

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION**

ORDER NO. 88-57

WASTE DISCHARGE REQUIREMENTS  
FOR  
UNOCAL CORPORATION  
SALTON SEA UNITS I AND II  
GEOHERMAL PRODUCTION FACILITIES  
North of Westmorland - Imperial County

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

1. Unocal Corporation (hereinafter referred to as the discharger), P. O. Box 1805, Indio, CA 92202, submitted a Report of Waste Discharge dated August 8, 1988.
2. The discharger currently operates a 10 megawatt geothermal test plant (Unit I) in the Salton Sea Known Geothermal Resource Area (KGRA). Eight geothermal wells (production and injection) have been drilled at the following locations in Section 5, T12S, R13E, SBB&M:

<u>Well</u>	<u>Location</u>	<u>Total Depth</u>
Sinclair-15	SW $\frac{1}{4}$ , SW $\frac{1}{4}$	6031'
Sinclair-20	SE $\frac{1}{4}$ , NW $\frac{1}{4}$	5569'
Sinclair-25	SW $\frac{1}{4}$ , SW $\frac{1}{4}$	6124'
IID-5	SW $\frac{1}{4}$ , NW $\frac{1}{4}$	3132'
IID-6	NW $\frac{1}{4}$ , NW $\frac{1}{4}$	3500'
IID-9	SW $\frac{1}{4}$ , NW $\frac{1}{4}$	5485'
IID-11	NW $\frac{1}{4}$ , NW $\frac{1}{4}$	4500'
IID-12	SW $\frac{1}{4}$ , NW $\frac{1}{4}$	4318'

3. Two monitoring wells, Sinclair-13 and IID-10, have been drilled within Section 5, T12S, R13E, SBB&M to depths of 5610 feet and 1519 feet, respectively.
4. The discharger proposes to construct an addition to the Unit I power plant, to be known as Unit II. Unit II would be constructed next to Unit I in the W $\frac{1}{2}$ , NW  $\frac{1}{4}$ , Section 5. Units I and II will use the same wells (as noted above) for production and injection.
5. The discharger proposes to drill up to 16 additional wells in said Section 5 during the life of the project as replacements or additions to the existing wells that service the power plants.

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94-082*

6. Temporary clay lined containment basins have been constructed at the well sites to contain the drilling mud, drill cuttings, and cleanout fluid produced during drilling. Additional temporary containment basins would be constructed at any newly drilled well sites.
7. Final disposal of geothermal wastes discharged to temporary containment basins would be by subsurface injection or by hauling said wastes to a waste management facility approved by the Regional Board to accept said wastes.
8. Geothermal fluids (brines) from production flow tests would be injected subsurface.
9. Geothermal fluids in this portion of the Salton Sea KGRA contain approximately 25% (by weight) dissolvable solids. These fluids also may be classified as hazardous in accordance with the criteria listed in Section 66699, Title 22 of the California Code of Regulations, based on concentrations of lead, zinc, and arsenic.
10. Precipitated minerals removed from the brine during operation of the power plant are processed into a form of concrete (referred to by the discharger as "geocrete"). The "geocrete" is tested by the discharger to verify that it is non-hazardous and non-toxic and it is then used by the discharger for on-site construction purposes.
11. The discharger operates a concrete-lined brine pond at Unit I to contain fluids prior to their injection subsurface. Fluids contained in said brine pond include steam condensate from the power plant, cooling tower blowdown, brine diverted from the power plant during emergency conditions, and fluids produced from geothermal salt dissolving processes or rinsing of other geothermal wastes. Said brine pond would also service fluids from Unit II. Fluid from said brine pond is injected subsurface through Well IID-5.
12. The discharger operates a ground level concrete lined sump adjacent to the power plant to collect any surface runoff or drainage from the power plant area, including any equipment leakage. Fluids from said sump are periodically pumped into the brine pond (described in Finding No. 11 above) for eventual injection.
13. The Water Quality Control Plan for the Colorado River Basin Region of California was adopted by the Regional Board on November 14, 1984.
14. Beneficial uses to be protected by this Order are as follows:
  - a. Ground water
    1. Shallow ground waters at the discharge location are saline and are not beneficially used.
    2. Deep ground waters are 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.
15. Imperial County Planning Department adopted Environmental Impact Report (SCH #8002623) for the Unit I development in December 1980 and subsequently determined that the Unit II addition will not have a significant effect on the environment in a Notice of Determination approved on May 10, 1988. Regional Board staff has reviewed these documents and finds that this project should not have a significant environmental impact on water quality if conducted according to requirements and provisions of this Order.
16. These geothermal development wells have been subject to Waste Discharge Requirements Orders No. 78-56 and 81-40 adopted by the Regional Board on July 12, 1978 and March 25, 1981, respectively.
17. 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 approved in August 1982.
18. The Board has notified the discharger and interested agencies and persons of its intent to update waste discharge requirements for the discharge.
19. The Board in a public meeting heard and considered all comments pertaining to the existing discharge.

