CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ORDER R7-2011-0037

WASTE DISCHARGE REQUIREMENTS
FOR
CE OBSIDIAN ENERGY LLC, OWNER
BLACK ROCK 1, 2 AND 3 GEOTHERMAL POWER PROJECT BRINE PONDS

Salton Sea Known Geothermal Resource Area (KGRA) - Imperial County

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

1. CE Obsidian Energy, LLC (the Discharger) proposes to construct three 53-Megawatt geothermal power plants, identified as Black Rock 1, 2 and 3 (the Black Rock 1, 2 and 3 Geothermal Power Project, or Project) on land owned by Imperial Magma, LLC, an affiliate of CE Obsidian. The power plants are located within the Salton Sea KGRA, 6 miles northwest of the town of Calipatria and approximately 7.5 miles southwest of community of Niland. The address for both CE Obsidian Energy, LLC and Imperial Magma, LLC is 1111 South 103rd Street, Omaha, NE 68124.

2. The Black Rock 1, 2 and 3 Geothermal Power Project will be operated by Cal Energy Operating Corporation, an affiliate of CE Obsidian Energy LLC. CalEnergy is located at 7030 Gentry Road, Calipatria, CA 92233.

3. Geothermal wells will be drilled at various locations on the project property to provide geothermal brine to operate the plant. The mud sumps for these wells are regulated under separate Waste Discharge Requirements (WDRs), Board Order R7-2011-0038

4. This Board Order regulates the Facility's emergency brine ponds. The emergency brine ponds are designated as Class II Surface Impoundments Waste Management Units (WMU) and must meet the requirements of the California Code of Regulations (CCR), Title 27, Section 20200 et seq. The boundaries of the proposed Black Rock 1, 2 and 3 Geothermal Project are shown on Attachment A, as incorporated here in and made a part of this order.

5. The Discharger submitted a Report of Waste Discharge, dated July 30, 2009, for the Black Rock 1, 2 and 3 Geothermal Project Power Project.

6. The following definition of terms used in this Board Order:

   Facility – The entire parcel of property where the proposed Black Rock 1, 2 and 3 Geothermal Power Plant industrial operation or related geothermal industrial activities are conducted.

   Waste Management Units (WMUs) – The area of land or the portions of the facility where geothermal or related wastes are discharged and the emergency brine holding pond are WMUs.

Discharger – The term "Discharger" means any person who discharges waste that could affect the quality of the waters of the State, and includes any person who owns the land, WMU or who is responsible for the operation of a WMU. Specifically, the terms "discharger" or "dischargers" in this Board Order means CE Obsidian Energy, LLC.

Facility Location

7. The Project is located southeast of the Salton Sea in an unincorporated area of Imperial County, approximately 6 miles northwest of the community of Calipatria and approximately 7.5 miles southwest of the community of Niland. The project site is bounded by McKendry Road to the north, Severe Road to the west, Peterson Road to the south, and Boyle Road to the east. The approximately 160-acre project site (APN 020-110-08) is at an average elevation of 225 feet below mean sea level (msl). The property is owned by Imperial Magma, LLC, which is an affiliate of CE Obsidian. The project site is located in the southwest quarter of Section 33 Southwest, Township 11 South, Range 13 East, San Bernardino Meridian. Primary land uses in this region of the Imperial Valley include agriculture and geothermal power production. The project site is located within the Salton Sea KGRA and is covered by the County of Imperial's Geothermal Overlay Zone, which allows for development of geothermal resources and geothermal power plants.

Facility Description

8. The Project consists of three 53-megawatt (MW) net geothermal electric power plants (Black Rock Units 1, 2, and 3), which will produce a combined 159-MW net of geothermal power. These plants will be operated as base load plants that will be in continuous operation except during planned maintenance outages and so forth. The three units will be co-located on a 160 acre common site.

9. The Project includes 22 wells:

    a. Nine production wells on three pads (average pad size 6.6 acres)
    b. Nine injection wells on three pads (average size 4.7 acres, three wells each) offsite (approximately 8,000 to 10,000 feet south, southeast, and east of the Facility site)
    c. Two Facility wells
    d. Two aerated brine wells.

10. The three geothermal power plants will be situated near the center of the site. A site map is included as Attachment B, as incorporated here in and made a part of this order.

11. Each of the three proposed geothermal power plants consists of two major components, a Resource Production Facility (RPF) and a Power Generating Facility (PGF).

12. The three plants will share various support facilities and equipment. The RPF includes all the brine and steam handling facilities from the production wellheads to the injection wellheads. RPF equipment includes a brine injection system, a brine pond, steam-polishing equipment designed to provide turbine-quality steam to the PGFs, and appropriate steam-venting vessels to support operations during startup/shutdown and emergency conditions. Each PGF includes a condensing turbine/generator set, a

noncondensable gas (NCG) removal and abatement system, and a cooling tower. Shared support facilities include a 230-kilovolt (kV) switchyard, a control building, service water pond, plant injection wells, and a condensate storage/stormwater sedimentation basin.

Climate

13. The climate of the region is arid. Climatological data from measurements taken at three U.S. Weather Bureau stations located at El Centro, Blythe, and Yuma indicate that during 1980 to 1992, the maximum and minimum rainfall in the area were 10 inches and 1 inch, respectively, with an average annual rainfall of about 4 inches, and a mean annual pan evaporation rate of about 100 inches.

14. The wind direction follows two general patterns:

    a. From late fall to early spring, prevailing winds are from the west and northwest. Most of these winds originate in the Los Angeles basin area, enter the Coachella Valley and travel southeasterly through the Salton Sea Trough. The humidity is generally the lowest under these conditions.

    b. Summer weather patterns are often dominated by an intense, heat-induced low-pressure area that forms over the hot interior deserts, drawing air from the Gulf of California (southeast of the site) and northern portion of Mexico. The humidity is generally the highest during these conditions.

Surrounding Land Use

15. Current land uses around the plant site include agriculture, geothermal production, and wildlife conservation habitat. The injection well pads and pipeline routes occur on and are surrounded by agricultural lands, roadways, ditches, and developed industrial area. Most of the agricultural areas on and adjacent to the project site are currently active or have been recently used for alfalfa, wheat, or onion production.

Site Geology and Soils

16. Alluvial and non-marine deposits underlie the project area. Potential for water and wind erosion ranges from high to moderate for soil types in the project area. Soil types found at the project site are as follows:

    a. Glenbar Clay Loam, wet – Nearly level, very deep soils formed in alluvial sediment on floodplains and in alluvial basins within irrigated areas. Irrigation has caused a perched water table at a depth of 36 to 60 inches, and the water can rise to a depth of 18 inches during periods of heavy irrigation.

    b. Holtville Silty Clay, wet – Nearly level, very deep stratified soil formed in alluvial sediment on floodplains and alluvial basin floors. Irrigation has caused a perched water table at a depth of 36 to 60 inches, and the water table can rise to within 18 inches of the surface during periods of heavy irrigation.

c. Imperial – Glenbar Silty Clay Loams, wet, 0 to 2 percent slopes – Nearly level, very deep calcareous soils formed in alluvial deposits on floodplains and lakebeds within the irrigated areas of Imperial Valley. Irrigation has caused a perched water table commonly at a depth of 36 to 60 inches, but which can rise to a depth of 18 inches during periods of heavy irrigation.

d. Indio Loam wet – Nearly level, very deep soils formed in alluvium and eolian sediments on floodplains and basin floors. Irrigation has caused a perched water table commonly at a depth of 36 to 60 inches, but can rise to a depth of 18 inches during periods of heavy irrigation.

Surface Water

17. Surface water features in the vicinity of the Project include the Salton Sea (0.3 mile to the west and north), New River (2.7 miles to the southwest), Alamo River (4.8 miles to the northeast), and two irrigation drains, Vail Drain 4a and Vail Lateral Drain 5 (on the east and west sides of the project site, respectively). All drainage from the project area drains toward the Salton Sea, which is a closed basin with no outlet for surface water discharge. Inflows to the Salton Sea are limited primarily to surface and groundwater return flows from agricultural irrigation and stormwater runoff during the rainy season. The New and Alamo Rivers are both perennial streams with headwaters starting in Mexico that convey primarily agricultural irrigation drainage and some treated wastewaters. The Sonny Bono Salton Sea Wildlife Refuge Headquarters is approximately 1 mile northeast of the project site.

18. Water contact is unauthorized in the Vail Drains. The New River is unfit for any recreational use because of existing contamination. The Salton Sea has a history of water quality issues associated with increasing salinity and nutrient concentrations. The Clean Water Act Section 303(d) requires states to list water bodies not meeting water quality standards (or impaired). The Salton Sea is listed for nutrients, salinity, and selenium with sources designated as agricultural return flows. The New River is listed for bacteria, nutrients, pesticides, and sedimentation/siltation and the Alamo River is listed for pesticides, sedimentation/siltation, and selenium. The sources of pollutants are all designated as agricultural runoff.

Site Drainage

19. The Project site is fairly level and proposed site drainage generally will flow from the southeast corner to the northwest corner toward the stormwater detention pond located in the northwestern area of the plant site. The stormwater detention pond will be an earthen structure. All buildings and equipment are constructed on foundations with the overall site grading scheme designed to route surface water around and away from equipment and buildings. Stormwater flows will be directed to the stormwater detention pond via ditches, swales, and culverts. Chemical spills will not flow into the stormwater collection system. Spill containment areas and sumps (subject to chemical spills) will be designed to route liquids to a diked area where they will be pumped out, characterized, and properly disposed.

20. The proposed stormwater detention pond for the Project is designed for 3 inches of precipitation in a 24-hour period (100-year storm conditions) and will be approximately 500 feet long by 225 feet wide by 3.5 feet deep and the sides will have a 2:1 (horizontal: vertical) side slope. Stormwater accumulated in the pond will evaporate and infiltrate.

21. Imperial County's Land Use Ordinance, Section 90106.00 et seq. and Section 91604.00 et seq., require a Development Permit for construction below -220 feet msl along any portion of the Salton Sea. For the Project, this will require the 160-acre project site to be enclosed by a perimeter berm designed with 2:1 (horizontal to vertical) sloping sides with a top elevation of -220 feet msl. This berm will meet the County's encroachment permit requirements because it will be of adequate height to provide flood protection to an elevation of at least -220 feet msl in accordance with the County's Land Use Ordinances and will reduce the potential for offsite drainage.

Regional Groundwater Resources

22. The U.S. Geological Survey (USGS) undertook a comprehensive study of the water resources of both the Upper and Lower Colorado River region in the 1950s and 1960s. The often cited geohydrologic reconnaissance survey of the Imperial Valley conducted by Loeltz et al (1975) is one of a series of reports resulting from those USGS studies and is the classic assessment of ground water resources in the area. No substantive change in the geohydrologic conditions of the Imperial Valley ground water resource has subsequently occurred.

23. The Salton Sea is located within the Colorado River Hydrologic Region, as defined by the California Department of Water Resources (DWR 2003). The Project area is located in the Imperial Valley Basin, one of seven groundwater basins in the hydrologic region located adjacent to the Salton Sea.

24. The following discussion of regional groundwater hydrology within the Imperial Valley Basin was extracted from the recent Salton Sea Ecosystem Recovery Programmatic EIR (DWR and CDFG 2006).

    a. The Imperial Valley Basin is located south of the Salton Sea and is at the southernmost part of the Colorado Desert (sic) Hydrologic Region. The basin is bounded on the east by the Sand Hills and on the west by the impermeable rocks of the Fish Creek and Coyote Mountains. The basin extends from the Mexicali Valley to the Salton Sea (DWR, 2003). Imperial County is responsible for groundwater management in the Imperial Valley.

    b. Deep exploration boreholes have shown that most of the Imperial Valley Basin is underlain by thick, water-saturated lacustrine and playa deposits overlying older sediments. Perched groundwater exists over much of the basin and is recharged by seepage from irrigated lands and drains (IID and Reclamation, 2002b). The basin has two major aquifers separated by a semi-permeable aquitard (silt and clay lenses) that averages 60 feet thick and reaches a maximum thickness of 280 feet. Average thickness of the upper aquifer is 200 feet with a maximum thickness of 450 feet. The lower aquifer averages 380 feet thick with a maximum thickness of 1,500 feet (DWR, 2003). Studies have indicated that the hydraulic connection is poor between the water within the deeper deposits and that within the upper part of the aquifer (IID and Reclamation, 2002b). Well yields in this area are limited (Loeltz et al., 1975).

c. The general direction of groundwater movement in the Imperial Valley Basin is from the Colorado River towards the Salton Sea. However, in the southern portion of the basin, a substantial amount of groundwater flows into the Alamo River and, to a lesser extent, the New River (USGS, 2004). Seepage from the All-American Canal and other canals has caused formation of localized perched groundwater. Between the early 1940s and 1960, groundwater levels rose more than 40 feet along the All-American Canal. Seepage from the canal is expected to decrease substantially when the canal is lined.

d. Tile drains have been installed by IID to convey shallow groundwater away from the root zone of crops (IID and Reclamation, 2002b). Most of the shallow groundwater, leaching water, or excess irrigation water flows into the drains and New and Alamo rivers. Groundwater levels remained relatively stable within the majority of the basin between 1970 and 1990 because of a constant rate of discharge from canals and subsurface agricultural drains.

e. The San Andreas and Algodones faults do not appear to impede or control groundwater movement, based on review of groundwater levels in the 1960s (Salton Sea Authority, 1999).

f. As described by Hely et al. (1966), the groundwater discharge to the Salton Sea is estimated to be less than 2,000 acre-feet a year, and IID and Reclamation (2002a) has estimated this value to be about 1,000 acre-feet a year. The IID estimate of 1,000 acre-feet a year has been adopted as a reasonable estimate of historical groundwater discharge to the Salton Sea from the Imperial Valley. It was developed in a method that was consistent with the hydrological assumptions used in the Draft Programmatic Environmental Impact Report (PEIR) and it represents a period of time after the groundwater elevation became stable in the 1970s.

