

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

CLEANUP AND ABATEMENT ORDER NO. R7-2011-0006

ISSUED TO

UNOCAL CORPORATION

RESIDUE PROCESSING FACILITY (GEMCOR)

West of Calipatria, Imperial County

This Cleanup and Abatement Order (CAO, or Order) is issued pursuant to Sections 13304 and 13267 of the California Water Code (CWC), which authorizes the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) to issue Cleanup and Abatement Orders and require the submittal of technical reports. The Regional Water Board, with respect to the Discharger's actions, finds that:

1. Unocal Corporation (hereinafter referred to as the Discharger), 6111 Bollinger Canyon Road, San Ramon, CA 94583, owns an 80-acre property (hereinafter referred to as the site), which included administration buildings, a laboratory, a warehouse, and a shop (all buildings were demolished in 2009), and 65 acres of former evaporation basins used for disposal of geothermal wastes. The site has been known at various times as the Geothermal Residue Processing Facility (GRPF), Geothermal Energy and Mineral Corporation (GEMCOR), and Salton Sea Operation Center.
2. The site address is 950 West Lindsey Road, Calipatria, CA 92233, and is located at the SE 1/4, Section 4, T12S, R13E, SBB&M.
3. The local land use in the immediate area around the site is agricultural. Several geothermal power plants are located north and northeast of the site.
4. Beginning in the 1960's, brines from an onsite geothermal well were managed by GEMCOR in unlined solar evaporation ponds covering approximately 65 acres of the site. In 1974, the Regional Water Board adopted Board Order No. 74-063 prescribing Waste Discharge Requirements (WDRs) for the discharge of geothermal brines into nine evaporation basins owned by GEMCOR. Brines from nearby geothermal wells were collected in these evaporation basins on the site. The evaporation basins covered approximately 65 acres. Solar evaporation of the brine left salt residues in the basins. Calcium chloride was extracted from the brine and excess brine was re-injected into the geothermal reservoir. Salts remaining in the evaporation basins were sampled by Regional Water Board staff and analyzed by the California Department of Health Services laboratory in Los Angeles (now called the California Department of Public Health). The salts were classified as hazardous due to high concentrations of lead and arsenic in accordance with hazardous waste criteria specified in Title 22 of the California Code of Regulations (CCRs) and Chapter 6.5 of the California Health and Safety Code (commencing with section 25100).
5. UNOCAL purchased the site in 1980 and assumed responsibility for the brine and the salt stored in the evaporation basins.
6. Regional Water Board WDRs Order No. 81-022, adopted on May 20, 1981, superseded Board Order No. 74-063 and allowed the Discharger to temporarily use existing evaporation basins on site for brine storage from testing of a nearby geothermal well and a demonstration power plant. Additionally, Board Order No. 81-022 included an

- evaporation basin cleanup schedule that had three cleanup alternatives: 1) Beneficial Use of Salt; 2) Re-injection; and 3) Haul to disposal site.
7. The Discharger reports that in July 1984, it began a process of dissolving the salt in the basins and re-injecting the solutions into the geothermal reservoir. This process continued until July of 1988 and left approximately 30,000 tons of undissolved residual solids remaining on site in evaporation basin No. 1. The residual solids had concentrations of lead above the Soluble Threshold Limit Concentrations (STLC) specified in the California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.24.
 8. In 1988, the Discharger proposed to use the facility to wash geothermal residues from pipes and equipment from the other nearby geothermal sites and inject the rinsate into the geothermal reservoir. The Discharger also proposed that any residual solids would be converted to soil cement ("geocrete") to reduce the leachability of the high levels of lead and arsenic. The geocrete would then be used as road base and for other site improvements.
 9. In response to the Discharger's request, the Discharger was permitted to utilize geocrete pursuant to WDRs that were adopted by the Regional Water Board on January 25, 1989, in Board Order No. 89-005, which superseded Board Order No. 81-022. Board Order No. 89-005 allowed the use of geocrete under the following conditions:
 - a. Geocrete and soil cement shall not exceed the Soluble Threshold Limit Concentration (STLC) or the Total Threshold Limit Concentration (TTLC) values in accordance with Section 66699, Title 22 of the CCRs, and any future revisions thereto.
 - b. Leachate produced from representative samples of geocrete and soil cement 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 and soil cement shall not cause 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.
 10. In 1989, the Discharger reported that 30,000 cubic yards of residual solids were excavated from Evaporation Basin No.1 and spread in a layer 3-inches thick on the northeast portion of the site. Fly ash and cement were mixed into the layer of residual solids to form a geocrete crust on the ground that was used as a foundation for a 28-acre storage area.
 11. From 1989 through 1993, the Discharger reports that a total of approximately 62,700 cubic yards of solids were received at the GEMCOR site. Of this amount: 1) approximately 13,000 cubic yards of washed soil were incorporated into geocrete and placed in the northwest corner of the site; 2) approximately 14,000 cubic yards that, due to elevated levels (above STLC and/or TTLC) of lead and arsenic, could not be incorporated into geocrete, were disposed of at a nearby Class I landfill; and 3) the remaining solids were dissolved during washing and were injected into the geothermal reservoir.