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

A. Discharge Specifications

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 drilling mud, drill cuttings, and cleanout fluid shall be injected subsurface or discharged for temporary storage into either:
  - a. Earthen basins with a minimum six (6) inch compacted clay lining having a coefficient of permeability of  $1 \times 10^{-7}$  cm/sec or less. Clay lining shall be defined as: at least 40 percent of the material, by weight, passing a No. 200 U. S. Standard Sieve; or

- 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.

All such basins or containers shall be protected and maintained to ensure their effectiveness.

- 3. Permanent (longer than one (1) year) disposal or storage of geothermal waste in on-site temporary containment basins is prohibited.
- 4. Wastes stored in temporary containment basins shall be injected subsurface or disposed at an appropriate waste management facility approved by the Regional Board.
- 5. Storage of fluids described in Findings 11 and 12 (above) other than into containment basins having a liner 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. A minimum freeboard of two (2) feet shall be maintained in all containment basins at all times.
- 7. Adequate protective works and maintenance shall be provided to assure that containment basins shall not become eroded or otherwise damaged by floods occurring during the project life of said basins.
- 8. Geothermal fluids and other wastes shall not enter any canals, natural or man-made drainage channels, or drains (including subsurface drainage systems) except as allowed under an appropriate National Pollutant Discharge Elimination System (NPDES) Permit.
- 9. Fluid discharged by subsurface injection shall not be injected into any subsurface aquifer which has a TDS concentration below that of the injection fluid, unless the discharger demonstrates to the satisfaction of the Executive Officer that injection into said zone will not pose a threat to beneficial water use.
- 10. Any subsurface injection at depths less than 1000 feet below ground surface shall have written approval of the Executive Officer prior to subsurface injection after the date of adoption of this Order.
- 11. "Geocrete" may be used for on-site construction or maintenance only if all of the following conditions are met:
  - a. "Geocrete" shall not exceed the Soluble Threshold Limit Concentration (STLC) or the Total Threshold Limit Concentration (TTLIC) values in accordance with Section 66699, Title 22, of the California Code of Regulations, and any future revisions, thereto.

- b. Leachate produced from representative samples of "geocrete" shall be tested using a bioassay procedure approved by the Executive Officer. Results of the bioassays shall demonstrate to the satisfaction of the Executive Officer that the produced leachate does not contain substances in concentrations toxic to human, animal, plant or aquatic life.
  - c. Use of "geocrete" shall not cause a violation of any applicable water quality standards for receiving waters adopted by the Regional Board or the State Water Resources Control Board as required by the Clean Water Act and regulations adopted thereunder.
12. Final disposal of residual wastes and cleanup of containment facilities shall be accomplished upon abandonment or closure of operations to the satisfaction of the Executive Officer. Lack of construction or operational activity on site for a period of one year shall constitute abandonment for the purposes of this Order.

