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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

ORDER NO. 80-4

WASTE DISCHARGE REQUIREMENTS  
FOR  
UNION OIL COMPANY OF CALIFORNIA  
GEOTHERMAL EXPLORATION PROJECT  
East of Brawley - Imperial County

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

1. Union Oil Co. of California (hereinafter also referred to as the discharger), 135 Main Street, Brawley, CA 92227, submitted a Report of Waste Discharge, dated October 26, 1979.
2. The discharger proposes to drill 13 exploratory geothermal wells in the Brawley area. These wells are to be located as follows:

Meyer #1	SW 1/4, NE 1/4 of Section 7, T13S, R16E, SBB&M.
Meyer #2	SW 1/4, SW 1/4 of Section 8, T13S, R16E, SBB&M.
Suchy #1	SW 1/4, SE 1/4 of Section 8, T13S, R16E, SBB&M.
Shank #1	SW 1/4, SE 1/4 of Section 27, T13S, R15E, SBB&M.
Hoeptner #1	SW 1/4, SW 1/4 of Section 26, T13S, R15E, SBB&M.
Elmore #1	NW 1/4, NE 1/4 of Section 36, T13S, R15E, SBB&M.
Elmore #2	NW 1/4, SE 1/4 of Section 36, T13S, R15E, SBB&M.
Elmore #3	NE 1/4, NW 1/4 of Section 31, T13S, R16E, SBB&M.
Elmore #4	NE 1/4, SW 1/4 of Section 31, T13S, R16E, SBB&M.

Rescinded  
1/26/83  
by 83-3

Hellis #1

NW $\frac{1}{4}$ , NW $\frac{1}{4}$  of Section 3,  
T14S, R15E, SBB&M.

Merrill #1

NW $\frac{1}{4}$ , NE $\frac{1}{4}$  of Section 3,  
T14S, R15E, SBB&M.

Merrill #2

NW $\frac{1}{4}$ , SW $\frac{1}{4}$  of Section 3,  
T14S, R15E, SBB&M.

Gerrard #1

NW $\frac{1}{4}$ , NW $\frac{1}{4}$  of Section 10,  
T14S, R15E, SBB&M.

3. An impermeable mud sump, 60 feet by 160 feet by 7 feet deep with an approximate capacity of 431,000 gallons would be constructed at each well site. Each site would utilize about 2.6 acres of surface area.
4. The discharger proposes to discharge into each mud sump a maximum of 337,000 gallons of drilling mud. Following some evaporation, the residual mud would be removed from the sump and discharged at a solid waste disposal site approved by the Regional Board to receive this waste.
5. The drilling mud components which may be used are:

Bentonite	Barium Sulfate	Soda Ash
Lignite	Bicarbonate of Soda	Sodium Polyacrylate
Caustic Soda	Soda Phosphate	Drilling Detergent
Sepiolite		

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

6. The discharger proposes to discharge into each mud sump or into steel tanks approximately 374,000 gallons of clean-out fluid and 105,000 gallons of flow test fluid. Final disposal would be by subsurface reinjection or after some evaporation, the residual mud would be discharged at a Class I or Class II-I solid waste disposal site approved by the Regional Board to receive this waste.
7. The discharger is hereby informed that there are no solid waste disposal sites in the Colorado River Basin Region at this time that have been approved by the Regional Board to receive geothermal salt wastes.

8. Flow from production testing of geothermal wells would be injected subsurface.
9. The Water Quality Control Plan for the West Colorado River Basin Region was adopted on April 10, 1975. The Basin Plan contains water quality objectives for Imperial Hydrologic Unit.
10. 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 are saline 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.
11. Imperial County Planning Department adopted on November 28, 1979 , Environmental Impact Report No. 223-79 for these wells. This report indicates that this project would not have any significant adverse effects on water quality.
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, Union Oil Company of California, 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 muds or any wastes is prohibited at the well sites.
4. Temporary discharge and/or storage of drilling mud, drill cuttings, and cleanout and flow test fluid, except in mud sumps or other containers having a coefficient of permeability of lining of  $1 \times 10^{-6}$  cm/sec, or less, is prohibited, and the fluids contained therein shall not penetrate through the lining during the containment period.
5. Long term storage and/or flow of geothermal materials for longer than one (1) year, except in containers having a lining coefficient of permeability of  $1 \times 10^{-8}$  cm/sec, or less, is prohibited, and the fluids contained therein 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, well cleanout, and flow test materials are removed.
7. A minimum freeboard of at least two feet shall be maintained in the sumps.
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 of the injection water is less than or equal to that of the receiving water.
9. 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-I disposal site approved by the Regional Board to receive said waste.
10. Drilling muds, with extractable water containing a total dissolved solids concentration which is less than 6,000 mg/l, and not containing hazardous wastes\* may be disposed at a Class II-2 disposal site approved by the Regional Board to receive said wastes.

