

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

ORDER R7-2013-0059

WASTE DISCHARGE REQUIREMENTS  
FOR  
HUDSON RANCH POWER I LLC, OWNER  
HUDSON RANCH ENERGY SERVICES LLC, OPERATOR  
HUDSON RANCH I GEOTHERMAL DEVELOPMENT PROJECT  
JOHN L. FEATHERSTONE GEOTHERMAL POWER PLANT  
Salton Sea Known Geothermal Resource Area (KGRA) - Imperial County

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

1. Hudson Ranch Power I LLC owns the 49.9 Mega Watt (MW) power plant known as the John L. Featherstone Geothermal Power Plant and its accompanying geothermal well field. The well field and power plant (Project) are located on land also owned by Hudson Ranch Power I, LLC within the KGRA, is approximately three miles southwest of the town of Niland. The address of the power plant is 409 McDonald Road, Calipatria 92233.
2. The Project is operated by Hudson Ranch Energy Services LLC, located at 321 South Waterman Ave, Suite 200, El Centro, CA 92243.
3. Geothermal wells have been drilled at various locations on the project property to provide geothermal brine to operate the plant. Mud sumps associated with these wells were regulated under separate Waste Discharge Requirements (WDRs). After completion of the wells, the mud sumps were abandoned and the mud sump WDR's for these wells were rescinded on May 16, 2013.
4. This Regional Water Board Order regulates the Project's emergency brine pond. The emergency brine pond is designated a Class II Surface Impoundment Waste Management Unit (WMU) and must meet the requirements of the California Code of Regulations (CCRs), Title 27, section 20200 et seq. The boundaries of the Hudson Ranch I Geothermal Project, the John L. Featherstone Geothermal Power Plant and the emergency brine pond are shown on Attachments A and B, which are incorporated herein and made a part of this Order by reference.
5. Located on a portion of the facility is a research and demonstration facility for the separation and recovery of lithium from geothermal brine. Simbol, Inc. owns and operates the Research and Demonstration Facility (R&D Facility). The R&D Facility is located approximately 300 feet east of the brine pond and is shown on Attachment B, which is incorporated herein and made a part of this Order by reference.
6. Hudson Ranch Power I, LLC submitted a Report of Waste Discharge dated November 30, 2012 for review and update of Order R7-2008-0063 for the Project.
7. Definition of terms used in this Order:

**Project** - The entire parcel of property where the Hudson Ranch I Geothermal Project and Simbol R&D Facility or related geothermal industrial activities are conducted.

**Facility** The John L. Featherstone Power Plant industrial operation and associated Simbol R&D Facility.

**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 Regional Water Board Order mean Hudson Ranch Power I, LLC and Hudson Ranch Energy Services LLC.

## 8. Regional Water Board Orders

The Project is currently regulated under Order R7-2008-0063 which is being revised to reflect changes in Facility operation, administrative modifications and the addition of the Simbol, Inc. R&D Facility.

## 9. Power Plant Site

All the Project development facilities, with the exception of the production and residual brine injection wells and pipelines, are located within an approximately 40-acre power plant site bounded on the north by McDonald Road, on the east by inactive duck ponds, and on the west and south by barren land.

The power plant site is located in the north half of the northwest quarter of Section 24, Township 11 South, Range 13 East; San Bernardino Base and Meridian (Imperial County Assessor Parcel Number 020-010-044). Most of the Brine Processing Facility (BPF) and all of the Turbine-Generator Facility (TGF) are located within the power plant site.

## 10. Brine Processing Facility

The BPF includes the geothermal production wells, brine and steam handling facilities, solids handling system, a brine pond, a fresh water pond and the injection wells. Geothermal fluid produced from the production wells is delivered to the power plant site through above ground pipelines to the brine and steam handling facilities. The geothermal fluid is flashed in the steam handling facilities (flash tanks, vent tanks and associated facilities) at successively lower pressures to produce high pressure (HP), standard pressure (SP), and low pressure (LP) steam that is delivered to the TGF. Chemically stabilized brine flows from the BPF into the solids handling system (clarifiers, thickener and associated facilities) where solids are removed. Two booster and two main injection pumps are used when necessary to pump the spent brine from the secondary clarifier of the BPF to the injection wells via the above ground brine injection pipelines for subsurface injection.

## 11. Fluid Storage Basins

Three fluid storage basins have been constructed on the power plant site. These include the service water pond, the storm water retention basin, and the brine pond. The following are descriptions of these fluid storage basins and the fluids that may be discharged into or stored in the basins.

- a. **Service Water Pond:** The source of external freshwater for the facility is canal water made available under a supply contract with Imperial Irrigation District (IID). Water is obtained from either the "O" lateral at existing gate 32, located east of the power plant site, with a backup connection to the "N" lateral, located south of the power plant site. Water is transferred to the power plant site via pipeline to a service water storage basin on the power plant site. The water is used for dilution of geothermal brine, solids dewatering system, steam wash water, purged water for pump seals and the potable water system and, at times, cooling water makeup. The Project is designed to minimize reliance on external sources of water supply for process needs as well by using geothermal steam condensate to the greatest extent practical. Canal water also serves as the source of water for maintenance purposes and water for the fire protection system.

The potable water system – consisting of a pre-treatment filter to remove suspended and colloidal particles, followed by direct treatment, is used to treat canal water and provide a supply of drinking water, wash basin water, eyewash equipment water, water for showers and toilets in crew change quarters, and sink water in the laboratory. Backwash from the pre-treatment filter, consisting of solids and water from the IID canal system, is discharged either back into the service water pond or to the storm water retention basin.

