMESA GEOTHERMAL,
AMOR 12 ORMESA GEOTHERMAL 1H PROJECT
10 MW (GROSS) MODULAR BINARY POWER PLANT
AND
GEOTHERMAL WELLFIELD
EAST MESA KNOWN GEOTHERMAL RESOURCE AREA (KGRA)
Imperial County

The California Regional Water Quality Control Board, Colorado River Basin Region, finds that:

1. Ormesa Geothermal, AMOR 12 Ormesa Geothermal 1H Project (hereinafter referred to as the discharger), 610 East Glendale Avenue, Sparks, Nevada 89431, submitted a Report of Waste Discharge dated June 9, 1989. The Report of Waste Discharge was received in the Regional Board's office, and deemed complete on June 22, 1989.
2. The discharger is proposing to operate a 10 MW (gross) geothermal power plant (Ormesa 1H) and its associated wellfield development in the East Mesa Known Geothermal Resource Area (KGRA). The Ormesa 1H Project is located on a portion of Federal Geothermal Lease No. CA-6218, which includes Section 1, T16S, R16E, SBB&M, and Section 6, T16S, R17E, SBB&M, Imperial County, California.
3. Some of the proposed wells to be used by the discharger consist of the following:

<u>Well</u>	<u>Location</u>	<u>Type</u>
55-1	T16S, R16E, Section 1	Injection
57-1	T16S, R16E, Section 1	Injection
76-1	T16S, R16E, Section 1	Injection
26-6	T16S, R17E, Section 6	Injection
58-6	T16S, R17E, Section 6	Production
66-6	T16S, R17E, Section 6	Production
78-6	T16S, R17E, Section 6	Production
86-6	T16S, R17E, Section 6	Production

Upon completion, the wells begin discharging into the on-site containment basins for short-term production flow tests.

4. Some additional injection and production wells may be drilled, completed, developed, and tested in order to replace or supplement wells throughout the life of the project.
5. Following analysis of the data from these flow tests the wells may be flowed again for one or more tests of one week or longer duration. The flow from this test is either discharged into the on-site storage basin or other test facilities via permanent, or as necessary, temporary pipelines placed on the ground adjacent to access roads. Discharged fluids are removed from the storage basins or other containers and discharged by subsurface injection into the geothermal reservoir or the fluid is allowed to evaporate.
6. Geothermal fluids produced from the adjacent Ormesa II facility have had the following chemical composition:

Ormesa II Project Geothermal Fluid Chemistry
Geothermal Wells

Chemical Parameters ¹ (mg/l)	<u>21-6</u>	<u>33-6</u>	<u>84-1</u>	<u>45-6</u>	<u>14-5</u>	<u>36-5</u>	<u>18-5</u>
TDS	7018	8480	6812	7794	7568	6855	6722
Na	2632.8	2756.0	2613.2	2922.0	2765.7	2629.1	2431.5
K	158.8	596.4	154.1	236.6	300.6	191.3	204.4
Ca	17.1	9.1	10.5	13.0	15.5	28.2	17.2
Mg	3.0	1.9	2.9	2.1	2.1	2.9	0.8
Fe	ND ²	ND	ND	0.04	0.05	ND	0.15
SiO ₂	171.4	197.7	170.9	212.2	213.3	182.6	224.7
B	7.8	7.4	7.8	7.0	5.9	5.8	5.5
Li	5.7	7.1	5.5	8.1	8.1	7.4	7.2
Sr	2.0	1.9	1.2	2.2	2.9	4.0	3.1
Zn	0.08	ND	ND	ND	ND	ND	ND
As	ND	ND	0.64	ND	0.51	ND	ND
Ba	0.59	0.41	0.51	0.51	0.63	0.36	ND
F	1.8	3.5	2.0	3.0	3.2	2.5	3.6
HCO ₃	357.0	477.0	419.0	401.0	306.0	357.0	392.0
CO ₃	ND	ND	ND	ND	11.0	ND	15.0
Cl	3820.0	4320.0	3700.0	4250.0	4110.0	3930.0	3620.0
SO ₄	95.0	123.0	94.0	107.0	112.0	113.0	126.0
pH	8.3	6.0	8.2	8.4	8.6	8.2	8.7
Conductivity μmhos/cm	12220	14000	11800	13400	13000	12300	11700