g. Groundwater quality varies extensively in the Imperial Valley Basin. Total dissolved solids, a measure of salinity, ranged from 498 to 7,280 mg/L when measured by DWR in 2003. High concentrations of fluoride have also been reported by IID and Reclamation, (2002b).

h. Due to the low yield and poor water quality, few production wells have been drilled in the Imperial Valley. Most of the wells in the Imperial Valley are domestic wells. Total production from these wells is estimated to be a few thousand acre-feet a year (Salton Sea Authority, 1999).

i. Extremely deep groundwater has been developed along the southern Salton Sea shoreline for geothermal resources. These wells access non-potable groundwater from several thousand feet below ground surface.

j. The amount of usable near-surface groundwater in the central Imperial Valley is unknown, but this resource has not been significantly exploited because of low well yields and poor chemical quality. The upper 500 feet of fine-grained deposits in the central portion of the Imperial Valley are estimated to have a transmissivity of less then 10,000 gallons per day. Even lower permeabilities are estimated to occur at greater depths (Westec 1981), and low vertical permeability inhibits mixing of waters from different depths such as between the shallow aquifer system and underlying deeper groundwater that includes the geothermal resources.

k. The main source of groundwater recharge to the shallow aquifer system, and likely to a lesser extent the deeper aquifer, is imported Colorado River water that seeps from canals and is applied as irrigation water to cultivated areas. Shallow groundwater, ranging in depths from about 5 to 20 feet, is drained by an extensive network of ditches and drains in agricultural areas and also discharges into the Alamo and New Rivers that drain toward the Salton Sea.

l. Groundwater discharge from the Imperial Valley into the Salton Sea has been estimated to be about 2,000 afy (U.S. Department of Interior and Resource Agency for California 1974).

m. The amount of water in the deep aquifer has been estimated at 1.1 billion to 3 billion acre-feet, and the total recoverable water has been estimated to be about 20 percent of the total amount of water in storage. The deep aquifer is recharged with about 400,000 acre-feet of water per year. Some of the deepest groundwater in this aquifer system is believed to be moderately altered residual ocean water. Above this may be relatively fresh residual water of low to moderate salinity from prehistoric lakes that had filled the Salton Trough. Water in the upper portion of the deep aquifer is high temperature and locally of high salinity.

25. Geothermal fluids in this portion of the Salton Sea KGRA contain approximately 25% (by weight) dissolvable solids. These fluids may be classified as hazardous in accordance with the criteria listed in Section 66699, Title 22 of the CCRs. However, the geothermal fluids are not required to be managed as hazardous waste under Title 22 because they are exempt from regulation as hazardous waste by Health & Safety Code Section 25143.1, Subdivision (a). The brine pond and LDS are adequate for the geothermal fluids, considering the toxicity, persistence, degradability, solubility, and other biological, chemical and physical properties of the wastes.

Site Specific Groundwater Conditions

26. Previous geotechnical investigations performed at the Project site found that the depth to groundwater beneath the Facility is shallow, ranging from approximately 3 to 6 feet bgs. Naturally occurring groundwater in the area is hydraulically connected to the Salton Sea and is very saline. The fine-grained deposits that are characteristic of the area have transmissivities of 1,000 to 10,000 gallons per day per foot to depths of approximately 500 feet. The low transmissivity of these deposits limits the ability of water to percolate downward into deeper aquifers (greater than 500 feet bgs). As a result, depleted groundwater levels will recharge slowly, which limits the potential for development of groundwater in the area. The deep aquifer is too saline for irrigation and most other beneficial uses. The geothermal reservoir is not in hydraulic connection with surficial groundwater.

Facility Operational Water

27. The primary water demand for the Facility is for cooling tower makeup. This water demand will be satisfied largely (about 95 percent on an annual average basis) by condensate from steam extracted from the geothermal brine. After powering the turbines, the steam will be sent to condensers and the resulting condensate will then be routed to the cooling towers. Condensed steam will also be the source of scrubber makeup water and will be the source of seal water for the mechanical pump seals.

28. Additional water from condensate will be required for the dilution of acid to be added to the injected brine, potable water treatment, and quench water for the RTO air emissions control equipment. Any "deficit" water will be supplied from an Imperial Irrigation District (IID) canal adjacent to the plant site via a new water supply pipeline. The water delivery will occur under a new water supply agreement currently being negotiated. The connection point to the IID canal will be the Vail 4A Lateral, Gate 459 and/or 460 at the southeast corner of the power plant site, along Boyle Road. The supply pipeline will be a 500-foot- long, buried, 10-inch pipeline. Water quality data for IID water are shown in Table 1.

TABLE 1
Expected Water Quality – IID Canal

Constituent	IID Canal Water (ppm)
Calcium	88
Magnesium	34
Sodium	140
Potassium	5.5
Total alkalinity	150
Hydroxide	ND
Carbonate	ND
Bicarbonate	180
Chloride	120
Sulfate	320
Fluoride	0.6
Nitrate	1.0
pH	8.1
TDS	750
Bromide	0.12
CO_2	2.9
Sulfide	ND
Benzene	ND
Ethyl benzene	ND
Toluene	ND
Xylenes	ND
Ammonia-Nitrogen	ND
Aluminum	290
Antimony	ND
Arsenic	ND

TABLE 1
Expected Water Quality – IID Canal

Constituent	IID Canal Water (ppm)
Barium	130
Beryllium	ND
Boron	190
Cadmium	ND
Total Chromium	ND
Copper	39
Iron	230
Lead	ND
Lithium	ND
Manganese	80
Mercury	ND
Nickel	ND
Selenium	ND
Total Silica	10
Silver	ND
Strontium	1,400
Zinc	30

ND = Not Detected
Source: AECOM, 2009

Facility Operation Process

29. The Project includes three RPFs, three PGFs, ancillary facilities and three high-efficiency condensing steam turbines with a net unit output of 53 MW each (159 MW total). The design of the RPF utilizes a single-stage flash to produce the required steam supply to the turbine. The single-stage flash starts at the production well pad that supports its associated PGF. Hot, high-pressure (HP) geothermal fluid (brine) is extracted from the geothermal reservoir through three production wells located on the aforementioned well pad. As the brine travels up the production well casing, it "flashes" producing two-phase steam and brine flow, which is conveyed to a steam handling system. The flash point is set to avoid solids precipitation in the depleted brine and the depleted brine can be further chemically conditioned if necessary with hydrochloric acid to prevent scale formation in the process piping or injection wells, and injected back into the formation through the offsite injection wells. The facilities and equipment that handle the brine constitute the RPF. The steam handling system consists of a scrubber, HP separator, and demister.

30. Steam from the RPF is conditioned through scrubber and demister stages and sent to the steam turbine, which drives a generator for power production. The depleted steam leaves the turbine and enters a shell-and-tube heat exchanger that condenses the steam to water. Cooling water for the heat exchanger is provided by a piping loop from the cooling towers. Water condensed in the heat exchanger is used for cooling tower make-up water, among other (much smaller quantity) uses. NCGs released from the condensed steam are evacuated from the heat exchanger using a vacuum pump and sent to a regenerative thermal oxidizer (RTO) for control of hydrogen sulfide (H_2S), methane, benzene, and other trace gases. Exhaust from the RTO is routed to a wet scrubber before being released to the atmosphere. Wastewater from the wet scrubber flows to the cooling tower basin and then to the plant injection well for reinjection into the formation.

Steam / Liquid Separator System

31. The common production header discharges the two-phase brine flow into one HP steam/liquid separator for each of the three RPFs. There will be three HP steam liquid separators (one per power plant). Production brine is discharged to the HP separator to separate the process steam from the brine and reduce its temperature and pressure prior to discharging the spent brine to the injection wells. HP steam is directed from the separator to a chloride scrubber and demister in series, then into the HP inlets of the steam turbine. The scrubber accomplishes chloride removal from the steam to prevent damage to the steam turbine using an injected water stream and chemical conditioning. The discharge stream from the scrubber is routed to the RPF brine injection system for re-injection into the geothermal reservoir. The demister is a device that removes liquid droplets entrained in the steam phase flow to the turbine. The demister aggregates water droplets entrained in the steam phase flow that will otherwise damage the steam turbine. This is accomplished with an injected water stream to the demister. The discharge stream from the demister is routed to the RPF brine injection system for re-injection into the geothermal reservoir. The steam handling system also has a rock muffler, which is an emergency bypass vessel. In the event of a plant trip or mechanical malfunction necessitating the shutdown of the PGF, HP steam can be released to the atmosphere through the rock muffler; its design is such that it muffles the noise levels associated with the event. This rock muffler is used for short periods of time until the plant can either be completely shutdown or returned to service.

Hot Brine Injection System

32. For each power plant, three hot brine injection wells will be situated on three new brine injection well pads. Injection well pads will be located to the south, southeast, and east approximately 8,000 to 10,000 feet from the plant site. Injection wells will be drilled to an average depth of 8,725 feet. The brine injection wells will each have an average injection rate of approximately 1.9 million pounds per hour of brine at a temperature of approximately 400°F to 420°F. Use of the single-stage flash technology for the Facility allows for maintaining this elevated injection temperature which, in turn, mitigates solids precipitation and allows the three power plants to be operated without producing large amounts of brine filter cake solids. The brine injection system operates as follows: brine from the HP separator is pumped from the RPF to the remote injection well pads via an aboveground pipeline. Each injection well is remotely metered for pressure, temperature, and flow rate. Brine injection will take place in accordance with California Division of Oil, Gas, and Geothermal Resources (CDOGGR) regulations.

Production Test Unit

33. Each RPF will have a PTU, which is used for well startup. The PTU is an atmospheric flash tank into which brine flows during production well testing and startups until a sufficiently high temperature is reached. The brine flow is then directed to the HP separator for steam production to feed the PGF. Brine passing through the PTU is then discharged to the brine pond. The PTU will be designed for 1 million pounds per hour (lbs/hr) of brine flow with a 20 percent flash rate (200,000 lbs/hr of steam flow).

Power Generation Facility

34. There are three major energy conversion components included in each of the three identical PGFs. Each PGF includes the following components:

    a. STG – single-casing, single-pressure, down-exhaust condensing turbine
    b. Condenser – shell-and-tube type heat exchanger (part of the power cycle heat rejection system)
    c. One five-cell cooling tower (part of the power cycle heat rejection system)
    d. One RTO and scrubber system – air emission control system
    e. Chemical oxidization
    f. One rock muffler/pressure-relief vent system
    g. One1.5-MW emergency generator, diesel fueled, 4,160 volts (V)
    h. One 1.0-MW emergency generator, diesel-fueled, 480 V

Steam Turbine Generator

35. The PGF includes a single-cased, single-pressure, down-exhaust condensing turbine. Geothermal steam from the RPF will be the only steam source used by the STG. Each turbine generator set will consist of a condensing turbine generator with HP steam entry pressure. The STG is nominally rated at 53 MW (net). Heat rejection for the steam turbines will be accomplished with a condenser and counter flow cooling tower.

Condenser

36. The condenser is a stainless steel shell-and-tube type heat exchanger designed to operate under vacuum. It receives steam from the turbine exhaust of the STG and condenses it to liquid for return to the cooling tower. During base load operation at design ambient conditions (83.7°F wet bulb temp, 105°F dry bulb temp), the condenser is expected to operate at a vacuum pressure of 2.34 inches mercury (atmospheric) and produce condensate flow of 804,935 lbs/hr. The warmed circulating water exits the condenser and returns to the cooling tower.

Counter Flow Cooling Tower

37. Each PGF will have a dedicated five-cell, induced-draft cooling tower. Each cooling tower will have three 50-percent capacity, vertical, wet-pit circulating water pumps to circulate water between the cooling tower and condenser and two 100 percent capacity, vertical, wet-pit auxiliary water pumps that will circulate water between the cooling tower and the plant auxiliary cooling loads. Each cooling tower has an inlet circulating water flow rate of 89,112 gpm and will be equipped with a high-efficiency mist eliminator to minimize drift losses to no more than 0.0005 percent of design flow rate to reduce

particulate matter (PM10) emissions. The circulating water is distributed among multiple cells of the cooling tower, where it cascades downward through each cell and collects in the cooling tower basin. The circulating water is cooled through evaporation. The cooled circulating water is pumped from the cooling tower basin back to the condenser.

Closed-Loop Auxiliary Equipment Cooling Water System

38. The closed-loop auxiliary cooling water system will be filled with a coolant such as a mixture of glycol and water. The coolant is circulated through a closed-loop system to cool auxiliary equipment including the STG lubrication oil coolers, air compressor aftercoolers, and steam cycle sample coolers. The coolant absorbs heat from the various equipment items being cooled and is, in turn, cooled by non-contact heat exchange with a branch of the circulating water system.

Steam Relief System (Rock Muffler)

39. The rock muffler is a system used during upset conditions when it is necessary to vent steam to the atmosphere. The proposed rock muffler vent system is a reinforced-concrete rectangular structure with dual chambers, to be designed to allow internal inspection of the diffuser at the bottom chamber through a manway into the vent chamber. The rock muffler's dimensions are 16 feet wide by 20 feet long by 24 feet high, and the wall thickness is approximately 1 foot. During these upset events, steam bypasses the turbine and is rerouted to the rock muffler for venting to the atmosphere. The rock muffler can receive the flow of steam generated from 6.3 million pounds per hour of geothermal brine. Condensate from the rock muffler will be routed to the brine pond rather than the cooling tower due to the potentially high concentration of chlorides in the condensate.

Air Emission Control System (Regenerative Thermal Oxidizer)

40. Air emissions control for each PGF will be accomplished using an RTO and scrubber primarily for control of sulfur dioxide (SO_2). NCGs are evacuated from the condenser heat exchanger using a vacuum pump and routed to the RTO for control of H_2S, methane, benzene, and other trace gas emissions. The RTO is a direct oxidizing process that allows for simultaneous destruction of benzene and H_2S and other combustible constituents present in the NCG in a compact unit that is easy to operate and maintain. Following the RTO, the exhaust gas enters a quench tower in which the temperatures of the gases are lowered using water injection. The quench water is discharged to the cooling tower basin.