12. In 1993, the Discharger performed cleanup activities on site. Residual solids, pond liners, and contaminated soils were taken to a nearby Class I Landfill. Following the removal of the above, a site assessment was performed resulting in data that indicated elevated levels of arsenic (As) of less than 0.1 ppm to 211 ppm and lead (Pb) of 4.5 ppm to 579 ppm remained in the soils.
13. On November 4, 1994, a deed restriction was recorded by Imperial County for the GEMCOR property that restricts the property from use for residential or agricultural purposes. The deed restriction also requires that the property be sloped and graded so that no drainage of surface waters will run onto adjacent lands. The deed restriction is still in effect.
14. In 2001, the Discharger cleared the site of clean pipe and vessels that had been stored there and disposed of any remnant residual solids.
15. In June 2001, pursuant to Section 13267 of the CWC, the Regional Water Board issued a technical order requiring site assessment. The Discharger conducted an investigation that included the following activities: Soil samples were taken using a geoprobe hydraulic drill. The sample locations were located on 200-foot centers throughout the 80 acres of the site and sampled at 6-inch intervals to approximately 4 feet in depth. Off-site samples were taken to determine background values.
16. Historical site operations (1964-1979) included management of geothermal brines in unlined evaporation ponds on site. Use of unlined ponds resulted in infiltration of geothermal brines into the underlying soils with resulting impacts from brine-related constituents of concern (COCs), including lead and arsenic. Current remaining impacts to soil and groundwater appear to be the result of this historical application of brines to the unlined evaporation ponds.
17. The Discharger has caused or threatened to cause the discharge of lead and arsenic into the waters of the State of California and has created or threatens to create a condition of pollution or nuisance.
18. On October 11, 2002, the Regional Water Board issued CAO No. R7-2002-0207 to the Discharger for causing or threatening to cause a release of hazardous constituents to the groundwater at the GEMCOR site.
19. In compliance with CAO No. R7-2002-0207, the Discharger submitted on December 11, 2002, a Feasibility Study and Preferred Alternative to address pollution at the site.
20. On December 16, 2002, the Regional Water Board issued CAO No. R7-2002-0207 Revision 1 to clarify that the remedial action plan was due 30 days after Regional Water Board approval of the Feasibility Study.
21. In a letter dated February 13, 2003, Regional Water Board staff explained that it determined that the Feasibility Study and Preferred Alternative were incomplete and, as a result, indicated that further site characterization would be required before an appropriate Preferred Alternative could be selected.

