CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ORDER NO. 77-1

WASTE DISCHARGE REQUIREMENTS
FOR
REPUBLIC GEOTHERMAL, INC.
Northwest 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), 2544 Cleveland Avenue, Suite 5, Santa Rosa, California 95401, submitted a Report of Waste Discharge dated October 4, 1976, with subsequent revisions.

2. The discharger proposes to drill ten deep-test geothermal wells in the Westmorland area of Imperial County. The wells will be located as follows:

Well	Location
Buckingham #1 & #2	2495'S, 140'E (No. 1) and 190'E (No. 2) from NW corner Sec. 28, T12S, R13E, SBB&M
Huffman & Allen #1 & #2	2495'S, 2780'E (No. 1) and 2830'E (No. 2) from NW corner Sec. 29, T12S, R13E, SBB&M
Griset #1 & #4	175'N, 2750'E (No. 1) and 2800'E (No. 4) from SW corner Sec. 20, T12S, R13E, SBB&M
Griset #2 & #5	175'N, 150'E (No. 2) and 200'E (No. 5) from NW corner Sec. 20, T12S, R13E, SBB&M
Griset #3 & #6	220'S, (No. 3) and 270'S (No. 6) 2975'E from NW corner Sec. 19, T12S, R13E, SBB&M

3. The discharger proposes to drill two wells (approximately 50 feet apart) at each of five (5) sites. Both wells at each site will use the same reserve mud pit and attendant facilities. Buckingham #1 and #2, Huffman-Allen #1 and #2, Griset #1 and #4, Griset #2 and #5, will each disturb 2.01 acres of surface. Griset #3 and Griset #6 will disturb 2.06 acres of surface. No new roads will be constructed.

Replaced by 81-78 / 11/18/81

4. The discharger proposes that drilling muds will be stored in a leak-proof reserve mud pit and later either neutralized and made arable or trucked and discharged at a disposal site approved by the Executive Officer to receive these wastes. The possible drilling fluid components which may be used are:

Colloidal clay (drilled solids)	Sodium Chloride
Wyoming Bentonite plus .1% acrylic acid	Ground nut shells
Lignite or leonardite brown coal	Lime
Tannic acid	Barium sulphate
Caustic soda	Cypan
Cane Fiber	Bit lube
Mica	Thread dope
Potassium chloride	Diesel oil

Bentonite will be the main component; the other substances are additives and may or may not be used, depending on the particular drilling conditions. The pH level of the drilling fluid is not expected to exceed 8.5 at any time. Caustic soda will be used in the drilling fluid at a concentration ranging from 200 to 2500 lbs. per well.

5. The discharger proposes to discharge a maximum of 12.9 acre-feet of fluids (maximum 100,000 barrels) from each of the ten proposed deep test geothermal wells during an initial well clean-out period. Discharge of fluid from this clean-out and initial testing period shall consist of the following:

a. Displacement water, consisting of from 300 to 500 barrels of drilling mud mixed with a quantity of fresh water to total from 1,000 to 5,000 barrels (0.7 acre-feet) will first be discharged. This muddy water would be discharged into the mud reserve pit, and the drilling mud-displacement water mixture would either be reused as drilling mud on other drillsites, neutralized and made arable, or taken to an approved solid waste disposal site.

b. Up to 95,000 barrels (12.2 acre-feet) of geothermal fluid, also containing varying amounts of formation sands and shales and drilling filtrates, would then be discharged into either steel tanks or into storage basins constructed so that fluids contained within will not penetrate through over one-half the thickness of the lining during the life of the basin. The fluids in the basins will be ultimately disposed of by either subsurface reinjection or solar evaporation, and the residual solids or concentrate would be taken directly to an approved solid waste disposal site without further treatment or concentration.

6. The discharger states that subsequent to initial clean-out each well may be placed on substantial production tests which will produce no more than 3 million barrels (387 acre-feet) of geothermal fluid. The fluid will be discharged into steel tanks and/or leak-proof storage basins and reinjected into wells specifically drilled or converted for disposal purposes. All reinjection will take place at a depth of at least 2500 feet and will not take place in any subsurface zone which has a total dissolved solids content of less than 10,000 mg/l, unless the quality of the reinjected water is comparable to that of the receiving water. Prior to injection the fluid will be filtered. Approximately 50,000 barrels (6.5 acre-feet) of the production-test geothermal fluid may be used for filter back-flush and will be discharged into steel tanks or a properly constructed and lined storage basin as approved by the Executive Officer and disposed of by one or more of the three alternatives described in Finding 5b (above).