41. The applicant has developed a chemical oxidation (Chem Ox) process that will be used for treatment of condensate prior to the use in the cooling tower. The Chem Ox system will oxidize H_2S found in the hot-well condensate into sulfates by the addition of air and an oxidant (hydrogen peroxide, bleach, or similar compound). The oxidant will be direct injected into the condensate line using metering pumps to facilitate the oxidization process. The oxidant will be stored in a 1,000-gallon storage tank. The byproduct of the oxidation process is a soluble sulfate salt that will remain dissolved in the condensate. The Chem Ox system is expected to have an overall H_2S control efficiency of 90 percent or more.

42. Following the RTO and quench tower, the gas stream enters a packed-bed SO_2 scrubber where a sodium hydroxide (NaOH) solution is introduced. The scrubbing solution is discharged to prevent sulfate and sulfite buildup in the scrubber tower. The sodium sulfite/sulfate solution created by operation of the SO_2 scrubber is of a sufficiently small volume that it can be safely introduced into the cooling tower basin where it ultimately is re-injected into the underlying geothermal formation. The treated exhaust then vents to the atmosphere through a stack. Excess condensate (that is, not used in the cooling tower) will be sent to the plant injection well for reinjection into the formation.

Facility Production Wells

43. As part of the Facility, there are nine production wells (three for each 53-MW unit on three separate well pads). Each production well will be drilled to a depth of approximately 7,400 feet, with casing set at a depth of approximately 2,500 feet bgs. The proposed production wells are spatially separated from injection wells to optimize field development and reservoir management. The well pads will be equipped with production line warm-up headers used to start up the production wells after they are drilled and for facility startups. During initial startup, the warm-up headers will feed into a warm-up line that discharges into a PTU located near the brine pond. For each of the three power plants, there will be one PTU and one brine pond. Liquid from each PTU will discharge into the brine pond. Each production well will have an average flow rate of approximately 2.1 million pounds of brine per hour at wellhead pressures of 375 to 425 pounds per square inch (psi) and at temperatures of 450 degrees Fahrenheit (°F) to 480°F. Actual depths will vary based on the geology and reservoir

44. Reservoir properties of the hyper-saline brine in the Project area are expected to have downhole temperatures of 500 to 600°F and a TDS content of approximately of 23.5 percent by weight, with NCGs of 0.212 percent by weight. Dissolved solids consist primarily of sodium chloride, calcium chloride, and potassium chloride salts. Zinc, manganese, iron, and silica are also dissolved in the brine. The major component of the NCG is carbon dioxide (CO_2). While the brine includes a broad range of other components, the other components each represent less than 0.3 percent by weight. Each well will produce an average of 2.1 million pounds per hour of a mixture of steam vapor, NCG, and brine in a two-phase flow.

45. The anticipated chemical composition of the produced fluids based on the applicant's operating experience is shown in Table 2.

TABLE 2
Anticipated Chemical Composition of Produced Fluids

Constituent	Concentration (ppm)
Beryllium	ND[1]
Ammonium	369
Sodium	50,169
Magnesium	39
Aluminum	ND[1,2]

TABLE 2
Anticipated Chemical Composition of Produced Fluids

Constituent	Concentration (ppm)
Potassium	12,784
Calcium	24,584
Chromium	ND[1]
Manganese	983
Iron	1,180
Nickel	ND[1]
Copper	4
Zinc	320
Rubidium	69
Strontium	443
Silver	ND[1]
Cadmium	1
Antimony	1
Cesium	12
Barium	177
Mercury	ND[1]
Lead	79
Bicarbonate	69
Nitrate	ND[1]
Fluorine	20
Sulfur Monoxide	98
Chlorine	137,670
Arsenate	20
Selenate	ND[1]
Bromine	89
Iodine	10
Silicon Dioxide	433
Carbon Dioxide	3,309
Boric Acid	1,800
Hydrogen Sulfide	15
Ammonia	59

TABLE 2
Anticipated Chemical Composition of Produced Fluids

Constituent	Concentration (ppm)
Methane	10
Total Dissolved Solids	235,000

ND = Not Detected

[1] Several of the constituents listed as ND have been detected in brine from this resource, although the quantities may be present at trace levels.

[2] Aluminum is known to be present in measurable quantities in brine from this resource.

Source: AECOM, 2009

Facility Injection Wells

46. In addition to the hot brine injection wells, four additional injection wells will be dedicated to managing excess condensate and cooling tower blowdown and aerated brine. Two injection wells for aerated brine (brine that has been exposed to the atmosphere) will be constructed for the management of brine pond liquids. Two separate injection wells, known as "plant" injection wells, will be dedicated to the management of excess condensate and cooling tower blowdown. The two plant condensate injection wells and two aerated brine injection wells will be located within the Facility site. Generally, fluid from these two sources is not co-mingled in a single injection well, due to chemical incompatibility. Constituents of the cooling tower blowdown and injected brine are provided in Table 3.

TABLE 3
Cooling Tower Blowdown and Injected Process Brine Fluid Characterization

Constituent	Cooling Tower Blowdown mg/L	Aerated Brine mg/L
Lithium	ND	253.3
Beryllium	ND	0.01
Ammonia	900	500.0
Sodium	197	68,024
Magnesium	46	53.3
Aluminum	0.42	0.3
Potassium	7.3	17,333
Calcium	121	33,333
Chromium	ND	0.004
Manganese	0.13	1,333
Iron	0.21	1,600

TABLE 3
Cooling Tower Blowdown and Injected Process Brine Fluid Characterization

Constituent	Cooling Tower Blowdown mg/L	Aerated Brine mg/L
Nickel	ND	0.03
Copper	0.06	5.3
Zinc	0.05	433.3
Rubidium	NA	93.3
Strontium	2.3	600.0
Silver	ND	0.3
Cadmium	ND	1.7
Antimony	ND	1.1
Cesium	NA	16.7
Barium	0.21	240.0
Mercury	ND	0.004
Lead	ND	106.7
Bicarbonate	NA	93.3
Nitrate	1.26	0.0
Fluoride	0.88	26.7
Sulfate	3,132	133.3
Chloride	210	186,667
Arsenic	0.53	14.7
Selenium	ND	0.007
Bromide	ND	120
Iodine	NA	13.3
Silica	13	586.7
CO2	NA	2,007
Boron	399	426.6
Sulfide	11.76	20.1
Benzene	0.01	0.003
TDS	7,952	316,063
pH	6.60	4 to 7

mg/L = milligrams per liter
ND = Not detected
NA = Not analyzed
Source: AECOM, 2009

Facility Brine Ponds

47. Three brine ponds (636 feet by 58 feet by 7.5 feet each) will be constructed; one for each of the three power plants. In addition to the six mud sumps, the three brine ponds initially will be used to manage material from well construction. The brine ponds will be designed in accordance with Title 27, Division 2 of the California Code of Regulations (CCR) – Special Requirements for Surface Impoundments. The design of the three brine ponds within the Facility site is depicted in Attachment C, as incorporated herein and made a part of this order. Each brine pond will contain a surrounding 20-foot area for cleanout vehicle access with an entry ramp. The brine ponds are of earthen construction, lined with the following layered liner materials, and include a built-in leak detection system:

    a. Geosynthetic clay liner (GCL)
    b. High-density polyethylene (HDPE) 80 mil
    c. HDPE 200 mil
    d. White Texture single side – HDPE 80 mil
    e. 6-inch compacted soil
    f. 6-inch fiber-reinforced concrete

48. During plant-upset conditions, well flow testing, or startup, produced brines will be discharged to the brine ponds. The brine ponds will collect brine from production wells and steam will be vented to the PTU during startup. Aerated brine will be pumped into one of two aerated brine injection wells. Brine produced in startup will be infrequent because the project will be operated as a base load facility. During operational upset conditions, HP separator brine and condensate from the steam vented to the rock muffler will be directed to the brine ponds for temporary containment. Most of the material collected in the brine ponds will be managed by dilution as necessary and subsequently pumped to one of two aerated brine injection wells.

49. The brine ponds will be used for the collection of permitted wastewater streams prior to injection into the formation. The Facility is expected to generate a small amount of solids that are expected to precipitate out of the brine in the brine pond due to the low temperature (relative to reservoir temperatures). The rate of accumulation is not known, but is expected to be only a few tons per year. The brine pond solids will be removed annually, then dewatered in a filter press and transported by a licensed transporter to an appropriately permitted offsite facility. Liquids from the dewatering will be directed to the plant injection wells.

Mud Sumps

50. Mud sumps associated with geothermal well drilling at the Facility are regulated under a separate WDR (Board Order R7-2011-0038).

Facility Operation and Maintenance Wastes

51. Spent Brine – The primary discharge from the Facility consists of spent brine that is injected directly into the brine injection wells. Spent brine is exempt from regulation as hazardous waste according California Health and Safety Code Section 25143.1 so long as the spent brine is contained in a piping system or lined pond. During normal operations, brine will be injected in the injection wells immediately following the HP

separator. During startup and shutdown, some brine may be directed to the brine ponds and subsequently injected into the aerated brine injection wells.

52. Brine Solids – During plant-upset conditions, well flow testing, or startup, production brines will be discharged to the brine ponds. The brine ponds will be used for the collection of miscellaneous byproduct streams prior to their injection into the formation. The brine is then pumped into one of two aerated brine injection wells located at the Facility. As needed, brine pond liquids will be pumped out and injected, and the solids will be removed, and dewatered with a portable pressure filter press. Solids will be transported by a licensed transporter to an appropriately permitted offsite facility.

53. Wastewater – Sources of wastewater and their dispositions include the following:

    a. Blowdown from the cooling towers will be injected into one of the two dedicated Facility injection wells.

    b. Blowdown from the quench and scrubber stages of the air emissions control system will be bled into the cooling tower basin, and will be injected into one of the two dedicated Facility injection wells along with the cooling tower blowdown.

    c. HP Steam is directed from the separator to a chloride scrubber and demister in series, then into the HP inlets of the steam turbine. The scrubber accomplishes chloride removal from the steam to prevent damage to the steam turbine using an injected water stream and chemical conditioning. The discharge stream from the scrubber is routed to the RPF brine injection system for re-injection into the geothermal reservoir.

    d. Reject water from the RO water purification system will be pumped to the cooling tower basin.

    e. Uncontaminated storm water collected in the chemical storage and feed containment areas that contain fixed or portable tanks and other containers will be directed to the brine ponds and discharged together with other plant wastewater to a dedicated Facility injection well.

54. Sanitary Waste – Sanitary waste for the Facility will be directed to a septic tank, which will be constructed according to the Imperial County building code. This tank will be pumped out as necessary. There are no drinking water wells in the area near the Facility

55. Well Rehabilitation – Periodically (once every 5 to 10 years), production or injection wells have to be re-drilled to maintain their productive capacity. Wet materials from well construction consist of soils, brine effluent, and other materials removed from the ground during the re-drilling of production and injection wells. This waste will be allowed to dry out in the clay-lined mud sumps. By regulation, materials from geothermal drilling are non-hazardous; therefore, after evaporation, the remaining solid waste in the mud sumps will be disposed at the Desert Valley Company's Monofill Facility, a Class II landfill.

56. General Maintenance Wastes – Office waste and general refuse will be recycled to the extent practicable and the remainder will be disposed by the local sanitation service to a Class III landfill. Pipe maintenance and de-scaling activities that include hydroblasting or sandblasting will be performed in a designated containment area to prevent wastes generated from these activities from impacting the environment. Water from the hydroblasting process will be conveyed to the brine ponds for injection into the geothermal resource.

57. Hazardous Waste – Hazardous and universal waste expected to be generated by the Facility during normal operations include the limited amounts of brine pond solids (if testing reveals them to be hazardous), scale from the walls of piping and brine handling equipment (if testing reveals them to be hazardous), used oil, oil adsorbents, cleaning solutions and solvents, empty containers, fluorescent lamps, used batteries, and electronic equipment. If determined to be non-hazardous, these wastes will be removed regularly by a certified waste handling contractor to the Applicant's affiliate operated Class II monofill. Hazardous wastes will be disposed at an appropriate Class I hazardous waste management facility. Universal wastes will be recycled or disposed properly.

Waste Generated During Construction of the Facility

58. Material from Well Construction – The construction of the production, injection, and plant wells associated with the Facility will result in the following:

    a. Spent drilling fluids and drilling cuttings.
    b. Material from well construction (solids).
    c. Fluids from performing "flowbacks" on the completed wells.

    Spent drilling fluids and cuttings will be managed in mud sumps or the brine ponds. Material from well construction will be pumped to the mud sumps and brine ponds where the liquid constituents will be allowed to separate by gravity and/or evaporate. Gravity-separated fluids may be pumped or conveyed by truck between sumps/ponds as management demands dictate. Decanted fluids will be injected into the geothermal formation to help preserve the geothermal resource. Materials from geothermal drilling are exempt from regulation as hazardous waste under California Health and Safety Code Section 25143.1. Material from well construction generated from the project will be disposed in the Applicant's affiliate-operated local monofill.

    After a well is completed, it must be "flowed back," which flushes the well to remove drilling mud remnants, cuttings, and other materials that ultimately might inhibit well performance. Depending on the well, a certain amount of geothermal brine may also be entrained in the flowback stream. The amount of material generated from this activity varies; however, in practice the well is flowed until such time as the fluids are clear. Solid waste from well construction will be managed in roll-off containers. These containers will be removed from the job site by a permitted hauler and conveyed to a permitted facility for ultimate disposal.

59. Hazardous Waste – Hazardous waste generated during construction of the Facility will be accumulated onsite for less than 90 days at specified accumulation points. Hazardous and universal wastes will be transported by a licensed transporter using a Uniform Hazardous Waste Manifest and disposed or recycled at an appropriate

Treatment, Storage, or Disposal Facility (TSDF). Copies of manifests, reports, waste analysis, exception reports, land disposal restrictions, and other related documents will be maintained onsite as required.

