

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ORDER NO. 81-78

WASTE DISCHARGE REQUIREMENTS
FOR
REPUBLIC GEOTHERMAL, INC.
North of Westmorland - Imperial County

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

1. Republic Geothermal, Inc., (hereinafter also referred to as the discharger), 11823 East Slauson Ave., Suite One, Santa Fe Springs, CA 90670, submitted a request, dated May 22, 1981, to change ownership of 16 geothermal wells in the Westmorland area from Mapco Geothermal, Inc. to the discharger.
2. The discharger proposes to drill 11 deep-test geothermal wells, which have been subject to waste discharge requirements contained in Orders No. 76-52 and No. 77-1. The wells are to be located as follows:

Landers No. 4	SE 1/4, SW 1/4, NE 1/4 of Section 20, T12S, R13E, SBB&M
Buckingham Nos. 1 & 2	SW 1/4, SW 1/4, NW 1/4 of Section 28, T12S, R13E, SBB&M
Huffman & Allen Nos. 1 & 2	SW 1/4, SW 1/4, NE 1/4 of Section 29, T12S, R13E, SBB&M
Griset Nos. 1 & 4	SW 1/4, SW 1/4, SE 1/4 of Section 20, T12S, R13E, SBB&M
Griset Nos. 2 & 5	SW 1/4, SW 1/4, SW 1/4 of Section 20, T12S, R13E, SBB&M
Griset Nos. 3 & 6	NE 1/4, NE 1/4, NW 1/4 of Section 19, T12S, R13E, SBB&M

3. The discharger has drilled the following deep-test geothermal wells, which have been subject to waste discharge requirements contained in Orders No. 75-61 and No. 76-52 at the following locations:

*Revised by 89-015
1/25/89*

Dearborn Farms Nos. 1A & 1	NE 1/4, NE 1/4, SW 1/4 of Section 30, T12S, R13E, SBB&M
Landers No. 1	SE 1/4, SW 1/4, NE 1/4 of Section 20, T12S, R13E, SBB&M
Landers Nos. 2 & 3	SW 1/4, SW 1/4, NW 1/4 of Section 20, T12S, R13E, SBB&M

4. An impermeable mud sump, 250 feet by 90 feet by 7 feet deep with an approximate capacity of 420,000 gallons would be constructed at each proposed well site. Each site would utilize about one acre of surface area.
5. The discharger proposes to discharge into each proposed mud sump a maximum of 231,000 gallons of drilling fluid. Following some evaporation, the residual mud would be removed from the sump and discharged at a waste disposal site approved by the Regional Board to receive this waste.
6. The drilling mud components which may be used are:

Colloidal clay	Tannic acid	Ground nut shells
Bentonite	Cane fiber	Barium Sulphate
Lignite	Potassium Chloride	Cypan
Caustic Soda	Sodium Chloride	Bit lube
Mica	Lime	Thread dope
Diesel oil	Sodium Tetrphosphate	Attapulgate
Sodium Carbonate	Calcium Carbonate	Calcium Chloride
Cottonseed Hulls	Sepiolite	Sodium Bicarbonate

Bentonite and Lignite would be the main components; the other substances are additives and may or may not be used depending on the particular drilling conditions.

7. The discharger proposes to discharge from each proposed well a maximum of 210,000 gallons of cleanout fluid into each mud sump. After some evaporation, the residual fluid would be discharged at a Class I or Class II-1 waste disposal site approved by the Regional Board to receive this waste.
8. The discharger proposes to discharge from each proposed well about 1.5 million gallons of flow-test fluid into each mud sump or into steel holding tanks. The fluid would later be injected directly from the sump or tanks into one of the injection wells.
9. Flow from production testing of geothermal wells would be injected subsurface directly.
10. The discharger proposes that reinjection occur at a depth from approximately 2500 feet to 4500 feet.