¹Chemical parameters in mg/l

²Not Detected

	<u>21-6</u>	<u>33-6</u>	<u>84-1</u>	<u>45-6</u>	<u>14-5</u>	<u>36-5</u>	<u>18-5</u>
Total							
Depth (ft.)	6000	5998	6000	6047	5500	5890	5890
Completion Interval							
(ft.)	2718-	2625-	2642-	2598-	2677-	2657-	2566-
	5980	5975	5980	6000	5480	5885	5876

7. A mudpit, capable of containing the expected discharge of drilling mud and cuttings, will be constructed at each well site. Additional mudpits would be constructed at any newly drilled well sites.
8. A lined containment basin consisting of a minimum of 6 inches of compacted clay with a maximum permeability of 1×10^{-6} cm/sec will be constructed at each well site for temporary storage of the geothermal cleanout and geothermal test fluid.
9. A clay-lined storage basin will be constructed adjacent to the plant site to contain the sands and geothermal fluids produced from the sand separators and injection filters located within the plant site. This storage basin will also contain the geothermal cleanout and test fluids from Well No. 78-6.
10. Final disposal of geothermal wastes discharged to containment basins will be by subsurface injection or by hauling said wastes to a waste management facility approved by the Regional Board to accept said wastes.
11. All such basins or containers will be protected and maintained to ensure their effectiveness.
12. The geothermal fluid injection system will consist of injection pumps, distributing piping, injection well metering facilities, and other components necessary to dispose of the geothermal liquid from the power plant. These production fluids will be reinjected into the geothermal reservoir at depths ranging from 1,900' to 4,000'. Geothermal fluid treatment is not part of the geothermal fluid injection system at this time.
13. The Regional Board approved on September 20, 1989 Negative Declaration SCH # 89081602 for this project in accordance with the California Environmental Quality Act and State Guidelines.
14. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge.
15. The Board in a public meeting heard and considered all comments pertaining to the discharge.

16. Two shallow ponds, each approximately 5 acres in size are located within the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 6, T16S, R17E, SBB&M. The Imperial Irrigation District Highline Canal is located approximately 1-3/4 miles west of the proposed power plant site.
17. Mechanical draft cooling towers will be built at the power plant in one battery containing two to four cells. These cooling towers will be erected on a concrete basin which will be used for cooling water storage.
18. Shallow ground water produced from Sweetwater Well 3 located near the center of Section 6, T16S, R17E, SBB&M has a reported Total Dissolved Solids (TDS) concentration of 1776 mg/l.
19. The United States Department of Energy (USDOE) is currently under Waste Discharge Requirements (Board Order No. 89-027), adopted on May 17, 1989, which specifically states that East Mesa Wells 31-1, 5-1, 6-1, 6-2, and 8-1 are the property of the United States Department of Energy.
20. In a letter from USDOE to the discharger dated July 31, 1989, the discharger was granted permission to use some of the wells belonging to USDOE for disposal of cooling tower blowdown and geothermal brines, as long as the transfer of the facility from USDOE to the discharger continued on a "quid pro quo" basis.
21. The Water Quality Control Plan (Basin Plan) for the Colorado River Basin Region of California was adopted by the Regional Board on November 14, 1984. The Basin Plan contains water quality objectives for the Imperial Hydrologic Unit.
22. Beneficial uses of water in certain portions of the Imperial Hydrologic Unit are:
 - a. Industrial supply
 - b. Municipal supply (This use is limited to a small portion of the hydrologic unit, with the existing use being practically inconsequential.)
23. Geothermal projects are also regulated by the California Division of Oil and Gas. The Regional Board and the local District of the Division of Oil and Gas (located in El Centro) have worked together to review this project in accordance with the Memorandum of Agreement between the State Water Resources Control Board and the Division of Oil and Gas as originally approved in August 1982, with subsequent amendment approved on May 19, 1988.