60. Miscellaneous Construction Waste – During construction of the Facility, the primary type of waste generated will be solid non-hazardous wastes. Small quantities of non-hazardous liquid wastes, hazardous solid and liquid wastes, and universal wastes also may be generated during construction. Non-hazardous wastes generated during construction is expected to include scrap wood, concrete, empty containers (plastic, metal, glass, cardboard, and Styrofoam), packaging materials, scrap metals, insulation (silicate and mineral wool), and materials from well construction. Approximately 20 to 40 cubic yards per week of construction wastes are expected to be generated during construction of the Facility. Management of these wastes will be the responsibility of the construction contractor(s). Where practical, such as in the case of scrap steel, the wastes will be recycled. Non-hazardous wastes will be properly stored to prevent wind dispersion, and will be transported by a licensed transporter and disposed or recycled at an appropriately permitted facility.

61. Sanitary Waste – During construction, sanitary waste will be collected in portable, self-contained toilets. The sanitary wastes from the portable chemical toilets will be pumped out regularly by a licensed contractor and transported to a sanitary wastewater treatment plant.

Basin Plan

62. 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 water in this Region.

63. The beneficial uses of ground water in the Imperial Hydrological Unit are:

    a. Municipal Supply (MUN)
    b. Industrial Supply (IND)

64. The beneficial uses of nearby surface waters are as follows:

    Imperial Valley Drains
    a. Freshwater Replenishment
    b. Water Contact Recreation (RECI)
    c. Noncontact Water Recreation (RECII)
    d. Warm Freshwater Habitat (WARM)
    e. Wildlife Habitat (WILD)
    f. Preservation of Rare, Threatened, or Endangered Species (RARE).

    Alamo River
    a. Fresh Water Replenishment (FRSH)
    b. Water Contact Recreation (RECI)
    c. Noncontact Water Recreation (RECII)
    d. Warm Freshwater Habitat (WARM)
    e. Wildlife Habitat (WILD)
    f. Hydropower Generation (POW)
    g. Preservation of Rare, Threatened, or Endangered Species (RARE)

Salton Sea
a. Aquaculture (AQUA)
b. Industrial Service Supply (IND)
c. Water Contact Recreation (RECI)
d. Noncontact Water Recreation (RECII)
e. Warm Water Habitat (WARM)
f. Wildlife Habitat (WILD)
g. Preservation of Rare, Threatened, or Endangered Species (RARE)

Monitoring Parameters

65. Based on the chemical characteristics of the projected discharges to the brine pond from the flashed geothermal brine, the following list of monitoring parameters are required. These specific parameters are selected because they provide the best distinction between the chloride-rich brine and the sulfate-rich groundwater in the Project area that can be used to differentiate a potential brine pond release from other influences that could change the chemical composition of the groundwater.

Cations: Barium, Boron, Cadmium, Magnesium, Manganese, Iron, Lead, Potassium, Sodium, Strontium, and Zinc;

Anions: Ammonium, Bicarbonates, Chloride and Sulfate; and

Other: Total Dissolved Solids, Specific Conductivity, and pH.

California Environmental Quality Act (CEQA)

66. The environmental review program of the California Energy Commission (CEC), which has exclusive jurisdiction over the permitting of this Facility, has been certified by the California Secretary for Natural Resources as meeting the requirements of Public Resources Code Section 21080.5 to exempt the CEC's power plant certification program from the CEQA requirements to prepare EIR's, negative declarations, and initial studies. (See CCR, Title 14, Section 15251 (k).) Accordingly, the CEC has prepared the appropriate substitute CEQA environmental documents, identified as the Final Staff Assessment, pursuant to its responsibilities as Lead Agency for this site certification program. As a Responsible Agency under CEQA, the Regional Water Board has considered these substitute environmental documents and the potential impacts to water quality the CEC identified and addressed pursuant to specified mitigation measures made a condition of the CEC's site certification approval. The Regional Water Board has concluded that compliance with the CEC's mitigation measures and these waste discharge requirements will prevent any significant adverse impacts to water quality.

Industrial Storm Water Permit

67. Federal regulations for storm water discharges were promulgated by the U.S. Environmental Protection Agency (40 CFR Parts 122, 123, and 124). The regulation require specific categories of facilities which discharge storm water associated with industrial activity to obtain NPDES permits and to implement Best Conventional Pollutant Technology (BCPT) to reduce or eliminate industrial storm water pollution.

68. The State Water Resources Control Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001) specifying WDRs for discharges of storm water associated with industrial activities, excluding construction activities, and requiring submittal of a Notice of Intent (NOI) by industries to be covered under this permit (General Industrial Permit). Pursuant to a February 23, 1993 State Water Resources Control Board Office of Chief Counsel memorandum from Senior Staff Counsel Betsy Jennings, however, geothermal power plants are not required to obtain coverage under the State Water Board's General Industrial Permit. Therefore, the Discharger is not subject to the General Industrial Permit requirements.

Construction Storm Water Permit

69. Federal regulations for storm water discharges were promulgated by the United States Environmental Protection Agency (USEPA) on November 16, 1990 (40 CFR Parts 122, 123, and 124). These regulations required discharges of storm water to surface waters associated with construction activity, including clearing, grading, and excavation activities (except operations that result in disturbance of less than five (5) acres of total land area and which are not part of a larger common plan of development or sale) to obtain a National Pollutant Discharge Elimination System (NPDES) permit and to implement Best Conventional Pollutant Control Technology and Best Available Technology Economically Achievable to reduce or eliminate storm water pollution. (40 CFR 122.26(b)(14)(x).) On December 8, 1999, federal regulations promulgated by USEPA (40 CFR Parts 9, 122, 123, and 124) expanded the NPDES storm water program to include, in pertinent part, storm water discharges from construction sites that disturb a land area equal to or greater than one acre and less than five acres, or is part of a larger common plan of development or sale (small construction activity). (40 CFR 122.26(b)(15).)

70. To comply with these federal requirements, the State Water Resources Control Board (State Water Board) adopted in 1999 Water Quality Order No. 99-08-DWQ (NPDES) General Permit No. CAS000002, "Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity" (Construction General Permit or CGP). The CGP specifies WDRs for discharges of storm water associated with construction activity that results in a land disturbance of one acre or more or is part of a larger common plan of development or sale. The CGP specifies certain construction activities that are exempted from coverage. Because these exemptions do not apply to the Discharger's proposed construction activity and because this activity will result in a land disturbance of more than 1 acre, the Discharger is subject to the CGP requirements.

71. On September 2, 2009, the State Water Board adopted a new CGP to replace Order No. 99-08-DWQ. The new CGP, Order No. 2009-0009-DWQ (NPDES No. CAS000002), became effective on July 1, 2010.

Anti-Degradation Policy

72. State Water Resources Control Board (State Water Board) Resolution No. 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State"; hereafter Resolution No. 68-16) requires a Regional Board in regulating the discharge of waste to maintain high quality waters of the state (i.e., background water quality) until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in plans and policies (e.g. violation of any water quality objective). The

discharge is required to meet waste discharge requirements that result in the best practicable treatment or control of the discharge necessary to assure pollution or nuisance will not occur, and the highest water quality consistent with maximum benefit to the people will be maintained.

Monitoring and Reporting Program

73. The monitoring and reporting requirements in Monitoring and Reporting Program R7-2011-0037, and the requirement to install groundwater monitoring wells, is necessary to determine compliance with these WDRs, and to determine the Facility's impacts, if any, on receiving water.

Notifications

74. The Board has notified the Discharger and all known interested agencies and persons of its intent to update WDRs for said discharge and has provided them with an opportunity for a public meeting and an opportunity to submit comments.

75. The Board, in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, that in order to meet the provisions contained in Division 7 of the California Water Code (CWC) and regulations adopted thereunder, the Discharger shall comply with the following:

A. Discharge Specifications

1. The treatment or disposal of wastes at this Facility shall not cause pollution or nuisance as defined in Sections 13050 of Division 7 of the CWC.

2. The Discharger will maintain the monitoring, production and injection wells in good working order at all times. Well maintenance may include periodic well re-development to remove sediments.

3. At least 30 days prior to introduction of a new waste stream into the brine ponds, the Discharger must receive approval from the California Energy Commission's Compliance Project Manager (CPM), who will evaluate any proposed new waste streams in consultation with the Colorado River Basin Regional Water Quality Control Board's (Regional Board's) Executive Officer.

4. Waste material shall be confined or discharged to the brine ponds.

5. Prior to drilling a new production well or conversion of a production well to an injection well at the Facility, the Discharger shall notify, in writing, both the CPM and the Regional Board's Executive Officer, of the proposed change.

   Containment of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated waste containment area, or any proposed change in operation at the Facility that changes the nature and constituents of the waste produced must be submitted in writing to the CPM, with copies to the Regional Board's Executive Officer, for review. The CPM, in consultation with the Regional Board's

Executive Officer, must approve the proposed change before any change in operations or modification of the designated area is implemented.

6. Any substantial increase or change in the annual average volume of material to be discharged under this order at the site must be submitted in writing to the CPM, with copies to the Regional Board's Executive Officer, for review. The CPM, in consultation with the Regional Board's Executive Officer, must approve of the proposed change before the change is discharge volume is implemented.

7. If any portions of the brine ponds are to be closed, the Discharger shall notify the CMP and the Regional Board's Executive Officer at least 180 days prior to beginning any partial or final closure activities.

8. Fluids and/or materials discharged to and/or contained in the brine ponds shall not overflow the ponds.

9. Prior to the use of new chemicals for the purposes of adjustment or control of microbes, pH, scale, and corrosion of the cooling tower water and geothermal brine, the Discharger shall notify the CPM and the Regional Board's Executive Officer in writing.

10. For the liquids in the brine ponds, a minimum freeboard of two (2) feet shall be maintained at all times.

11. Fluids discharged by subsurface injection shall be injected below the fracture pressure of the receiving aquifer and of the confining layer immediately above the receiving aquifer.

12. Final disposal of residual waste from cleanup of the brine ponds shall be accomplished to the satisfaction of the CPM, in consultation with the Regional Board's Executive Officer, upon abandonment or closure of operations.

13. The brine ponds shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.

14. Geothermal well clean out fluid, test and production fluid, production and injection well startups and cleanouts shall be discharged in metal tanks, or containers approved by the CPM, in consultation with the Regional Board's Executive Officer, to receive this discharge. Mud sumps may not be used to store well cleanout or production fluids after initial well drilling and development.

15. Within one year after completion of a new geothermal well, the mud sump used to contain fluids during drilling and well development must be properly abandoned.

16. Prior to removal of solid material that has accumulated in the concrete cooling tower basins, an analysis of the material must be conducted and the material must be disposed of in a manner consistent with that analysis and applicable laws and regulations.

17. Conveyance systems throughout the plant area shall be cleaned out at least every 90 days to prevent the buildup of solids or when activity at the site creates the potential for release of solid materials from the conveyance systems.

18. Pipe maintenance and de-scaling activities that include hydroblasting and/or sandblasting shall be performed within a designated area that minimizes the potential for release to the environment. Waste generated as a result of these activities shall be disposed of in accordance with applicable laws and regulations. Water from the hydroblasting process shall be conveyed to the brine pond for injection into the geothermal resource.

19. Public contact with wastes containing geothermal fluids shall be precluded through such means as fences, signs, or other acceptable alternatives.

20. The brine ponds shall be managed and maintained to ensure their effectiveness. In particular:

    a. Implementation of erosion control measures shall assure that small coves and irregularities are not created.

    b. The liner beneath the brine pond shall be appropriately maintained to ensure its proper function.

    c. Solid material shall be removed from the brine ponds in a manner that minimizes the likelihood of damage to the liner.

21. Ninety days prior to the cessation of discharge operations at the Facility, the Discharger shall submit a workplan, subject to approval of the CPM in consultation with the Regional Board's Executive Officer, for assessing the extent, if any, of contamination of natural geological materials and waters of the Imperial Hydrological Unit by the waste. One hundred twenty days following workplan approval, the Discharger shall submit to the CPM a technical report presenting results of the contamination assessment, with copies to the Regional Board's Executive Officer. A California Registered Civil Engineer or Certified Engineering Geologist must prepare the workplan, contamination assessment, and engineering report.

22. Upon ceasing operation at the Facility, all waste, all natural geologic material contaminated by waste, and all surplus or unprocessed material shall be removed from the site and disposed of in accordance with applicable laws and regulations.

23. The Discharger shall establish an irrevocable bond for closure in an amount acceptable to the CMP in consultation with the Regional Board's Executive Officer or provide other means to ensure financial security for closure if closure is needed at the discharging site. The closure fund shall be established (or evidence of an existing closure fund shall be provided) within six (6) months of the adoption of this Order.

24. Surface drainage from tributary areas or subsurface sources, shall not contact or percolate through the waste discharged at this site.

25. The Discharger shall implement the attached Monitoring and Reporting Program.R7-2011-0037 and revisions thereto, in order to detect, at the earliest opportunity, any unauthorized discharge of waste constituents from the Facility, or any impairment of beneficial uses associated with (or caused by) discharges of waste to the brine pond.

26. The Discharger shall use the constituents listed in Monitoring and Reporting R7-2011-0037 and revisions thereto, as "Monitoring Parameters".

27. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Board. The following are parts of WQPS as established by the Regional Board's Executive Officer:

    a. The Discharger shall test for the monitoring parameters and the Constituents of Concern (COCs) listed in the Monitoring and Reporting R7-2011-0037 and revisions thereto.

    b. Concentration Limits – The concentration limit for each monitoring parameter and constituents of concern for each monitoring point (as stated in the Detection Monitoring Program), shall be its background valued as obtained during that reporting period.

    c. All current, revised, and/or proposed monitoring points must be approved by the CPM, in consultation with the Region Board's Executive Officer.

28. Water used for the process and site maintenance shall be limited to the amount necessary in the process, for dust control, and for Facility cleanup and maintenance.

29. The Discharger shall not cause or permit the release of pollutants, or waste constituents, in a manner which could cause or contribute to a condition of contamination, nuisance, or pollution to occur.

30. The Discharger must develop and implement a Hazardous Materials Business Plan (HMBP), which will include, at a minimum, procedures for:

    a. Hazardous materials handling, use, and storage;
    b. Emergency response;
    c. Spill control and prevention;
    d. Employee training; and
    e. Reporting and record keeping.