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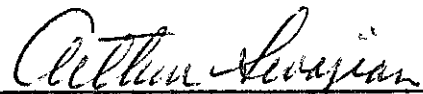
\*See Attachment A

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. 80-4 and "General Provisions for Monitoring and Reporting", and future revisions thereto, as specified by the Executive Officer.
2. 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.

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 March 26, 1980.



Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

ATTACHMENT A

Threshold Limit Concentrations for Persistent  
and 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 Threshold Limit mg/kg</u>	<u>Total Threshold Limit net 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. Manganese compounds	100	1,000
6. Zinc compounds	17	170

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

MONITORING AND REPORTING PROGRAM NO. 80-4  
FOR

UNION OIL COMPANY OF CALIFORNIA  
GEOTHERMAL EXPLORATION PROJECT  
East of Brawley - Imperial County

Location: Sections 7, 8 and 31, T13S, R16E, SBB&M, Sections 26, 27 and 36, T13S, R15E, SBB&M, and Sections 3 and 10, T14S, R15E, SBB&M.

MONITORING

Phillips Petroleum Company shall report monitoring data to the Regional Board in accordance with the following schedule:

<u>Constituents</u>	<u>Units</u>	<u>Reporting Frequency</u>
1. Volume of geothermal wastes contained in each sump.	Gallons	Monthly
2. Volume of saline drilling mud and salt and brine waste hauled to a Class I or Class II-1 solid waste disposal site, and name of site.	Gallons	Monthly
3. Volume and total dissolved solids concentration of non-saline drilling mud hauled to a Class II-2 solid waste disposal site, and name of site.	Gallons and mg/l	Monthly
4. Total dissolved solids concentration of waste fluid injected into each injection well.	mg/l	Monthly
5. Total dissolved solids concentration of ground-water contained in strata receiving waste fluid injection.	mg/l	At least 10 days prior to commencement of injection

<u>Constituents</u>	<u>Units</u>	<u>Reporting Frequency</u>
6. Representative samples of drilling mud, cuttings and geothermal fluid to be discharged at Class II-2 solid waste disposal sites shall be analyzed for the following constituents and the results reported to the Regional Board.		5 days prior to discharge
a. Arsenic and compounds	mg/kg	
b. Barium (excluding barite) and compounds	mg/kg	
c. Lead compounds, inorganic	mg/kg	
d. Lead compounds, organic	mg/kg	
e. Manganese compounds	mg/kg	
f. Zinc compounds	mg/kg	
7. Calibrated electrical conductivity of flow from tile drain system underlying the area of each well.	micromhos/cm	Daily* Monday Through Friday
8. 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. 80-4.		
9. At least 10 days before the initial discharge of any geothermal fluids from each well, the discharger shall report said initial discharge to the Board.		
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.		

\*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.



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 the 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