IT IS HEREBY ORDERED, that Ormesa Geothermal, AMOR 12 Ormesa Geothermal 1H Project shall comply with the following:

A. Discharge Specifications and Prohibitions

1. Neither the treatment nor the discharge of wastewater shall create pollution or nuisance as defined in Division 7 of the California Water Code.
2. Geothermal test fluid shall be discharged for temporary storage into either:
 - a. Earthen basins with a minimum 6 inch compacted clay lining having a liner permeability not to exceed 1×10^{-6} cm/sec. A clay lining shall be defined as at least 40 percent of the material, by weight, passing a No. 200 U.S. Standard Sieve;
 - b. Earthen basins lined with a synthetic liner of not less than 40 mil thickness, approved by the Executive Officer; or
 - c. Metal or other type containers approved by the Executive Officer.
3. All such basins or containers shall be protected and maintained to ensure their effectiveness.
4. Permanent (longer than 1 year) disposal or storage of geothermal waste in on-site temporary containment basins is prohibited.
5. A minimum of two feet of freeboard shall be maintained in all containment basins at all times.
6. The discharger shall submit to the Board within 30 days of adoption of this Board Order written adequate assurance that financial responsibility for cleanup of the facilities is feasible. This shall be in the form of the latest annual report for the discharger, as well as a Securities and Exchange Commission Form 10-K. Should the Regional Board Executive Officer determine that the Annual Report and Form 10-K are not adequate to prove financial assurance, then a closure bond of \$100,000 shall be submitted to the Regional Board Executive Officer within 60 days from the date of said determination.
7. The discharger shall submit to the Regional Board, at least 10 days prior to the discharge of any material into a new basin as defined in Discharge Specification and Prohibition No. 2, above, a report prepared by a California Registered Civil Engineer or Certified Engineering Geologist certifying that the sump is constructed to meet the requirements of this Order.
8. Fluids discharged by subsurface injection shall be injected below the fracture pressure of the receiving aquifer and of the confining layer immediately above the receiving aquifer.
9. Fluids discharged by subsurface injection shall not be injected into any subsurface aquifer which has a TDS concentration of less than

10,000 mg/l, unless the TDS of the injection water is less than or equal to that of the receiving water, or the discharger can demonstrate to the satisfaction of the Executive Officer that injection into said zone will not pose a threat to water quality.

10. Solids which may accumulate in the concrete cooling tower basin shall not be spread on the surrounding property until an analysis has been performed to ensure that there are no constituents in hazardous concentrations and written approval for such a disposal is granted to the discharger by the Regional Board's Executive Officer.
11. Prior to the disposal of any materials removed from the temporary storage basins, well pads, or other developed project locations, other than by subsurface injection, the discharger shall inform the Regional Board's Executive Officer concerning the nature and volume of the materials and the proposed location of disposal.
12. Geothermal fluids and other wastes shall not enter any canals, natural or man-made drainage channels, or drains (including sub-surface drainage systems) except as allowed under an appropriate National Pollutant Discharge Elimination System (NPDES) permit.
13. Adequate protective works and maintenance shall be provided to ensure that all basins shall not become eroded or otherwise damaged by floods occurring during the project life of said basins.
14. Pending the transfer of the facilities and properties owned by USDOE to the discharger, the wells described in Finding No. 19, above, are still subject to Board Order No. 89-027. Cooling tower blowdown and geothermal brines from the Ormesa 1H Project may be disposed of in the wells owned by USDOE pending the successful transfer of ownership of the USDOE facilities, as long as both the USDOE and the Regional Board's Executive Officer concur. At the time of transfer, the discharger (or other purchaser) shall be responsible for complete compliance with Board Order No. 89-027.
15. Once the wells at each newly drilled well site described in Finding No. 7, above, have been completed their respective mudpits shall have all of the drilling muds and cuttings removed and disposed of in a manner acceptable to the Regional Board's Executive Officer. The final disposal of these wastes and the final closure of the respective mudpits shall be completed within 60 days of the completion of the drilling of the respective wells.