31. Hazardous materials expected to be used during construction include: unleaded gasoline, diesel fuel, oil, lubricants (i.e., motor oil, transmission fluid, and hydraulic fluid), solvents, adhesives, and paint materials. There are no feasible alternatives to these materials for construction or operation of construction vehicles and equipment, or for painting and caulking buildings and equipment.

32. The construction contractor will be responsible for assuring that the use, storage and handling of these materials will comply with applicable federal, state, and local laws, ordinances, regulations and standards (LORS), including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.

33. During Facility operations, chemicals will be stored in chemical storage areas appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors on impervious surfaces in aboveground storage tanks with secondary containment. Secondary containment areas for bulk storage tanks will not have drains. Any chemical spills in these areas will be removed with portable equipment and reused

or disposed of properly. Other chemicals will be stored and used in their delivery containers.

34. A portable storage trailer may be on site for storage of maintenance lube oils, chemicals, paints, and other construction materials, as needed. Drains from chemical storage and feed areas that use portable vessels will be directed to the brine pond and discharged together with other plant wastewater to the dedicated injection well. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious vapors. The storage, containment, handling, and use of these chemicals will be managed in accordance with applicable laws, ordinances, regulations, and standards.

35. Small quantities of hazardous wastes will be generated over the course of construction. These may include filter cake waste, paint, spent solvents, and spent welding materials. During normal operations, less than five percent of the filter cake is projected to be characterized as hazardous because of elevated concentrations of heavy metals. Some hazardous wastes will be recycled, including used oils from equipment maintenance, and oil-contaminated materials such as spent oil filters, rags, or other cleanup materials. Used oil must be recycled, and oil or heavy metal contaminated materials (e.g., filters) requiring disposal must be disposed of in a Class I waste disposal facility. Scale from pipe and equipment cleaning operations, and solids from the brine pond, will be disposed of in a similar manner.

36. All hazardous wastes generated during facility construction and operation must be handled and disposed of in accordance with applicable laws, ordinances, regulations, and standards. Any hazardous wastes generated during construction must be collected in hazardous waste accumulation containers near the point of generation and moved daily to the contractor's 90-day hazardous waste storage area located on site. The accumulated waste must subsequently be delivered to an authorized waste management facility. Hazardous wastes must be either recycled or managed and disposed of properly in a licensed Class I waste disposal facility authorized to accept the waste.

37. The Discharger shall monitor the brine pond in conformance with applicable CCR Title 27 requirements for Class II surface impoundment waste management units.

38. The leachate collection and removal system must be used to provide preliminary detection monitoring of leaks through the top liner of the double-lined brine pond. Physical evidence of brine beneath the upper concrete liner shall be interpreted as a warning that containment of the brine pond contents may be compromised.

39. Groundwater monitoring wells must be constructed adjacent to and both up gradient and down gradient of the brine pond to provide background and detection monitoring for any potential release from the brine pond containment. The Point of Compliance to be used for the detection monitoring must be the uppermost shallow groundwater beneath the brine pond. The groundwater monitoring wells must be constructed in conformance with Title 27 CCR Section 20415 requirements. The monitoring wells must be designed to meet the background and detection monitoring requirements in conformance with Title 27 CCR Section 20415(b)(1)(B) as applicable, including:

a. Providing a sufficient number of monitoring points to yield ground water samples from the uppermost aquifer that represent the quality of ground water passing the Point of Compliance and to allow for the detection of a release from the brine pond;

b. Providing a sufficient number of monitoring points installed at locations and depths to yield ground water samples from the upper most aquifer to provide the best assurance of the earliest possible detection of a release from the brine pond;

c. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from zones of perched water to provide the best assurance of the earliest possible detection of a release from the brine pond; and

d. Selecting monitoring point locations and depths that include the zone(s) of highest hydraulic conductivity in the ground water body monitored.

40. The detection monitoring wells shall be constructed to meet the well performance standards set forth in Title 27 CCR Section 20415(b)(4), as applicable, including:

a. All monitoring wells shall be cased and constructed in a manner that maintains the integrity of the monitoring well bore hole and prevents the bore hole from acting as a conduit for contaminant transport.

b. The sampling interval of each monitoring well shall be appropriately screened and fitted with an appropriate filter pack to enable collection of representative ground water samples.

c. For each monitoring well, the annular space (i.e., the space between the bore hole and well casing) above and below the sampling interval shall be appropriately sealed to prevent entry of contaminants from the ground surface, entry of contaminants from the unsaturated zone, cross contamination between portions of the zone of saturation, and contamination of samples.

d. All monitoring wells shall be adequately developed to enable collection of representative ground water samples.

41. The monitoring program must also meet the general requirements set forth in Title 27 CCR Section 20415(e), which require that all monitoring systems be designed and certified by a registered geologist or a registered civil engineer. The applicable general requirements set forth for boring logs, quality assurance/quality control, sampling and analytical methods used, background sampling, data analysis, and other reporting as applicable will be implemented.

42. Baseline samples of the groundwater must be collected from each of the monitoring wells and analyzed prior to discharging geothermal fluid to the brine ponds. The groundwater must be initially sampled for each of the proposed monitoring parameters listed in the attached Monitoring and Reporting Program R7-2011-0037 and any additional Constituents of Concern (COC) identified by the Regional Board.

B. Prohibitions

1. The discharge or deposit of solid geothermal waste to the brine ponds as a final form of disposal is prohibited, unless authorized by the CPM, in consultation with the Regional Board's Executive Officer.

2. The Discharger is prohibited from discharging, treating or composting at this site the following wastes:

   a. Municipal solid waste;

   b. Sludge (including sewage sludge, water treatment sludge, and industrial sludge);

   c. Septage;

   d. Liquid waste, unless specifically approved by this Order or by the Regional Board's Executive Officer;

   e. Oily and greasy liquid waste; unless specifically approved by this Order or by the Regional Board's Executive Officer;

   f. Hot, burning waste materials or ash.

3. The Discharger shall not cause degradation of any groundwater aquifer or water supply.

4. The discharge of waste to land not owned or controlled by the Discharger is prohibited.

5. Use of geothermal fluids or cooling tower liquids on access roads, well pads, or other developed project locations for dust control is prohibited.

6. The discharge of hazardous or designated wastes to other than a waste management unit authorized to receive such waste is prohibited.

7. Any hazardous waste generated or stored at the facility will be contained and disposed in a manner that complies with federal and state regulations.

8. Permanent (longer than one year) disposal or storage of geothermal waste in on-site temporary mud sumps is prohibited, unless authorized by the Regional Board's Executive Officer.

9. Geothermal fluids or any fluids in the brine ponds shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Salton Sea.

10. The Discharger shall appropriately dispose of any materials, including fluids and sediments removed from the brine ponds.

11. The Discharger shall neither cause nor contribute to the contamination or pollution of ground water via the release of waste constituents in either liquid or gaseous phase.

12. Direct or indirect discharge of any waste to any surface water or surface drainage courses is prohibited.

13. The Discharger shall not cause the concentration of any Constituent of Concern or Monitoring Parameter to exceed its respective background value in any monitored medium at any Monitoring Point assigned for Detection Monitoring pursuant to Monitoring and Reporting Program R7-2011-0037

C. Provisions

1. The Discharger shall comply with Monitoring and Reporting Program R7-2011-0037 and future revisions thereto, as specified by the CPM, in consultation with the Regional Board's Executive Officer.

2. Unless otherwise approved by the CPM, in consultation with the Regional Board's Executive Officer, all analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health. All analyses shall be conducted in accordance with the latest edition of "Guideline Establishing Test Procedures for Analysis of Pollutants," promulgated by the United States Environmental Protection Agency (EPA).

3. The laboratory shall use detection limits less than or equal to EPA Action Levels/Maximum Contaminant Levels (MCLs) or California Department of Public Health (CDPH) Notification Levels/MCLs for all samples analyzed. The lowest concentration, whether EPA or CDPH, of the two agencies must be used for the analysis.

4. Prior to any change in ownership of this operation, the Discharger shall transmit a copy of these WDRs to the succeeding owner/operator, and forward a copy of the transmittal letter to both the CPM and the Regional Board Executive Officer, .

5. Prior to any modification in this facility that would result in material change in the quality or quantity of discharge, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the CPM and the Regional Board's Executive Officer and obtain revised waste discharge requirements before any modification is implemented.

6. All permanent containment structures and erosion and drainage control systems shall be certified by a California Registered Civil Engineer or Certified Engineering Geologist as meeting the prescriptive standards and performance goals.

7. The Discharger shall ensure that all site-operating personnel are familiar with the content of this Board Order, and shall maintain a copy of this these WDRs at the site.

8. The WDRs do not authorize violation of any federal, state, or local laws or regulations.

9. The Discharger shall allow the CPM, the Regional Board, or an authorized representative, upon presentation of credential and other documents as may be required by law, to:

    a. Enter upon the premises regulated by these WDRs or the place where records must be kept under the conditions of these WDRs;

b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of these WDRs;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under these WDRs; and

d. Sample or monitor at reasonable times, for the purpose of assuring compliance with these WDRs or as otherwise authorized by the California Water Code or the California Code of Regulations, any substances or parameters at this location.

10. The Discharger shall comply with all of the conditions of these WDRs. Any noncompliance with these WDRs constitutes a violation of the Porter-Cologne Water Quality Act and is grounds for enforcement action.

11. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with these WDRs. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.

12. These WDRs do not convey any property rights of any sort or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.

13. The Discharger shall comply with the following:

    a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

    b. The Discharger shall retain records of all monitoring information, copies of all reports required by these WDRs, and records of all data used to complete the application for these WDRs, for a period of at least five (5) years from the date of the sample, measurement, report or application. This period may be extended by request of the CPM, in consultation with the Regional Board Executive Officer, at any time.

    c. Records of monitoring information shall include:

        1. The date, exact places, and time of sampling or measurements.
        2. The individual(s) who performed the sampling or measurements.
        3. The date(s) analyses were performed.
        4. The individual(s) responsible for reviewing the analyses.
        5. The results of such analyses.

    d. Monitoring must be conducted according to test procedures described in the Monitoring and Reporting Program, unless other test procedures have been specified in these WDRs or approved by the CPM, in consultation with the Regional Board's Executive Officer.

14. All monitoring systems shall be readily accessible for sampling and inspection.

15. The Discharger is the responsible party for these WDRs, and the monitoring and reporting program for the Facility. The Discharger shall comply with all conditions of these WDRs. Violations may result in enforcement actions, including Regional Board Orders or court orders that require corrective action or impose civil monetary liability, or modification or revocation of these WDRs by the CPM, in consultation with the Regional Board Executive Officer.

16. The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with the specifications prepared by the CPM, in consultation with the Regional Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.

17. The Discharger's construction activity is subject to the new CGP, which became effective on July 1, 2010, since that activity is scheduled to commence after adoption of this Board Order. To obtain coverage, the Discharger is required to electronically file Permit Registration Documents (PRDs), which includes a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other compliance-related documents required by the CGP and mail the appropriate permit fee to the State Water Board.

18. The procedure for preparing samples for the analyses shall be consistent with Monitoring and Reporting Program R7-2011-0037 and any revisions thereto. The Monitoring Reports shall be certified to be true and correct, and signed, under penalty of perjury, by an authorized official of the company. All technical reports require the signature of a California Registered Professional Engineer or Professional Geologist.

19. All monitoring shall be done as described in Title 27 of the CCRs.

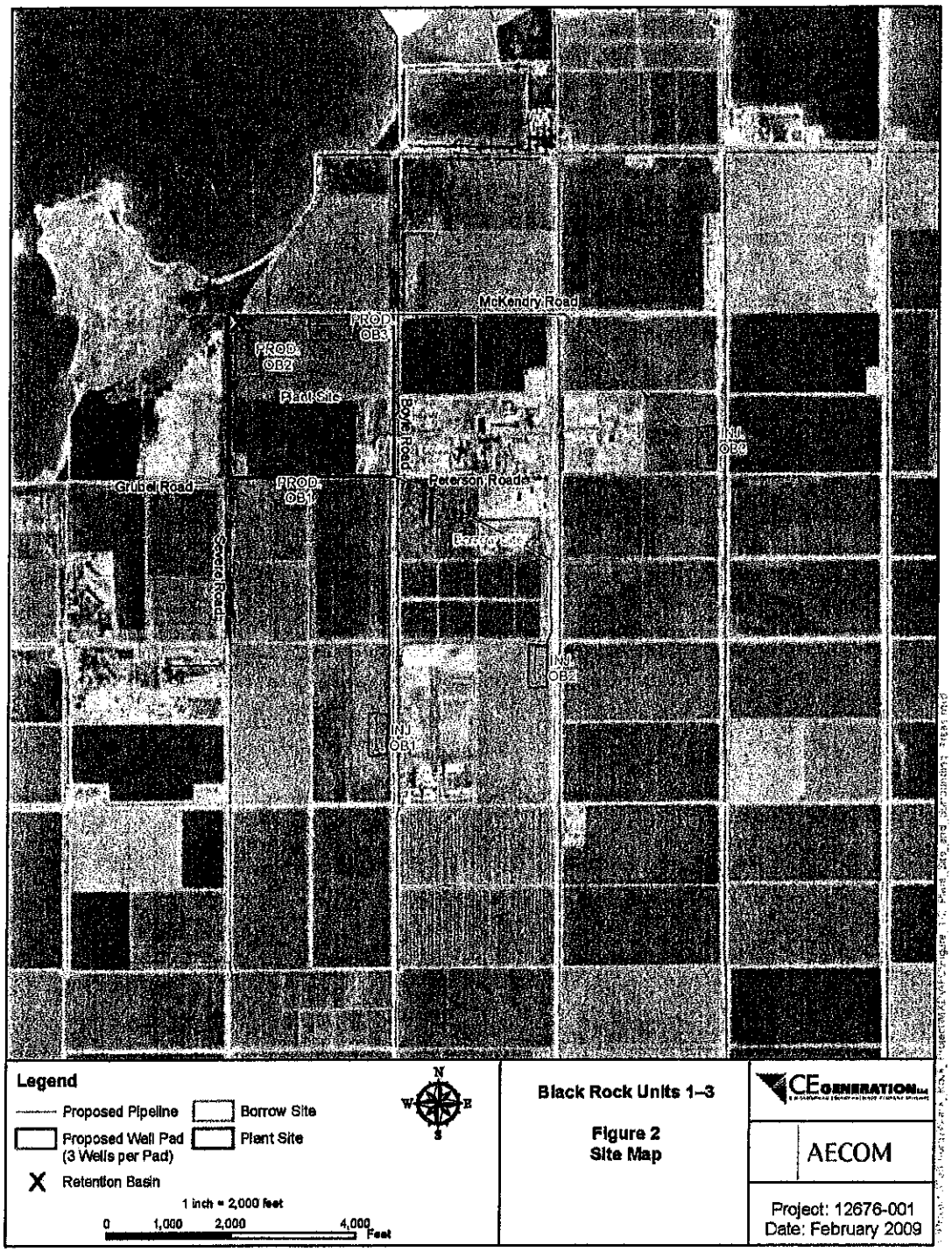
20. These WDRs do not convey property rights of any sort, or any exclusive privileges; nor does it authorize injury to private property, invasion of personal rights, or infringement of federal, state, or local laws and regulations.