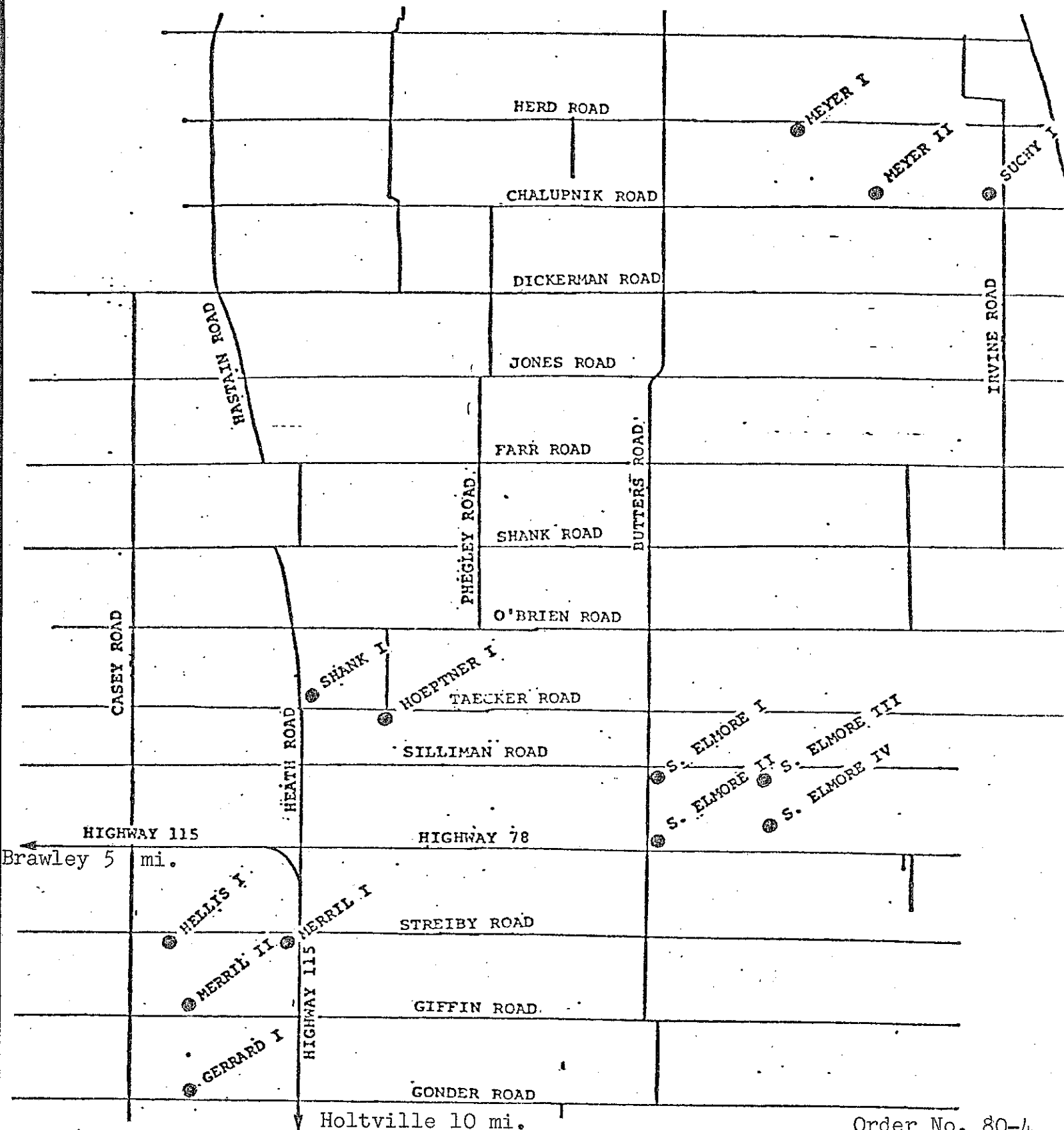
Ordered by

*Arthur Levajian*  
Executive Officer

March 26, 1980

Date

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - 7



Order No. 80-4

UNION OIL COMPANY OF CALIFORNIA  
GEOTHERMAL EXPLORATION PROJECT

East of Brawley - Imperial County

Sections 7, 8 and 31, T13S, R16E, SBB&M, Sections 26, 27 and 36, T13S, R15E, SBB&M, and Sections 3 and 10, T14S, R15E, SBB&M

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

GENERAL MONITORING AND REPORTING PROVISIONS  
FOR LAND DISPOSAL OF WASTES

GENERAL PROVISIONS FOR SAMPLING AND ANALYSIS

Unless otherwise noted, all sampling, sample preservation, and analyses shall be conducted in accordance with the current edition of "Standard Methods for the Examination of Water and Waste Water" or approved by the Executive Officer.

All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Public Health or a laboratory approved by the Executive Officer.