7. The discharger is fully informed that there are no solid waste disposal sites in Region 7 at this time that have been approved by the Regional Board to receive geothermal salt wastes.

8. The discharger proposes that clean-up will be accomplished upon abandonment of the well. All residue removed from the storage basins will be disposed of at an approved solid waste disposal site.

9. The discharger has stated that a maximum of approximately 12 - 15 persons will be working at the well sites at any one time. Portable sanitary facilities will be provided at the sites.

10. The Water Quality Control Plan for the West Colorado River Basin was adopted on April 10, 1975. This Order implements the objectives stated in said Plan.

11. 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.

    b. New River and Imperial Valley irrigation drains.

        1. Limited public fishing activity.

        2. Transport of dissolved solids to the Salton Sea for agricultural soil salinity control.

3. Freshwater habitat for fish and wildlife.

4. Freshwater replenishment for the Salton Sea.

c. Salton Sea

1. Water contact recreation.

2. Non-contact recreation.

3. Water and vegetative habitat for the maintenance of wildlife.

12. The Board has notified the discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the proposed discharge.

13. The Board in a public meeting heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, Republic Geothermal, Inc., shall comply with the following:

A. Discharge Specifications

1. Neither the treatment nor the discharge of wastes shall cause a pollution or a nuisance.

2. Geothermal fluids and other wastes shall not enter the Salton Sea or any canals, drainage channels, or drains (including subsurface drainage systems or aquifers) which could provide flow or seepage to the Salton Sea.

3. Temporary discharge and/or storage of geothermal materials other than in basins from which there is no seepage or overflow is prohibited.

4. There shall be no seepage or overflow from temporary storage basins.

5. Adequate protective works and maintenance shall be provided to assure that storage basins will not become eroded or otherwise damaged.

6. A minimum freeboard of at least two (2) feet shall be maintained in all storage basins.

7. Storage basins shall not be located within 50 linear feet of any irrigation drainage ditch.

8. All geothermal wastes shall be removed from the storage basins and reinjected or discharged to a disposal site approved for such wastes. Cleanup of all contents shall be accomplished upon abandonment of the basins. Lack of construction or operational activity on the site for a period of six (6) months shall constitute abandonment for the purposes of this Order.

9. Fluids discharged by subsurface injection at this location shall be discharged below a depth of 2500 feet, and shall not be discharged into any subsurface zone which has a total dissolved solids content of less than 10,000 mg/l, unless the quality of the injection water is comparable to that of the receiving water.

10. Of the above reported wastes, only drilling muds may be discharged at other than Class I solid waste disposal sites, which in addition must be approved by the Regional Board to receive these wastes.

B. Provisions

1. The discharger shall comply with the "Monitoring and Reporting Program '77-1", and future revisions thereto, as specified by the Executive Officer.

2. Prior to the discharge of any geothermal materials into storage basins, the discharger shall submit to the Regional Board a technical report showing construction of said basins, and, following completion of construction a certificate signed by a California Registered Civil Engineer stating that the basins and attendant facilities are constructed to meet the requirements of this Order.

I, Arthur Swajian, 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 January 24, 1977.

Arthur Swajian
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

MONITORING AND REPORTING PROGRAM NO. 77-1
FOR
REPUBLIC GEOTHERMAL, INC.
Northwest 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:

Constituents	Units	Reporting Frequency
1. Volume of geothermal fluid discharge to each storage basin	Gallons	Monthly
2. Volume contained in each storage basin	Gallons	Monthly
3. Total dissolved solids content of waste fluid contained in each storage basin	mg/l	Monthly
4. Volume injected to subsurface strata from each storage basin	Gallons	Monthly
5. Volume directly reinjected to subsurface strata from each geothermal well	Gallons	Monthly
6. Total dissolved solids concentration by chemical analysis of waste fluid injected into each injection well	mg/l	Monthly
7. Total dissolved solids concentration by chemical analysis of groundwater contained in strata receiving waste fluid injection	mg/l	At least 10 days prior to commencement of injection
8. Location and depth of each injection well		At least 10 days prior to commencement of injection

Constituents	Units	Reporting Frequency
9. Calibrated electrical conductivity of flow from tile drain system underlying the area of each well and holding basin.	Micromhos/cm	Daily*, Monday through Friday

10. Within 10 days after the initial discharge of geothermal fluids from a well, the discharger shall report said initial discharge to the Board.

11. Immediate reporting of any accidental spillage or release of waste material, and also, plan for immediate measures being taken to correct same and to limit detrimental effects.

12. At least 10 days prior to destruction of any storage basin, the discharger shall request a Regional Board staff inspection and approval of the cleanup procedure.