21. These WDRs may be modified, rescinded, or reissued for cause. The filing of a request by the Discharger to modify, or rescind or reissue these WDRs does not stay any WDR condition. Likewise, notification of planned changes or anticipated noncompliance does not stay any WDR condition. Causes for modification include: changes in land application plans, sludge use, or disposal practices; or promulgation of new regulations by the State or Regional Boards, including revisions to the Basin Plan.

22. Within thirty days of the adoption of these WDRs, the Discharger shall submit to the CPM, with copies to the Regional Board Executive Officer, a list of surface landowners (including responsible contact's name, address and phone number) for all land containing existing or proposed facilities and/or appurtenances related to the operation of this Geothermal Power Project. This list will be used to contact responsible parties if corrective action measures become necessary due to a release of pollutants to the environment.

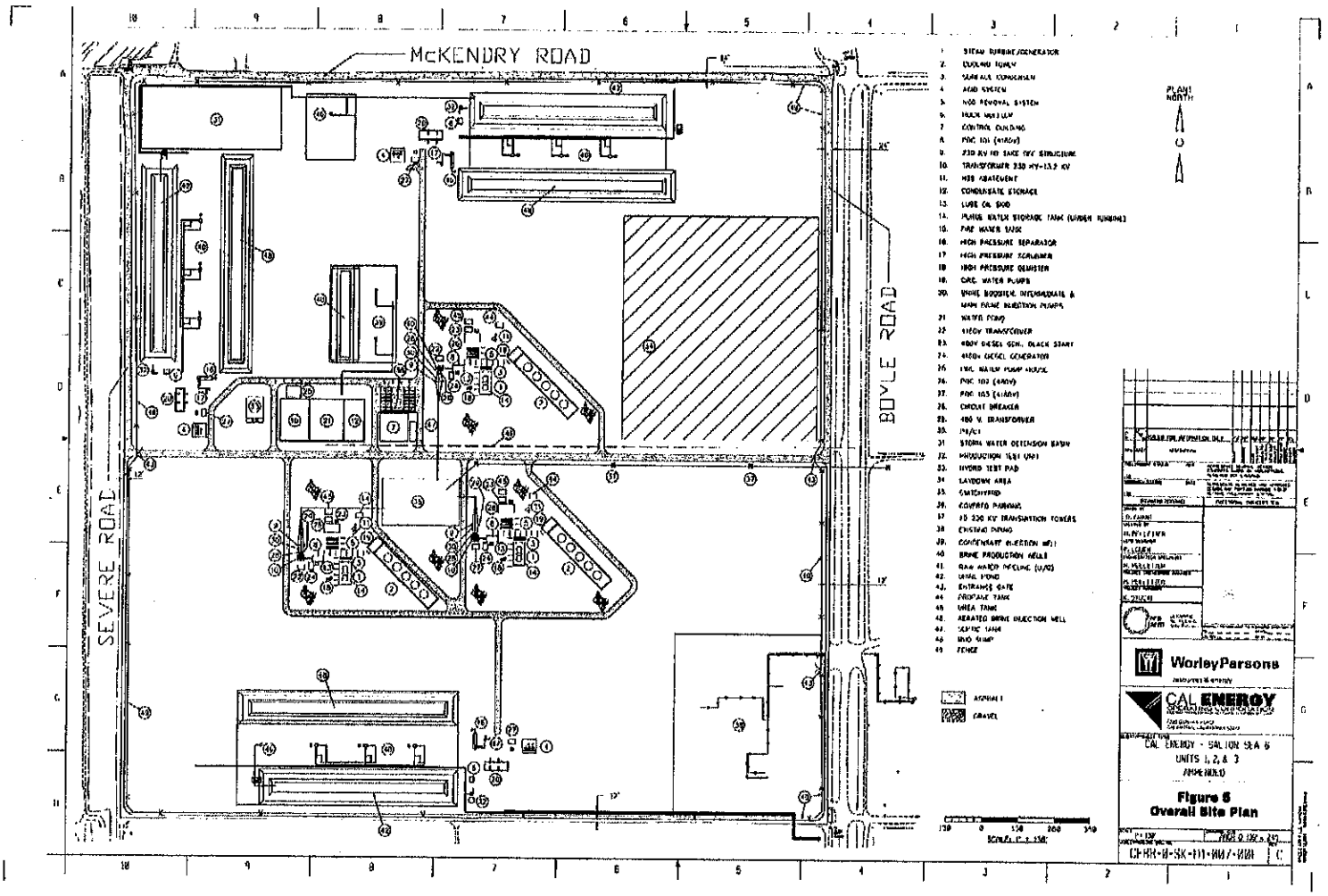
I, Robert Perdue, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Colorado River Basin Region, on September 15, 2011.

ROBERT PERDUE
Executive Officer



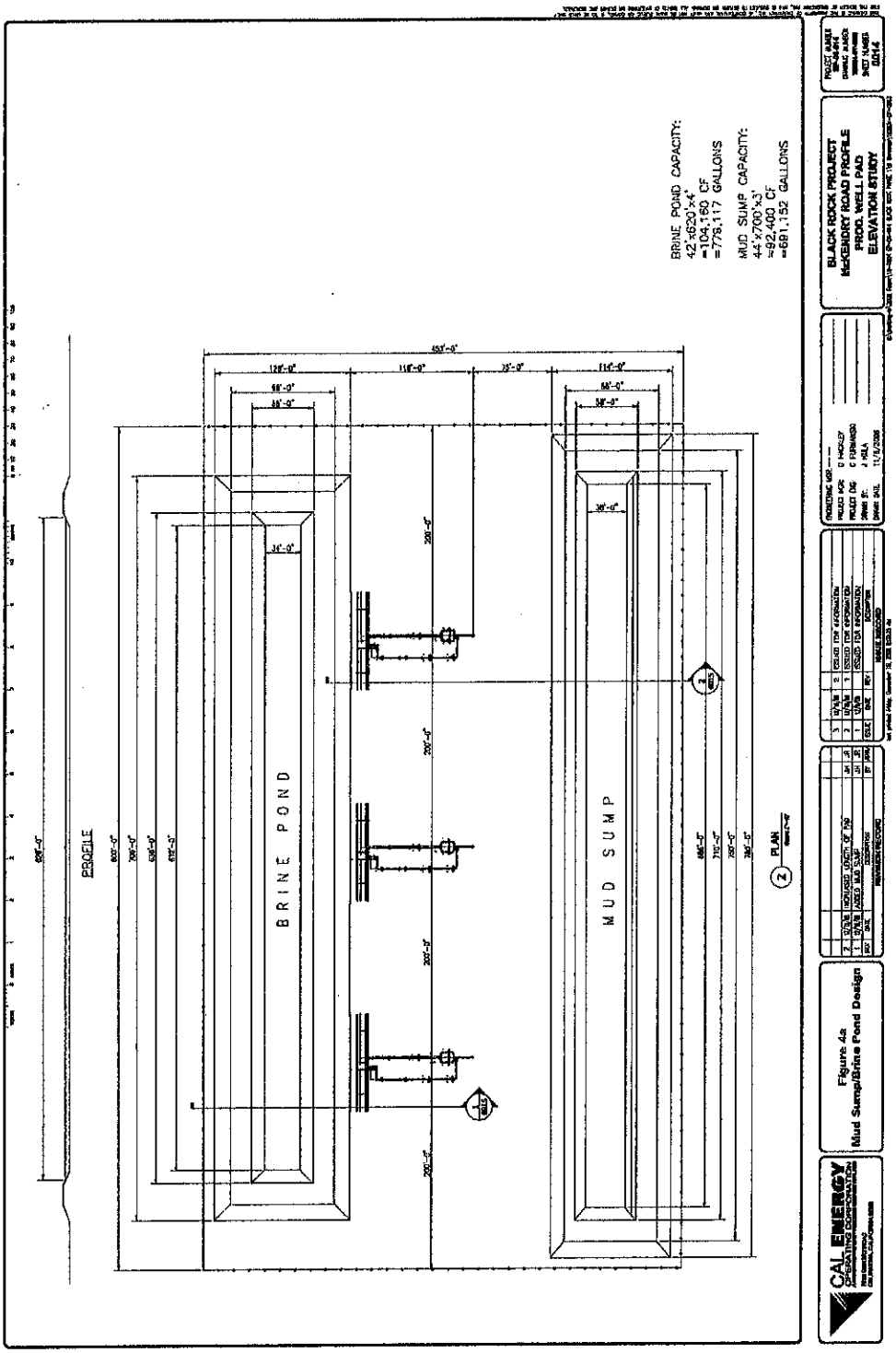
ATTACHMENT A

Black Rock 1, 2 and 3 Geothermal Power Project Brine Ponds
Project Location
Imperial County
Board Order R7-2011-0037



ATTACHMENT B

Black Rock 1, 2 and 3 Geothermal Power Project Brine Ponds
Site Map
Imperial County
Board Order R7-2011-0037



ATTACHMENT C
Black Rock 1, 2 and 3 Geothermal Power Project
Brine Ponds
Imperial County
Board Order R7-2011-0037

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

MONITORING AND REPORTING PROGRAM R7-2011-0037

FOR
CE OBSIDIAN ENERGY LLC, OWNER
BLACK ROCK 1, 2 AND 3
GEOTHERMAL POWER PROJECT BRINE PONDS

Salton Sea Known Geothermal Resource Area (KGRA) - Imperial County

CONSISTS OF:

PART I – GENERAL REQUIREMENTS
PART II – MONITORING REQUIREMENTS
PART III – STATISTICAL AND NON-STATISTICAL ANALYSIS
SUMMARY OF SELF-MONITORING AND REPORTING REQUIREMENTS

PART I

GENERAL REQUIREMENTS

A. GENERAL

A Discharger who owns or operates a Class II Surface Impoundment is required to comply with the provisions of Title 27, Division 2, Chapter 3, Subchapter 3, Article 1 of the California Code of Regulations for the purpose of detecting, characterizing, and responding to releases to the groundwater. Section 13267, California Water Code gives the Regional Water Board authority to require monitoring program reports for discharges that could affect the quality of waters within its region.

1. This Monitoring and Reporting Program (MRP) is issued pursuant to Specification No. 25 of Regional Water Board Order R7-2011-0037. The principal purpose of this self-monitoring program is:

   a. To document compliance with Waste Discharge Requirements (WDRs), and prohibitions established by the Regional Water Board;

   b. To facilitate self-policing by the Discharger in the prevention and abatement of pollution arising from waste discharge;

   c. To conduct water quality analyses.

2. The Energy Commission's Compliance Project Manager (CPM), in consultation with the Regional Water Board Executive Officer may alter the monitoring parameters, monitoring locations, and/or the monitoring frequency during the course of this monitoring program.

B. DEFINITION OF TERMS

1. Affected Persons – all persons who either own or occupy land outside the boundaries of the parcel upon which a waste management unit (surface impoundment or impoundment) is located that has been or may be affected by the release of waste constituents from the unit.

2. Background Monitoring Point – a device (e.g. well) or location (e.g. a specific point along a lakeshore) that is upgradient or side gradient from the impoundment assigned by this MRP, where water quality samples are taken that are not affected by a release from the impoundment and that are used as a basis of comparison against samples taken from downgradient Monitoring Points.

3. Constituents of Concern (COCs) – those constituents likely to be in the waste, or derived from waste constituents in the event of a release from the impoundment.

4. Matrix Effect – refers to any change in the Method Detection Limit (MDL) or Practical Quantitation Limit (PQL) for a given constituent as a result of the presence of other constituents - either of natural origin or introduced through a spill or release - that are present in the sample being analyzed.

5. Method Detection Limit (MDL) – the lowest constituent concentration that can support a non-zero analytical result with 99 percent reliability. The MDL is laboratory specific and should reflect the detection capabilities of specific procedures and equipment used by the laboratory.

6. Monitored Media – water - bearing media monitored pursuant to this Monitoring and Reporting Program. The Monitored Media may include: (1) groundwater in the uppermost aquifer, in any other portion of the zone of saturation (as defined in Title 27, Section 20164) in which it would be reasonable to anticipate that waste constituents migrating from the surface impoundment could be detected, and in any perched zones underlying the impoundment, (2) any bodies of surface water that could be measurably affected by a release, (3) soil-pore liquid beneath and/or adjacent to the surface impoundment, and (4) soil-pore gas beneath and/or adjacent to the surface impoundment.

7. Monitoring Parameters – the list of constituents and parameters used for the majority of monitoring activity.

8. Monitoring Point – a device (e.g. well) or location (e.g. a specific point along a lakeshore) that is downgradient from the surface impoundment assigned by this MRP, at which samples are collected for the purpose of detecting a release by comparison with samples collected at Background Monitoring Points.