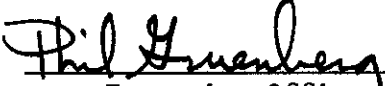
B. Provisions

1. The discharger shall comply with "Monitoring and Reporting Program No. 89-071" and future revisions thereto, as specified by the Executive Officer.
2. The discharger shall submit to the Regional Board, at least 30 days prior to commencement of operations at each new well, a written report

on the proposed method and estimated costs of cleanup and closure in accordance with the requirements of this Order.

3. In the event of any change in operation, or in control or ownership of land or waste disposal facilities owned or controlled by the discharger, the discharger shall:
 - a. Notify this Board of such change; and
 - b. Transmit a copy of this Order to the succeeding owner or operator, and file a copy of the transmittal letter with this Regional Board.
4. Only cooling tower blowdown and fluids from the wells described in Findings No. 3 and 4, above, shall be injected into the disposal wells and then only in accordance with the requirements set forth in this Board Order No. 89-071.
5. None of the geothermal fluids or cooling tower waters may be used on access roads, well pads, or other developed project locations for dust control.
6. This Board Order does not authorize violation of any federal, state, or local laws or regulations.

I, Phil Gruenberg, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Colorado River Basin Region, on September 20, 1989.


Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

MONITORING AND REPORTING PROGRAM NO. 89-071

FOR

ORMESA GEOTHERMAL,

AMOR 12 ORMESA GEOTHERMAL 1H PROJECT

10 MW (GROSS) MODULAR BINARY POWER PLANT

AND

GEOTHERMAL WELLFIELD

EAST MESA KNOWN GEOTHERMAL RESOURCE AREA (KGRA)

Imperial County

Location of Discharge: Federal Geothermal Land Lease CA-6218 - Section 1, T16S, R16E, SBB&M; Section 6, T16S, R17E, SBB&M

MONITORING

Ormesa Geothermal, AMOR 12 Ormesa Geothermal 1H Project shall report monitoring data to the Regional Board in accordance with the following schedule:

1. The discharger shall submit to the Board, at least 30 days prior to commencement of operation at each well, a written report on the proposed method and estimated costs of cleanup and closure of each well site in a manner which would not adversely affect water quality.
2. At least 10 days prior to the discharge of any materials into a temporary storage basin or other container, the discharger shall submit to the Regional Board a technical report signed by a California Registered Civil Engineer advising the Executive Officer that the temporary storage basin and attendant facilities are constructed to meet the requirements contained in Board Order No. 89-071.
3. The discharger shall submit a monthly report containing the following information:

<u>Constituents</u>	<u>Units</u>	<u>Reporting Frequency</u>
a. Volume of discharges contained in each temporary storage basin.	Gallons	Monthly
b. Volume of waste fluid injected into each injection well	Gallons	Monthly
c. Total dissolved solids concentration of waste fluid injected into each injection well.	mg/l	Monthly

<u>Constituents</u>	<u>Units</u>	<u>Reporting Frequency</u>
d. Total dissolved solids concentration of ground water contained in strata proposed to receive waste fluid injection	mg/l	At least 10 days prior to commencement of injection
4. Immediate reporting of any accidental spillage or release of waste material, and immediate measures being taken to correct same and to limit detrimental effects.		
5. Report of completion of removal of all geothermal waste from temporary storage basins within one week following completion of work.		
6. At least 10 days prior to destruction of each temporary storage basin the discharger shall request a Regional Board staff inspection and approval of the cleanup procedures.		

REPORTING

Except for Items 1 and 2, above, the monitoring program shall be implemented immediately upon commencement of discharge at each site.

Monthly reports shall be submitted to the Regional Board by the 15th day of the following month. Reports for Item 5 (above) shall be forwarded immediately and shall be preceded by phone communication to the Regional Board's office. Phone No. (619) 346-7491. Copies of the reports submitted to the Board pursuant to the Monitoring and Reporting Program shall be maintained at the operations site, and shall also be made available to staff of the Regional Board upon request.