13. Report of completion of removal of all geothermal wastes from storage basins and cleanup of premises - reported within one week following completion of work.

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 11 (above) shall be forwarded immediately, and if at all possible shall be preceded by phone communication to the Regional Board's office. Phone No. (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 staff of the Regional Board upon request.

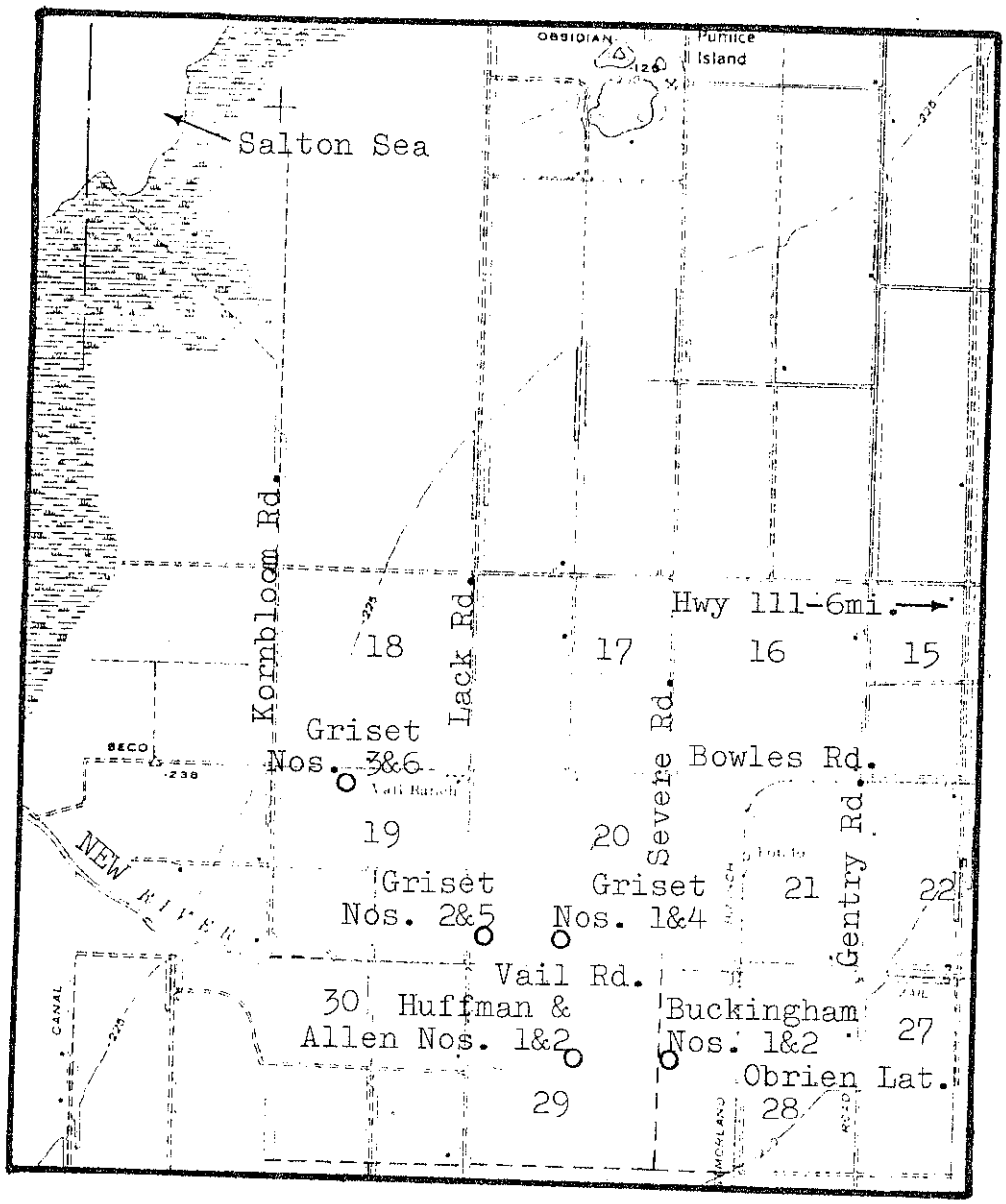
Mail reports to:

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

ORDERED BY Arthur Levajian
Executive Officer

January 26, 1977
Date

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



SITE MAP

REPUBLIC GEOTHERMAL, INC.
Northwest of Westmorland - Imperial County
Sections 19, 20, 28 and 29, T12S, R13E, SBB&M
U.S.G.S. Calipatria 15 min. Topographic Map