9. Practical Quantification Limit (PQL) – the lowest constituent concentration at which a numerical concentration can be assigned with a 99 percent certainty that its value is within 10 percent of the actual concentration in the sample. The PQL is laboratory specific and should reflect the detection capabilities of specific procedures and equipment used by the laboratory.

10. Reporting Period – the duration separating the submittal of a given type of monitoring report from the time the next iteration of that report is scheduled for submittal. Unless otherwise stated, the due date for any given report shall be 30 days after the end of its Reporting Period.

11. Sample Size –

    a. For Monitoring Points – the number of data points obtained from a given Monitoring Point during a given Reporting Period – used for carrying out the statistical or non-statistical analysis of a given analyte during a given Reporting Period.

    b. For Background Monitoring Points – the number of new and existing data points from all applicable Background Monitoring Points in a given Monitored Medium – used to collectively represent the background concentration and variability of a given analyte in carrying out a statistical or non-statistical analysis of that analyte during a given Reporting Period.

12. Uppermost Aquifer – the geologic formation nearest the natural ground surface that is an aquifer, as well as, lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

13. Volatile Organic Constituents (VOCs) – the suite of organic constituents having a high vapor pressure. The term includes at least the 47 organic constituents listed in Appendix I to 40 CFR Part 258.

14. VOC_{water} – the composite monitoring parameter that includes all VOCs that are detectable in less than 10 percent of the applicable background samples. This parameter is analyzed, using the non-statistical method described in Part III.A.2. of this MRP, to identify releases of VOCs that are detected too infrequently in backgroundwater to allow for statistical analysis.

C. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analysis shall be performed according to the most recent version of Standard USEPA methods, and California ELPA rulings. Water and waste analysis shall be performed by a laboratory approved for these analyses by the California Department of Public Health. Specific methods of analysis must be identified. If methods other than USEPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and approval by CPM, in consultation with the Regional Water Board Executive Officer prior to use. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the CPM and the Regional Water Board. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurement. In addition, the Discharger is responsible for verifying that laboratory analysis of all samples from Monitoring Points and Background Monitoring Points meet the following restrictions:

1. Methods, analysis, and detection limits used must be appropriate for expected concentrations. For detection monitoring of any constituent or parameter found in concentrations that produce more than 90% non-numerical determinations (i.e. "trace" or "ND") in data from Background Monitoring Points for that medium, the analytical methods having the lowest "facility-specific method detection limit (MDL)", defined in Part I.B.5., shall be selected from among those methods that provide valid results in light of any "Matrix Effects" (defined in Part I.B.4.) involved.

2. Analytical results falling between the MDL and the PQL shall be reported as "trace", and shall be accompanied both by the estimated MDL and PQL values for that analytical run, and by an estimate of the constituent's concentration.

3. MDLs and PQLs shall be derived by the laboratory for each analytical procedure, according to State of California laboratory accreditation procedures. These MDLs and PQLs shall reflect the detection and quantitation capabilities of the specific equipment used by the lab. If the lab suspects that, due to a change in matrix or other effects, the true detection limit or quantitation limit for a particular analytical run differs significantly from the laboratory-derived MDL/PQL values, the results shall be flagged accordingly, along with an estimate of the detection limit and quantitation limit actually achieved.

4. All Quality Assurance/Quality Control (QA/QC) data shall be reported, along with the sample results to which it applies, including the method, equipment, and analytical detection limits, the recovery rates, an explanation of any recovery rate that is less than 80%, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name and qualifications of the person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recovery.

5. Upon receiving written approval from the CPM, in consultation with Regional Water Board Executive Officer, an alternative statistical or non-statistical procedure can be used for determining the significance of analytical results for a constituent that is a common laboratory contaminant (i.e., methylene chloride, acetone, diethylhexyl phthalate, and di-n-octyl phthalate) during any given Reporting Period in which QA/QC samples show evidence of laboratory contamination for that constituent. Nevertheless, analytical results involving detection of these analytes in any background or downgradient sample shall be reported and flagged for easy reference by Regional Water Board staff.

6. In cases where contaminants are detected in QA/QC samples (i.e. field, trip, or lab blanks), the accompanying sample results shall be appropriately flagged.

7. The MDL shall always be calculated such that it represents a concentration associated with a 99 percent reliability of a non-zero result.

D. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the Discharger or laboratory, and shall be retained for a minimum of five (5) years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by CPM, in consultation with the Regional Water Board. Such records shall show the following for each sample:

1. Identity of sample and of the Monitoring Point or Background Monitoring Point from which it was taken, along with the identity of the individual who obtained the sample;

2. Date and time of sampling;

3. Date and time that analyses were started and completed, and the initials of the personnel performing each analysis;

4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used;

5. Calculations of results; and

6. Results of analyses, and the MDL and PQL for each analysis.

E. REPORTS TO BE FILED WITH THE BOARD

1. Detection Monitoring Reports – For each Monitored Medium, all Monitoring Points and Background Monitoring Points assigned to detection monitoring under Part II.A.7 of this MRP shall be monitored **semiannually** for the Monitoring Parameters (Part II.A.4). A "Detection Monitoring Report" shall be submitted to the CPM, with copies to the Regional Water Board in accordance with the schedule contained in the Summary of Self-Monitoring and Reporting Requirements, and shall include the following:

    a. A Letter of Transmittal that summarizes the essential points in each report shall accompany each report submittal. The letter of transmittal shall be signed by a principal executive officer at the level of vice-president or above, or by his/her duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter of transmittal shall include:

        i. A discussion of any violations noted since the previous report submittal and a description of the actions taken or planned for correcting those violations. If no violations have occurred since the last submittal, that should be so stated;

ii. If the Discharger has previously submitted a detailed time schedule or plan for correcting any violations, a progress report on the time schedule and status of the corrective actions being taken; and

iii. A statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

b. A Compliance Evaluation Summary shall be included in each Detection Monitoring Report. The compliance evaluation summary shall contain at least:

i. Velocity and direction of groundwater flow for each monitored groundwater body under and around the surface impoundment based upon the water level elevations taken during the collection of water quality data. A description and graphical presentation (e.g., arrow on a map) shall be submitted;

ii. Methods used for water level measurement and pre-sampling purging for each monitoring well addressed by the report including:

1. Method, time, and equipment used for water level measurement;

2. Type of pump used for purging, placement of the pump in the well, pumping rate, and well recovery rate;

3. Methods and results of field testing for pH, temperature, electrical conductivity, and turbidity, including;

a. Equipment calibration methods, and
b. Method for disposing of purge water

iii. Methods used for sampling each Monitoring Point and Background Monitoring Point, including:

1. A description of the type of pump, or other device used, and its placement for sampling;

2. A detailed description of the sampling procedure: number and description of samples, field blanks, travel blanks, and duplicate samples; types of containers and preservatives used; date and time of sampling; name and qualifications of individual collecting samples, and other relevant observations;

c. A map or aerial photograph showing the locations of Monitoring Points, and Background Monitoring Points;

d. For each Detection Monitoring Report, provide all relevant laboratory information including results of all analyses, and other information needed to demonstrate compliance with Part I.C.;

e. An evaluation of the effectiveness of the run-off/run-on control facilities;

f. A summary of reportable spills/leaks occurring during the reporting period; include estimated volume of liquids/solids discharged outside designated containment area, a description of management practices to address spills/leaks, and actions taken to prevent reoccurrence.

2. Annual Summary Report – The Discharger shall submit to the Regional Water Board, an "Annual Summary Report" for the period extending from January 1 through December 31. The "Annual Summary Report" is due **March 15** of each year, and shall include the following:

a. A graphical presentation of analytical data for each Monitoring Point and Background Monitoring Point (Title 27, Section 20415(e)(14)). The Discharger shall submit, in graphical format, the laboratory analytical data for all samples taken within at least the previous five (5) calendar years. Each such graph shall plot the concentration of one (1) or more constituents over time for a given Monitoring Point and Background Monitoring Point, at a scale appropriate to show trends or variations in water quality. The graphs shall plot each datum, rather than plotting mean values. For any given constituent or parameter, the scale for background plots shall be the same as that used to plot downgradient data. On the basis of any aberrations noted in the plotted data, the Regional Water Board Executive Officer may direct the Discharger to carry out a preliminary investigation (Title 27, Section 20080(d)(2)), the results of which will determine whether or not a release is indicated;

b. A tabular presentation of all monitoring analytical data obtained during the previous two (2) Monitoring and Reporting Periods, submitted on hard copy within the annual report as well as digitally on electronic media in a file format acceptable to the Regional Water Board Executive Officer (Title 27, Section 20420(h)). The Regional Water Board regards the submittal of data in hard copy and on diskette CD-ROM as "...a form necessary for..." statistical analysis in that this facilitates periodic review by the Regional Water Board statistical consultant;

c. A comprehensive discussion of the compliance record and any corrective actions taken or planned, which may be needed to bring the Discharger into full compliance with WDRs;

d. A written summary of the groundwater analyses, indicating changes made since the previous annual report; and

e. An evaluation of the effectiveness of the run on/run-off control facilities, pursuant to Title 27, Section 20365.

3. Contingency Reporting

a. The Discharger shall report any spill of geothermal brine by telephone within 48 hours of discovery. The reportable quantity for geothermal brine is 150 gallons.

After reporting a spill, a written report shall be filed with the Regional Board Executive Officer within seven (7) days, containing at a minimum the following:

i. A map showing the location(s) of the discharge/spill;

ii. A description of the nature of the discharge (all pertinent observations and analyses including quantity, duration, etc.); and

iii. Corrective measures underway or proposed.

b. Should the initial statistical comparison (Part III.A.1.) or non-statistical comparison (Part III.A.2.) indicate, for any Constituent of Concern or Monitoring Parameter, that a release is tentatively identified, the Discharger shall immediately notify the CPM and the Regional Water Board verbally as to the Monitoring Point(s) and constituent(s) or parameter(s) involved, shall provide written notification by certified mail within seven (7) days of such determination (Title 27, Section 20420(j)(1)), and shall conduct a discrete retest in accordance with Part III.A.3. If the retest confirms the existence of a release, the Discharger shall carry out the requirements of Part I.E.3.d. In any case, the Discharger shall inform the CPM and the Regional Water Board of the outcome of the retest as soon as the results are available, following up with written results submitted by certified mail within seven (7) days of completing the retest.

c. If either the Discharger or the CPM, in consultation with Regional Water Board determines that there is significant physical evidence of a release (Title 27, Section 20385(a)(3)), the Discharger shall immediately notify the CPM and the Regional Water Board of this fact by certified mail (or acknowledge the Regional Water Board's determination) and shall carry out the requirements of Part I.E.3.d. for all potentially-affected monitored media.

d. If the Discharger concludes that a release has been discovered:

i. If this conclusion is not based upon "direct monitoring" of the Constituents of Concern, pursuant to Part II.A.5., then the Discharger shall, within thirty days, sample for all Constituents of Concern at all Monitoring Points and submit them for laboratory analysis. Within seven (7) days of receiving the laboratory

analytical results, the Discharger shall notify the CMP and the Regional Water Board, by certified mail, of the concentration of all Constituents of Concern at each Monitoring Point. Because this scan is not to be tested against background, only a single datum is required for each Constituent of Concern at each Monitoring Point (Title 27 Section 20420(k)(1));

ii. The Discharger shall, within 90 days of discovering the release (Title 27, Section 20420(k)(5)), submit a Revised Report of Waste Discharge to both the CPM and the Regional Water Board proposing an Evaluation Monitoring Program meeting the requirements of Title 27, Section 20425; and

iii. The Discharger shall, within 180 days of discovering the release (Title 27, Section 20420(k)(6), submit a preliminary engineering feasibility study meeting the requirements of Title 27, Section 20430.

e. Any time the Discharger concludes - or the CPM, in consultation with Regional Water Board Executive Officer directs the Discharger to conclude - that a liquid phase release from the surface impoundment has proceeded beyond the facility boundary, the Discharger shall so notify all persons who either own or reside upon the land that directly overlies any part of the plume (Affected Persons).

i. Initial notification to Affected Persons shall be accomplished within 14 days of making this conclusion and shall include a description of the Discharger's current knowledge of the nature and extent of the release; and

ii. Subsequent to initial notification, the Discharger shall provide updates to all Affected Persons, including any persons newly affected by a change in the boundary of the release, within 14 days of concluding a material change in the nature or extent of the release has occurred.

4. Monitoring of Injection Wells

a. Sampling and reporting shall be conducted semi-annually.

b. For brine injection wells, collect one grab sample semi-annually from the main injection header leaving the facility, and analyze for Total Dissolved Solids (mg/L, grab sample).

c. Provide a summary of integrity tests (if any) conducted pursuant to requirements ordered by the State of California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

d. Provide a summary of major repairs (if any).

5. Surface Impoundment - Leakage Detection System (LDS), and Solids Monitoring

a. Sampling and reporting shall be conducted semi-annually.

b. Provide volume of solids removed from the holding pond each month for that reporting period, and transported to a waste management facility for disposal. Include name and location of waste management facility.

c. Conduct quarterly inspections of Leakage Detection System (LDS), and holding pond.

PART II

MONITORING REQUIREMENTS FOR GROUNDWATER

A. GROUNDWATER SAMPLING AND ANALYSIS FOR DETECTION MONITORING

1. Groundwater Surface Elevation and Field Parameters – Groundwater sampling and analysis shall be conducted semiannually pursuant to California ELAP rulings, and include an accurate determination of the groundwater surface elevation and field parameters (temperature, electrical conductivity, turbidity) for each Monitoring Point and Background Monitoring Point (Title 27, Section 20415(e)(13)). Groundwater elevation obtained prior to purging the well and sample collection, shall be used to fulfill the semi-annual groundwater flow rate/direction analyses required under Part I.E.1.b.i. Groundwater wells shall be gauged using an electronic sounder capable of measuring depth to groundwater within 100^{th} of an inch. Following gauging, wells shall be purged according to EPA groundwater sampling procedures until:

   a. pH, temperature, and conductivity are stabilized within 10 percent, and
   b. turbidity has been reduced to 10 NTUs or the lowest practical levels achievable.