Mail reports to:

California Regional Water Quality Control Board
Colorado River Basin Region
73-271 Highway 111, Suite 21
Palm Desert, CA 92260

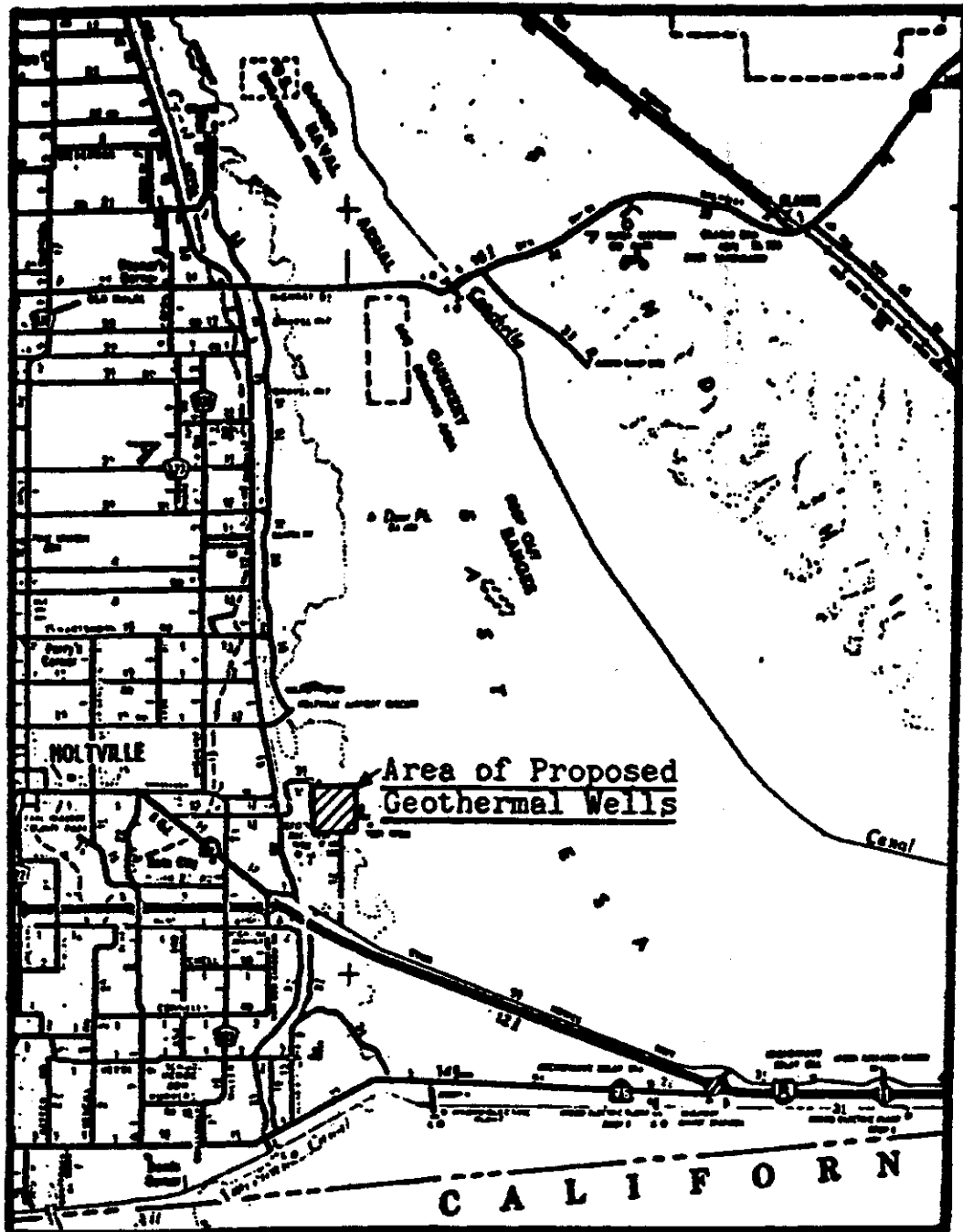
ORDERED BY:

Phil Gruenberg
Executive Officer

September 20, 1989

Date

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - 7



SITE MAP
ORMESA GEOTHERMAL,
AMOR 12 ORMESA GEOTHERMAL 1H PROJECT
10 MW (GROSS) MODULAR BINARY POWER PLANT
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EAST MESA KNOWN GEOTHERMAL RESOURCE AREA (KCRA)
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