11. Geothermal brines in portions of Imperial County are known to contain certain constituents which are classified as hazardous by the Department of Health Services, Hazardous Materials Management Section. Said hazardous wastes must be discharged at approved Class I or Class II-1 disposal sites.
12. The Water Quality Control Plan for the West Colorado River Basin was adopted on April 10, 1975. The Basin Plan contains water quality objectives for the Imperial Hydrologic Unit.
13. Beneficial uses to be protected by this Order are as follows:
 - a. Groundwater
 1. Shallow groundwaters at the discharge location are saline and are not beneficially used.
 2. Deep groundwaters consist of brine and are being investigated for geothermal development.
 - b. New and Alamo Rivers and Imperial Valley Irrigation Drains
 1. Transport of dissolved solids to Salton Sea for agricultural soil salinity control.
 2. Freshwater replenishment for Salton Sea
 3. Freshwater habitat for fish and wildlife
 4. Recreation - nonwater contact.
14. Imperial County Planning Department adopted on February 2, 1977, Environmental Impact Report No. 149-76 for these wells. This report indicates that this project would not have any significant adverse effects on water quality.
15. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge.
16. The Board in a public meeting heard and considered all comments pertaining to the discharge.
17. Imperial County Planning Department has required that the discharger file a blanket bond in the sum of \$150,000 to "indemnify the County for any costs incurred by the County in repairing any drill, test or production facility site, to as near as possible to its original state, and in abating any public nuisance caused by the principal's exploratory, testing, or producing operations".

IT IS HEREBY ORDERED, the discharger shall comply with the following:

A. Discharge Specifications:

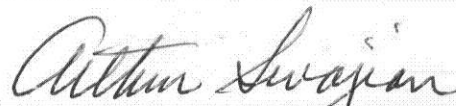
1. Neither the treatment nor the discharge of wastes shall create a pollution or a nuisance as defined in Division 7 of the California Water Code.
2. Geothermal fluids and other wastes shall not enter any rivers, canals, drainage channels or drains (including subsurface drainage systems) which could provide flow or seepage to Salton Sea.
3. Permanent disposal of drilling mud or any wastes is prohibited at the well sites.
4. Temporary discharge and/or temporary storage of drilling mud, and cleanout and flow test fluids other than in containers that have a lining coefficient of permeability of 1×10^{-6} cm/sec, or less, is prohibited, and the fluids contained within shall not penetrate through the lining during the containment period.
5. Long term storage and/or discharge of geothermal wastes for longer than one year, other than in containers having a lining coefficient of permeability of 1×10^{-8} cm/sec, or less, is prohibited, and the fluids contained within shall not penetrate through the lining during the containment period.
6. Adequate protective works and maintenance shall be provided to assure that the sumps will not become eroded or otherwise damaged during the project period, and/or until all well drilling materials are removed.
7. A minimum freeboard of at least two (2) feet shall be maintained in the sumps and other containers.
8. Fluids discharged by subsurface injection shall not be discharged into any subsurface zone which has a total dissolved solids concentration of less than 10,000 mg/l, unless the total dissolved solids concentration of the injection water is less than or equal to that of the receiving water.

9. Saline drilling muds, with extractable water containing a total dissolved solids concentration exceeding 6,000 mg/l, and brine and salt wastes, shall be discharged at a Class I or Class II-1 disposal site approved by the Regional Board to receive said waste.
10. Non-saline drilling muds, with extractable water containing a total dissolved solids concentration which is less than 6,000 mg/l, and not containing hazardous waste* may be disposed at a Class II-2 disposal site approved by the Regional Board to receive said wastes.
11. Final disposal of residual wastes in accordance with Specifications No. 8, 9 and 10 (above), and cleanup of all contents, shall be accomplished upon abandonment of operations. Lack of construction or operational activity on the site for a period of one year shall constitute abandonment for the purposes of this Order.

B. Provisions

1. The discharger shall comply with "Monitoring and Reporting Program No. 81-78" and General Provisions for Monitoring and Reporting", and future revisions thereto, as specified by the Executive Officer.
2. At least 5 days prior to the discharge of any materials into a mud sump, the discharger shall submit to the Regional Board a technical report showing the construction of the sump, and a certificate signed by a California Registered Civil Engineer stating that the sump and attendant facilities are constructed to meet the requirements of this Order.
3. 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 that will not adversely effect water quality.
4. This Order supersedes Board Orders No. 75-61 and No. 76-52 as to the wells referred to in this Order and it also supersedes No. 77-1.

I, Arthur Swajian, Executive Officer, do hereby certify that 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 November 18, 1981.


Executive Officer

*See Attachment A

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

MONITORING AND REPORTING PROGRAM NO. 81-78
FOR
REPUBLIC GEOTHERMAL, INC.
North of Westmorland - Imperial County

Location: Sections 19, 20, 28 and 29, T12S, R13E, SBB&M

MONITORING

Republic Geothermal, Inc. shall report monitoring data to the Regional Board in accordance with the following schedule:

1. At least 5 days prior to the discharge of any drilling mud or geothermal materials into a mud sump or other container, the discharger shall submit to the Regional Board a technical report on the construction of said container, and a certificate signed by a California Registered Civil Engineer stating that the container and attendant facilities are constructed to meet the requirements contained in Board Order No. 81-78.
2. At least 10 days before the initial discharge of any geothermal fluids from each well, the discharger shall report said plan to discharge to the Board.