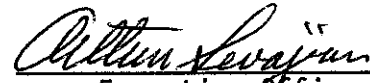
#### B. Provisions

1. The discharger shall comply with "Monitoring and Reporting Program No. 88-57", and future revisions thereto, as specified by the Executive Officer.
2. The discharger shall submit to the Board, at least 30 days prior to commencement of operation 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. At least ten days prior to the discharge of any material into a containment basin, the discharger shall submit to the Regional Board a report signed by a California Registered Civil Engineer or Certified Engineering Geologist advising the Executive Officer that the containment basin and attendant facilities are constructed to meet the requirements of this Order.
4. The discharger shall submit to the Board, at least 30 days prior to discharge to any constructed facilities, written adequate assurance that money is committed in the amount of \$150,000.00 to ensure that all facilities are cleaned up and closed in accordance with the requirements of this Order.
5. The discharger shall submit to the Regional Board a proposal to monitor the uppermost aquifer beneath the containment basins, described in Findings No. 11 and 12 (above), during the project life of said basins. Said proposal shall be submitted within 60 days of the adoption of this Order, and shall be implemented after receiving the approval of the Executive Officer.

6. 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 Board.

IT IS FURTHER ORDERED THAT: Board Orders No. 78-56 and 81-40 be superseded by 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 November 30, 1988.

  
Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
COLORADO RIVER BASIN REGION

MONITORING AND REPORTING PROGRAM NO. 88-57  
FOR  
UNOCAL CORPORATION  
SALTON SEA UNITS I AND II  
GEOTHERMAL PRODUCTION FACILITIES  
North of Westmorland - Imperial County

Location of Discharge: Section 5, T12S, R13E, SBB&M

MONITORING

Unocal Corporation 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 new well, a written report on the proposed method and estimated costs of cleanup and closure in accordance with the requirements of this Order.
2. At least ten days prior to the discharge of any material into a containment basin, the discharger shall submit to the Regional Board a report signed by a California Registered Civil Engineer or Certified Engineering Geologist advising the Executive Officer that the containment basin and attendant facilities are constructed to meet the requirements of this Order.
3. The discharger shall submit the following information:

<u>Constituents</u>	<u>Unit</u>	<u>Reporting Frequency</u>
a. Volume of discharge contained in each temporary containment basin and brine holding basin.	Gallons	Monthly
b. Volume of geothermal waste discharged at a waste management facility, and name of facility.	Gallons	Monthly
c. Total dissolved solids concentration and volume of geothermal fluid injected into each injection well.	mg/l and Gallons	Monthly

<u>Constituents</u>	<u>Unit</u>	<u>Reporting Frequency</u>
d. TTLC and STLC values for "Geocrete" (inorganics only)	mg/l	Monthly
e. Volume and location of emplacement of "Geocrete".	cubic feet	Monthly
f. Bioassay results from "geocrete" leachate test.	-	Quarterly
g. Total dissolved solids concentration of ground water contained in strata proposed to receive geothermal fluid injection.	mg/l	At least ten days prior to commencement of injection.

4. After the ground water monitoring proposal described in Provision No. 5 (above) is approved by the Executive Officer, the discharger shall comply with the monitoring and reporting requirements of said proposal.
5. Immediate reporting of any accidental spillage or release of waste material and immediate measures being taken to correct same and to limit detrimental effects.
6. Report of completion of removal of all geothermal waste from temporary containment basins within one (1) week following completion of work.
7. At least ten days prior to destruction of each temporary containment basin, the discharger shall request a Regional Board inspection and approval of the cleanup procedures.

#### REPORTING

The above monitoring program shall be implemented immediately upon commencement of discharge at each site.