22. Also on February 13, 2003, the Regional Water Board issued another CWC section 13267 Order requiring significant additional site characterization studies needed to provide data for compliance with CAO No. R7-2002-0207. The Discharger performed additional studies of soil, onsite and offsite groundwater, and Naturally Occurring Radioactive Materials (NORMs) in soil and groundwater during 2003, 2004, and 2005. The final report was submitted to the Regional Water Board in January 2006, which completed the additional site characterization required. The Site Characterization report found discrete locations of arsenic and lead concentrations in the soil at levels greater than the TTLCs specified in Title 22 for those constituents.
23. In 2005, Chevron Corporation (“Chevron”) acquired Unocal. Upon completion of this acquisition, Chevron Environmental Management Company, a wholly-owned subsidiary of Chevron, began providing environmental liability management and consulting services for Unocal’s environmental obligations at the site with respect to the Regional Water Board’s CAOs and WDRs. These obligations included the cleanup of the GEMCOR facility.
24. CAO No. R7-2009-0025 was issued June 1, 2009, which rescinded and superseded CAO No. R7-2002-0207.
25. CAO No. R7-2009-0025 Revision 1 was issued August 20, 2009, which rescinded and superceded CAO No. R7-2009-0025.
26. Pursuant to CAO No. R7-2009-0025 Revision 1, a Feasibility Study was submitted on June 15, 2010. The Feasibility Study was prepared by Chevron’s consultant, ARCADIS U.S., Inc.
27. On October 4, 2010, Regional Water Board staff and counsel met with Chevron representatives and counsel at the Regional Water Board office to discuss the Feasibility Study. Regional Water Board staff indicated that Chevron’s Preferred Alternative, identified as “Scenario A” in the Feasibility Study, was deemed acceptable with certain modifications. Chevron indicated that the modifications staff described were acceptable. Thus, the meeting participants agreed that CAO No. R7-2009-0025 Revision 1 would be revised to reflect the acceptance of Scenario A as the Preferred Alternative, as modified, and to specify the requirements for submittal of a Remedial Action Plan (RAP). The modifications are described below in the “Ordered” provisions of this CAO.
28. This CAO rescinds and supercedes CAO No. R7-2009-0025 Revision 1.
29. Section 13304(a) of the CWC states in relevant part:

“Any person...who has caused or permitted, causes or permits, or threatens to cause or permit, any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the State and creates, or threatens to create, a condition of pollution or nuisance, shall upon order of the Regional Board clean up such waste or abate the effects thereof, or in the case of threatened pollution or nuisance, take other necessary or remedial action....”

30. The Water Quality Control Plan for the Colorado River Basin Region of California (Basin Plan) was adopted on November 17, 1993, and designates the beneficial uses of ground and surface waters in the Region.
31. Ground water at this site occurs within a shallow aquifer five to ten feet below ground surface.
32. The site is located within the Imperial Hydrologic Unit. The designated beneficial uses of groundwater in the Imperial Hydrologic Unit are:
 - a. Municipal supply (MUN)
 - b. Industrial supply (IND)
33. Surface waters in the area of the site consist of the Imperial Irrigation District (IID) irrigation canals, surface drains, and tile drains (Imperial Valley Drains). Agricultural subsurface drainage water, which enters tile drains and open drains near the site, serves as a source of freshwater replenishment to the Salton Sea.
34. The beneficial uses of waters in the Imperial Valley Drains are:
 - a. Fresh Water replenishment of Salton Sea (FRSH)
 - b. Non contact Water Recreation (REC II)
 - c. Warm Water Habitat (WARM)
 - d. Wildlife Habitat (WILD)
 - e. Preservation of Endangered or Threatened Species (END)
35. Elevated levels of lead and arsenic detected in the soils, as described in Finding No. 16 above, have the potential to threaten to impair the beneficial uses of the waters of the State of California.
36. In accordance with Section 13304(c)(1) of the CWC, if the waste is cleaned up or the effects of the waste are abated, or, in the case of threatened pollution or nuisance, other necessary remedial action is taken by any governmental agency, the person or persons who discharged the waste within the meaning of subdivision (a) [of Section 13304] are liable to that governmental agency to the extent of the reasonable costs actually incurred in cleaning up the waste, abating the effects of the waste, supervising the cleanup or abatement activities, or taking other remedial action.
37. This enforcement action, which is being taken for the protection of the environment, is categorically exempt from the California Environmental Quality Act (CEQA) pursuant to Section 15308, Title 14, California Code of Regulations (CCRs). This enforcement action is also categorically exempt from CEQA pursuant to Section 15321(a)(2), Title 14, CCRs, since the issuance of this Order is an enforcement action taken by a regulatory agency
38. Section 13267(b) of the CWC provides that:

“In conducting an investigation specified in subdivision (a), the Regional Board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, or discharges, or is suspected of having discharged or discharging, or who proposes to

discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Regional Board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring such reports, the Regional Board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports”.