<u>Constituents</u>	<u>Units</u>	<u>Reporting Frequency</u>
3. Volume of geothermal wastes contained in each sump.	Gallons	Monthly
4. Volume of saline drilling mud and salt and brine waste hauled to a Class I or Class II-1 waste disposal site, and name of site.	Gallons	Monthly
5. Volume and total dissolved solids concentration of non-saline drilling mud hauled to a Class II-2 waste disposal site, and name of site.	Gallons and mg/l	Monthly
6. 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> |
|--|--------------|--|
| 7. Total dissolved solids concentration of groundwater contained in strata receiving waste fluid injection. | mg/l | At least 10 days prior to commencement of injection. |
| 8. Calibrated electrical conductivity of flow from tile drain system underlying the area of each well. | micromhos/cm | Daily* Monday through Friday |
| 9. The following information shall be reported to the Regional Board five (5) days prior to the discharge of drilling mud, cuttings or geothermal fluid to a Class II-2 waste disposal site. | | |
| A. Representative samples of drilling mud, cuttings, and geothermal fluid to be discharged at a Class II-2 waste disposal site shall be analyzed for the following constituents: | | |

<u>Constituents</u>	<u>Units</u>
Arsenic and compounds	mg As/kg wet sample weight
Barium (excluding barite) and compounds	mg Ba/kg wet sample weight
Lead compounds, inorganic	mg Pb/kg wet sample weight
Lead compounds, organic	mg Pb/kg wet sample weight
Zinc compounds	mg Zn/kg wet sample weight

- B. The waste is designated hazardous if the wet weight analysis of any of the above constituents exceed the Total Threshold Limits as listed in Attachment A. The waste would therefore not be acceptable for disposal in a Class II-2 waste disposal site. No further analyses are necessary.
- C. The waste is considered to contain non-hazardous levels of the above substances if all of the weight analyses of the above constituents do not exceed the Soluble Threshold Limits as listed in Attachment A. The waste would therefore be acceptable for disposal in a Class II-2 waste disposal site provided the waste also complies with the other Discharge Specifications and Provisions in this Order. No further analyses of the metal constituents are necessary.
- D. If the analyses of the waste do not conform to the conditions described under Sections B or C, above, extractions of the soluble waste constituents must be made in accordance with a

*Tile drain monitoring shall commence one (1) week prior to the initial discharge of geothermal fluids into each sump, and shall continue until wastes are removed from each sump.

procedure approved by the Executive Officer and analyzed for those constituents in which the wet weight concentrations exceeded the Soluble Threshold Limits as listed in Attachment A.

- i. If the wet weight analysis of any of the soluble constituents exceeds the Soluble Threshold Limits as listed in Attachment A, the waste is designated hazardous and is not acceptable for disposal in a Class II-2 waste disposal site.
 - ii. If the wet weight analyses of all of the soluble constituents do not exceed the Soluble Threshold Limits as listed in Attachment A the waste is considered to contain non-hazardous concentrations of these constituents. The waste would therefore be acceptable for disposal in a Class II-2 waste disposal site provided the waste also complies with the other Discharge Specifications and Provisions in this Order.
10. Immediate reporting of any accidental spillage or release of waste material, and plan for immediate measures being taken to correct same and to limit detrimental effects.
 11. Report of completion of removal of all geothermal wastes from mud sumps - reported within one week following completion of work.
 12. At least 10 days prior to destruction of each sump, the discharger shall request a Regional Board staff inspection and approval of the cleanup procedure.

REPORTING

The above 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 10 (above) shall be forwarded immediately, and if at all possible, shall be preceded by phone communication to the Regional Board's office (714) 346-7491. Copies of the reports submitted to the Board pursuant to this Monitoring and Reporting Program shall be maintained at the operations site, and shall also be made available to the 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