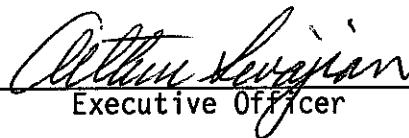
Monthly reports shall be submitted to the Regional Board by the 15th day of the following month. Quarterly monitoring reports shall be submitted to the Regional Board by January 15, April 15, July 15, and October 15 of each year. Reports for Item 5 (above) shall be forwarded immediately and shall be 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 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

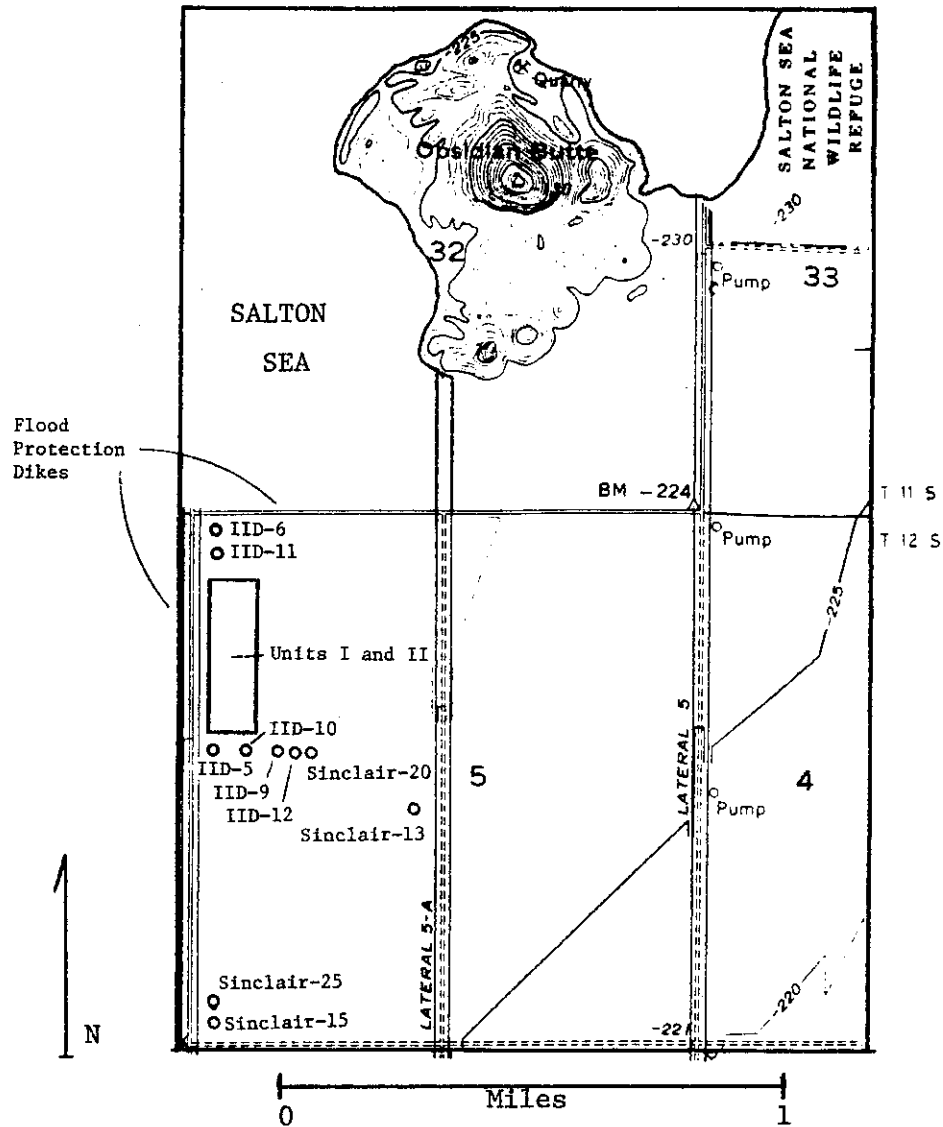
ORDERED BY:

  
Executive Officer

November 30, 1988

Date

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD - 7



UNOCAL CORPORATION  
 SALTON SEA UNITS I AND II  
 GEOTHERMAL PRODUCTION FACILITIES  
 North of Westmorland - Imperial County

Section 5, T12S, R13E, SBB&M  
 USGS Obsidian Butte 7.5 min Topographic Map

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