39. The technical reports required by this Order are necessary to assure compliance with this Order. Existing data and information about the site indicate that waste has been discharged or is discharging at the site, which is owned and operated by the Discharger.
40. Any person affected by this action of the Regional Water Board may petition the State Water Board to review the action in accordance with CWC Section 13320 and Title 23, CCRs, Section 2050 et seq. The State Water Board must receive the petition by 5:00 p.m. within 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml or a hard copy will be provided upon request.

IT IS HEREBY ORDERED, that CAO No. R7-2009-0025 Revision 1 is hereby rescinded upon the effective date of this CAO, and that pursuant to Sections 13267 and 13304 of the CWC, the Discharger shall prepare technical reports and shall clean-up or abate the constituents described in Finding No. 16 of this CAO consistent with Scenario A of the Feasibility Study (the Preferred Alternative) and the modifications specified below, by complying with the following:

1. **No later than March 31, 2011**, the Discharger shall submit a Remedial Action Plan (RAP) and Closure Work Plan (RAP/Closure Work Plan). The RAP/Closure Work Plan shall:
 - a. Describe the activities and proposed time schedule for cleanup and closure of the site.
 - b. Address compliance with the water quality objectives contained in the Regional Water Board's Basin Plan.
 - c. Be consistent with the range of cleanup levels described in the Scenario A Preferred Alternative.
 - d. Contain a Health and Safety Plan (HSP) for the planned field activities, which is consistent with all applicable federal and state laws and regulations.
2. **The Scenario A Preferred Alternative, as described in the Feasibility Study, is modified as follows:**
 - a. The site must be graded, including backfilling and compaction of all depressions related to former site activities.

- b. All piping related to the site water system, such as fire suppression, and all other subsurface utilities that have a potential to provide a conduit to ground water must be removed. A plastic liner acknowledged to be present at the site must also be removed.
 - c. Initially, ground water monitoring should be conducted on a quarterly basis to capture the irrigation cycle rather than semi-annually as proposed in Scenario A. Depending on monitoring results, the frequency of monitoring and constituents to be monitored may be reduced over time.
 - d. The potential for interaction between ground water at the site and potential surface water receptors, such as the tile drain pipes or sumps, drainage, and irrigation canals, must be evaluated. Chevron may need to coordinate with the Imperial Irrigation District and/or other entities to develop a plan to evaluate this interaction potential in order to demonstrate that there is no complete pathway.
 - e. Confirmation sampling must be part of the design and/or implementation of the proposed RAP to ensure that site remedial action meets the cleanup standards specified in Scenario A.
3. **Within 45 days** after receiving approval from the Executive Officer for the proposed RAP/Closure Work Plan and time schedule as well as approval of associated required permits, the Discharger shall initiate site cleanup. The approved time schedule shall become a part of this Order.
 4. In accordance with California Business and Professions Code Sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of California registered professionals (i.e., civil engineer, engineering geologist, geologist, etc.) competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain work plans, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall contain a statement of qualifications of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal. Additionally, all field activities are to be conducted under the direct supervision of one or more of these professionals.
 5. All technical reports required in conjunction with this Order are required pursuant to Section 13267 of the CWC, and shall include a statement by the Discharger, or an authorized representative of the Discharger, certifying under penalty of perjury under the laws of the State of California, that the report is true, complete, and accurate.
 6. The Regional Water Board reserves its right to take any enforcement action authorized by law. Accordingly, failure to timely comply with any provisions of this Order may subject you to further enforcement action. Such actions include, but are not limited to, the assessment of administrative civil liability pursuant to CWC Sections 13323, 13268,

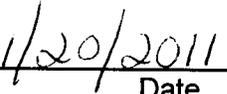
Unocal Corporation (GEMCOR)
Cleanup and Abatement
Order No. R7-2011-0006

and 13350, a Time Schedule Order issued pursuant to CWC Section 13308, or referral to the California Attorney General for recovery of judicial civil liability.

Unocal Corporation (GEMCOR)
Cleanup and Abatement
Order No. R7-2011-0006

I, Robert E. Perdue, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the Regional Water Board, on January 20, 2011.

Ordered by: 
ROBERT E. PERDUE
Executive Officer


Date