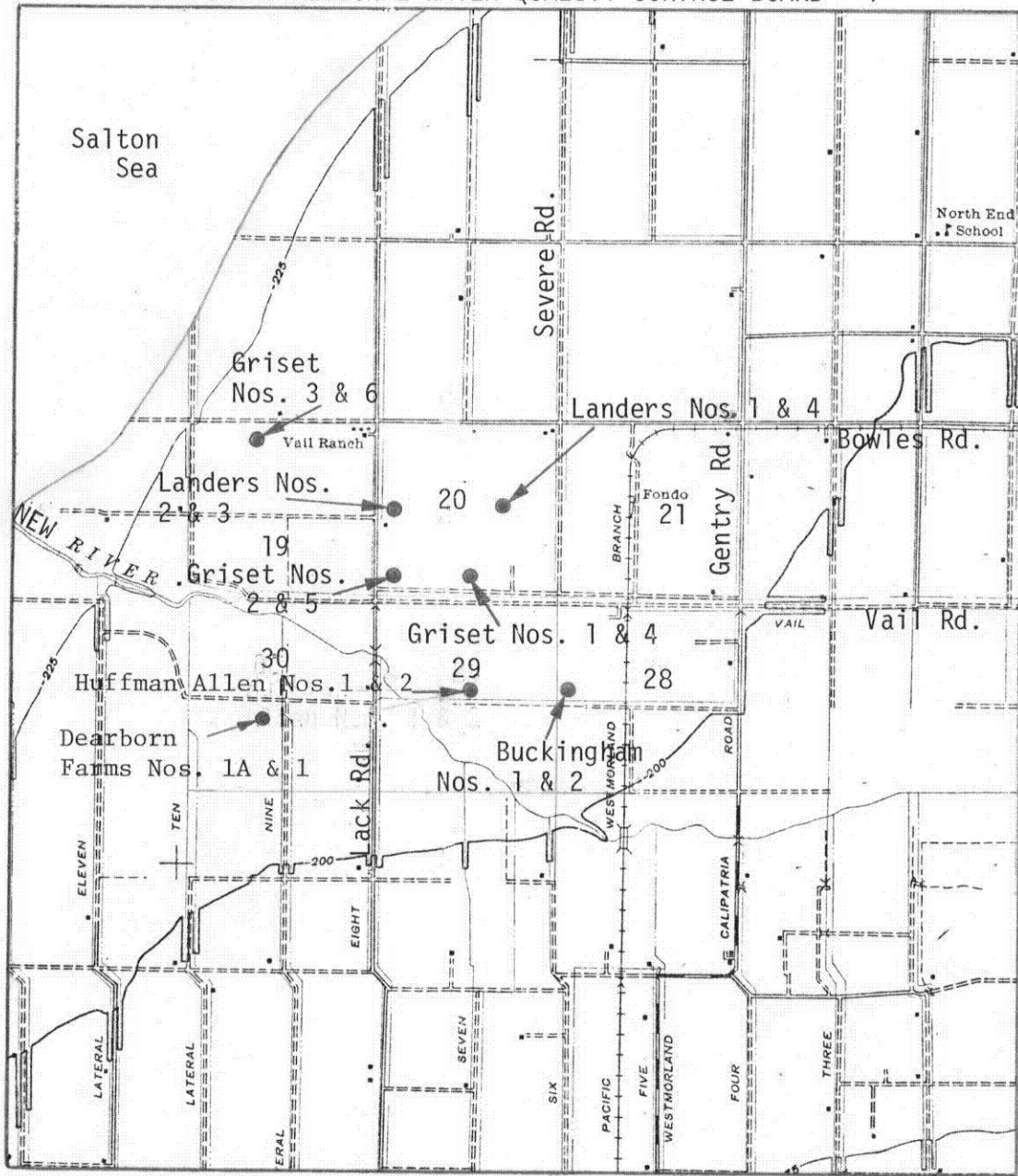
ORDERED BY:

Alton Sevjan
Executive Officer

November 18, 1981

Date

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - 7



SITE MAP
 REPUBLIC GEOTHERMAL, INC.
 North of Westmorland - Imperial County
 Sections 19, 20, 28 & 29, T12S, R13E, SBB&M
 USGS Calipatria 15 min. Topographic Map

Order No. 81-78

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ATTACHMENT A

Threshold Limit Concentrations for Persistent
Bioaccumulative Toxic Substances

Drilling mud, cuttings, and other geothermal wastes containing the following substances having concentrations equal to or greater than those listed below are designated as hazardous by the State of California Department of Health Services.

	<u>Soluble</u> <u>Threshold</u> <u>Limit wet</u> <u>weight mg/kg</u>	<u>Total</u> <u>Threshold</u> <u>Limit wet</u> <u>weight mg/kg</u>
1. Arsenic and compounds	5	50
2. Barium (excluding barite) and compounds	100	1,000
3. Lead compounds, inorganic	5	50
4. Lead compounds, organic	--	13
5. Zinc compounds	20	200