   The above identified parameters shall be recorded in the field, and submitted in the monitoring report. Sampling equipment shall be decontaminated between wells. Purge water may be discharged to the brine pond; discharge to the ground surface is prohibited.

2. Groundwater Sample Collection - Groundwater samples shall be collected from all monitoring points and background monitoring points after wells recharge to within at least 80 percent of their original static water level. Groundwater samples shall be collected with a paristaltic pump that is decontaminated between sampling events. Samples shall be labeled, logged on chain-of-custody forms, and placed in cold storage pending delivery to a State certified analytical laboratory.

3. Five-Day Sample Procurement Limitation – To satisfy data analysis requirements for a given reporting period, samples collected from all Monitoring Points and Background Monitoring Points shall be taken within a span not exceeding five (5) days, and shall be taken in a manner that insures sample independence to the greatest extent feasible (Title 27, Section 20415(e)(12)(B)).

4. Groundwater Monitoring Parameters for Detection Monitoring – Groundwater samples collected from monitoring points and background monitoring points shall be analyzed for the following:

Parameter	Unit	Sample Type
Total Dissolved Solids (TDS)	mg/L	Grab
pH	#	Grab
Specific Conductance	µohms/cm	Grab
Total Petroleum Hydrocarbon (TPH-gas & diesel)	mg/L	Grab
Heavy Metals (As, Ba, Cd, Pb, Zn)	mg/L	Grab
Oil & Grease	mg/L	Grab

All Monitoring Points and Background Monitoring Points assigned to Detection Monitoring shall be sampled semi-annually in **October** and **April** of each year in accordance with Part I of this MRP. Monitoring results shall be reported in the semi-annual Detection Monitoring Report.

5. Data Analysis – Statistical or non-statistical analysis shall be carried out as soon as the data is available, in accordance with Part III of this monitoring program.

   Monitoring Points and Background Monitoring Points – At a minimum of 90 days prior to the operation of the facility, the Discharger shall submit a proposed groundwater monitoring program, including background and detection monitoring locations, to the CPM for review and approval in consultation with Executive Officer.

6. Initial Background Determination: For the purpose of establishing an initial pool of background data for each Constituent of Concern at each Background Monitoring Point (Title 27, Section 20415(e)(6)):

   a. Whenever a new Constituent of Concern is added to the Water Quality Protection Standard, including any added by the adoption of this Board Order, the Discharger shall collect at least one (1) sample **quarterly** for at least one (1) year from each Background Monitoring Point in each monitored medium and analyze for the newly-added constituent(s); and

   b. Whenever a new Background Monitoring Point is added, including any added by this Board Order, the Discharger shall sample the new monitoring point at least

quarterly for at least one (1) year, analyzing for all Constituents of Concern and Monitoring Parameters.

7. Semiannual Determination of Groundwater Flow Rate/Direction (Title 27, Section 20415(e)(15): The Discharger shall measure the water level in each well and determine groundwater flow rate and direction in each groundwater body described in Part II.A.1. at least semiannually. This information shall be included in the semi-annual Detection Monitoring Reports required under Part I.E.1.

PART III

STATISTICAL AND NON-STATISTICAL ANALYSES

A. STATISTICAL AND NON-STATISTICAL ANALYSIS

The Discharger shall use the most appropriate of the following methods to compare the downgradient concentration of each monitored constituent or parameter with its respective background concentration to determine if there has been a release from the surface impoundment. For any given data set, proceed sequentially down the list of statistical analysis methods listed in Part III.A.1., followed by the non-statistical method in Part III.A.2., using the first method for which the data qualifies. If that analysis tentatively indicates the detection of a release, implement the retest procedure under Part III.A.3.

1. Statistical Methods. The Discharger shall use one (1) of the following statistical methods to analyze Constituents of Concern or Monitoring Parameters that exhibit concentrations exceeding their respective MDL in at least ten percent of the background samples taken during that Reporting Period. Each of these statistical methods is more fully described in the Statistical Methods discussion below. Except for pH, which uses a two-tailed approach, the statistical analysis for all constituents and parameters shall be a one-tailed (testing only for statistically significant increase relative to background) approach:

   a. One-Way Parametric Analysis of Variance (ANOVA) followed by multiple comparisons (Title 27, Section 20415(e)(8)) – This method requires at least four (4) independent samples from each Monitoring Point and Background Monitoring Point during each sampling episode. It shall be used when the background data for the parameter or constituent obtained during a given sampling period, has not more than 15% of the data below PQL. Prior to analysis, replace all 'trace' determinations with a value halfway between the PQL and the MDL values reported for that sample run, and replace all "non-detect" determinations with a value equal to half the MDL value reported for that sample run. The ANOVA shall be carried out at the 95% confidence level. Following the ANOVA, the data from each downgradient Monitoring Point shall be tested at a 99% confidence level against the pooled background data. If these multiple comparisons cause the Null Hypothesis (i.e., that there is no release) to be rejected at any Monitoring Point, the Discharger shall conclude that a release is tentatively indicated from that parameter or constituent; or

   b. One-Way Non-Parametric ANOVA (Kruskal-Wallis Test), followed by multiple comparisons – This method requires at least nine (9) independent samples from each Monitoring Point and Background Monitoring Point; therefore, the Discharger shall anticipate the need for taking more than four (4) samples per Monitoring Point, based upon past monitoring results. This method shall be used when the

pooled background data for the parameter or constituent, obtained within a given sampling period, has not more than 50% of the data below the PQL. The ANOVA shall be carried out at the 95% confidence level. Following the ANOVA, the data from each downgradient Monitoring Point shall be tested at a 99% confidence level against the pooled background data. If these multiple comparisons cause the Null Hypothesis (i.e., that there is no release) to be rejected at any Monitoring Point, the Discharger shall conclude that a release is tentatively indicated for that parameter or constituent; or

c. Method of Proportions – This method shall be used if the "combined data set" – the data from a given Monitoring Point in combination with the data from the Background Monitoring Points – has between 50% and 90% of the data below the MDL for the constituent or parameter in question. This method; (1) requires at least nine (9) downgradient data points per Monitoring Point per Reporting Period, (2) requires at least thirty data points in the combined data set, and (3) requires that $n * P > 5$ (where n is the number of data points in the combined data set and P is the proportion of the combined set that exceeds the MDL); therefore, the Discharger shall anticipate the number of samples required, based upon past monitoring results. The test shall be carried out at the 99% confidence level. If the analysis results in rejection of the Null Hypothesis (i.e., that there is no release), the Discharger shall conclude that a release is tentatively indicated for that constituent or parameter; or

d. Other Statistical Methods. – These include methods pursuant to Title 27, Section 20415(e)(8)(c-e).

2. Non-Statistical Method. The Discharger shall use the following non-statistical methods for all constituents that are not amenable to statistical analysis by virtue of having been detected in less than 10% of applicable background samples. A separate variant of this test is used for the VOC_{water} Composite Monitoring Parameters. Regardless of the test variant used, the method involves a two-step process: (1) from all constituents to which the test variant applies, compile a list of those constituents which equal or exceed their respective MDL in the downgradient sample from a given Monitoring Point, then (2) evaluate whether the listed constituents meet either of the test variant's two possible triggering conditions. For each Monitoring Point, the list described above shall be compiled based on either the data from a single sample taken during the Monitoring Period for that Monitoring Point, or (where several independent samples have been analyzed for that constituent at a given Monitoring Point) from the sample that contains the largest number of detected constituents. Background shall be represented by the data from all samples taken from the appropriate Background Monitoring Points during that Reporting Period (at least one (1) sample from each Background Monitoring Point). The method shall be implemented as follows:

a. VOC_{water} Composite Monitoring Parameter – For any given Monitoring Point, the VOC_{water} Monitoring Parameter is a composite parameter addressing all detectable

VOCs including at least all 47 VOCs listed in Appendix I to 40 CFR 258 and all unidentified peaks. The Discharger shall compile a list of each VOC which (1) exceeds its MDL in the Monitoring Point sample (an unidentified peak is compared to its presumed (MDL), and also (2) exceeds its MDL in less than ten percent of the samples taken during that Reporting Period from that medium's Background Monitoring Points. The Discharger shall conclude that a release is tentatively indicated for the VOC_{water} composite Monitoring Parameter if the list either (1) contains two or more constituents, or (2) contains one constituent that exceeds its PQL;

b. Constituents of Concern: As part of the COC monitoring required under Part 2.A.5 of this MRP, for each Monitoring Point, the Discharger shall compile a list of COCs that exceed their respective MDL at the Monitoring Point, yet do so in less than ten percent of the background samples taken during that Reporting Period. The Discharger shall conclude that a release is tentatively indicated if the list either (1) contains two or more constituents, or (2) contains one constituent that exceeds its PQL.

3. Discrete Retest – In the event that the Discharger concludes that a release has been tentatively indicated (under Parts III.A.1. or III.A.2.), the Discharger shall, within 30 days of that conclusion, collect two (2) new suites of samples for the indicated Constituent(s) of Concern or Monitoring Parameter(s) at each indicated Monitoring Point, collecting at least as many samples per suite as were used for the initial test. Re-sampling of Background Monitoring Points is optional. As soon as the retest data is available, the Discharger shall use the same statistical method or non-statistical comparison separately on each suite of retest data. For any indicated Monitoring Parameter or Constituent of Concern at an affected Monitoring Point, if the test results of either (or both) of the retest data suites confirms the original indication, the Discharger shall conclude that a release has been discovered. All retests shall be carried out only for the Monitoring Point(s) for which a release is tentatively indicated, and only for the Constituent of Concern or Monitoring Parameter that triggered the indication there, as follows:

   a. If an ANOVA method was used in the initial test, the retest shall involve only a repeat of the multiple comparison procedure, carried out separately on each of the two (2) new suites of samples taken from the indicating Monitoring Point;

   b. If the Method of Proportions statistical test was used, the retest shall consist of a full repeat of the statistical test for the indicated constituent or parameter, carried out separately on each of the two (2) new sample suites from the indicating Monitoring Point;

   c. If the non-statistical comparison was used:

i. Because the VOC Composite Monitoring parameters (VOC_{water}) each address, as a single parameter, an entire family of constituents which are likely to be present in any surface impoundment release, the scope of the laboratory analysis for each retest sample shall include all VOCs detectable in that retest sample. Therefore, a confirming retest for either parameter shall have validated the original indication even if the suite of constituents in the confirming retest sample(s) differs from that in the sample that initiated the retest;

ii. Because all Constituents of Concern that are jointly addressed in the non-statistical testing under Part III.A.2. remain as individual Constituents of Concern, the scope of the laboratory analysis for the non-statistical retest samples shall be narrowed to involve only those constituents detected in the sample which initiated the retest.

SUMMARY OF SELF-MONITORING AND REPORTING REQUIREMENTS

A. GROUNDWATER MONITORING

1. Groundwater monitoring wells shall be sampled/analyzed semi-annually for the following parameters/constituents:

Parameters & Constituent	Unit	Type of Sample	Reporting Frequency
a. Total Dissolved Solids (TDS)	mg/L	grab	semiannual
b. PH	#	field measurement	semiannual
c. Specific Conductance	µohms/cm	field measurement	semiannual
d. Total Petroleum Hydrocarbons (TPH-Gas & Diesel)	mg/L	grab	semiannual
e. Heavy Metals (As, Ba, Cd, Pb, Zn)	mg/L	grab	semiannual
f. Oil & Grease	mg/L	grab	semiannual

2. The collection, preservation, and holding times of all samples shall be in accordance with the U.S. Environmental Protection Agency approved procedures. All analyses shall be conducted by a laboratory certified by the California Department of Public Health to perform the required analyses.

B. SURFACE IMPOUNDMENT: Leakage Detection System (LDS), and Solids Monitoring

	Unit	Observation or Sampling Frequency	Reporting Frequency
1. Estimated volume of solid/liquid in holding pond	ft^3	Monthly	semiannual
2. Measurement of freeboard	ft	Monthly	semiannual
3. Volume of solids removed and shipped to off site waste management facility	tons	Monthly	semiannual

C. INJECTION WELL MONITORING

	Unit	Observation or Sampling Frequency	Reporting Frequency
1. Volume of fluid injected into each well		Monthly	semiannual
2. Grab sample from main injection header analyzed for the following:			
a. Total Dissolved Solids (TDS)	mg/L	semiannual	semiannual
b. pH	#	semiannual	semiannual

D. MONITORING REORTS AND OBSERVATION SCHEDULE

"Reporting Period" means the duration separating the submittal of a given type of monitoring report from the time the next iteration of that report is scheduled for submittal. An annual report, which is a summary of all the monitoring during the previous year, shall also be submitted to the CPM, with copies to the Regional Water Board. The submittal dates for Detection Monitoring Reports and the Annual Summary Report are as follows:

1. Detection Monitoring Reports

a. 1st Semiannual Report (January 1 through June 30) – report due by **August 1**

b. 2nd Semiannual Report (July 1 through December 31) – report due by **March 1**

2. Annual Summary Report

January 1 through December 31 – report due **March 15** of the following year.

3. The Detection Monitoring Reports and the Annual Summary Report shall include the following:

   a. The Discharger shall arrange the data in tabular form so that the specified information is readily discernible. The data shall be summarized in such a manner as to clearly illustrate whether the facility is operating in compliance with WDRs.

   b. Records of monitoring information shall include:

      i. The date, exact place, and time of sampling or measurement;
      ii. The individual performing the sampling or measurement;
      iii. The date the analysis was performed;
      iv. The initials of the individual performing the analysis;

v. The analytical technique or method used; and
vi. The result of the analysis.

c. Each report shall contain the following statement:

"I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations."

d. A duly authorized representative of the Discharger may sign the documents if:

i. Authorization is made in writing by the person described in Part I.E.1.a;

ii. Authorization specifies an individual or person having responsibility for the overall operation of the regulated disposal system; and

iii. Written authorization is submitted to the Regional Water Board Executive Officer.

iv. Monitoring reports shall be certified under penalty of perjury to be true and correct, and shall contain the required information at the frequency designated in this monitoring report.

Ordered by: _____
ROBERT PERDUE
Executive Officer

September 15, 2011
Date