- b. **Storm Water Retention Basin:** The Project site is fairly level. The drainage design in general flows from the northwest corner to the southeast corner of the power plant site toward the drainage retention pond. Within the power plant site, buildings and equipment are constructed on foundations with the overall site grading scheme designed to route surface water around and away from all equipment and buildings. The power plant site is graded to direct surface water runoff toward an earthen retention pond. Storm water flows are directed to the retention pond via ditches, swales, and culverts. The storm water drainage system is sized to accommodate 3 inches of precipitation in a 24-hour period (100-year storm event) and to comply with applicable local codes and standards. Backwash from the potable water system pre-treatment filter, consisting of solids and water from the IID canal system, is also discharged to the storm water retention basin. Water accumulated in the storm water retention pond is allowed to evaporate or seep into the ground, or is pumped into the aerated brine injection well.

Spill containment areas and sumps subject to spills of immiscible chemicals are drained to an enclosed oil/water separator and collected in a waste oil tank for offsite recycling. Clean water from the oil/water separator is injected into the aerated brine injection well. Brine handling equipment will be contained in curbed concrete aprons, with drainage directed to the plant thickeners and subsequently to the aerated brine injection well or the main brine injection system. Buildings and equipment are constructed in a manner that provides protection from a 100-year storm. The plant site is surrounded by a berm to prevent inundation from flooding of the power plant site during a 100-year flood event.

- c. **Brine Pond:** A brine pond has been constructed within the power plant site. The brine pond serves multiple purposes. During upset conditions, brine that overflows from the clarifiers and the thickener, and condensate from the steam vent tanks, is directed to this pond for temporary containment, after which this liquid is processed through the thickener and delivered to the main injection pumps or pumped to the aerated brine injection well for subsurface injection.

Reject water from the potable water treatment system may also be directed to the aerated plant injection well or the brine pond. Water from hydroblasting pipe and other equipment to remove geothermal scale and other impurities is also discharged into the brine pond. The brine pond is also used to collect brine from the production wells when they are flow-tested after drilling and from the production wells when brine is initially introduced into the facility during startup. These liquids are removed from the brine pond and pumped to a thickener and then discharged into the injection wells.

The brine pond will receive the return Project geothermal brine that has been diverted through the R&D Facility for the separation and recovery of valuable content elements such as lithium. The R&D Facility receives and processes approximately six to ten gallons per minute of geothermal brine from the Project for the purposes of testing Simbol's process engineering and design for the extraction of minerals from the Project geothermal fluid and for producing samples for market evaluation. The processed geothermal brine generated at the R&D Facility is essentially the same as the Project brine discharged to the brine pond except that it may be depleted in silica, iron, lithium, zinc and manganese. Similar to the Project, small quantities of scale inhibitors, flocculants, potable water, salt (sodium chloride), calcium hydroxide, soda ash (sodium carbonate), hydrochloric acid and sodium hydroxide may also be added to the brine pond. A flow diagram showing the processing sequence of the treated brine is shown on Attachment C, which is incorporated herein and made a part of this Order by reference.

This brine is pumped from the brine pond and either discharged to a thickener and then injected into an injection well, or discharged into the aerated brine well. The brine pond was constructed to meet Class II surface impoundment design requirements (Title 27, CCR, § 20200 et seq.). The engineered brine pond is a double-lined basin sized to accommodate up to three hours of brine that could be released during system upset conditions plus 2 feet of freeboard. The brine pond surface is lined with a six-inch fiber reinforced concrete liner and a 60-mil HDPE primary liner separated by a 6-inch cushion of sand. The HDPE primary liner is underlain with a 12-oz. nonwoven geotextile fabric (Geonet Geocomposite) under which a secondary 60-mil HDPE liner is located on top of a compacted subgrade.

## **12. Development Wells:**

The Project currently operates three geothermal production wells and three geothermal brine injection wells to support the Project. Two production wells (13-1 and 13-3) are drilled at the 3.4-acre Well Site 1 and one production well (13-2) is drilled at the 2.3-acre Well Site 3. Three geothermal injection wells (IW-1, IW-2 and IW-3) are drilled at the 2.75-acre Well Site 2. One additional injection well (IW-4) has been drilled from Well Site 1 for the injection of aerated brines. All production and injection wells are operated in accordance with California Division of Oil, Gas and Geothermal Resources (CDOGGR) regulations.

## **13. Well Site Production and Injection Equipment:**

Production wellheads are approximately fifteen feet above the ground surface. The wellheads consist of control valves, redundant isolation valves and bracing struts.

No auxiliary equipment or motor control buildings are required at the Site 3 injection well site. Instead, injection pumps located at the power plant site pump the geothermal injection fluid through the injection pipeline system, providing sufficient pressure to inject the polished geothermal brine and aerated geothermal brine back into the geothermal reservoir.

#### 14. Geothermal Pipeline Systems:

Above ground pipelines have been constructed to interconnect the production and injection wells with the power plant site facilities.

The production wellheads are all located north of McDonald Road and across the road from the power plant site. A pipeline crossing over the IID "O" drain and beneath McDonald Road interconnects the production wells with the brine and steam handling facilities. The production pipelines are constructed from alloy or alloy-lined pipe designed, constructed, tested and inspected pursuant to current industry standards for high temperature, high pressure piping. The diameter of the pipe varies depending on the type and amount of geothermal fluid to be conveyed. Covered with about two inches of insulation and a protective metal sheath (appropriately colored to blend with the area), the overall outside diameter of the finished pipe ranges from 12 to 30 inches. The pipelines are constructed near ground level (averaging about one foot off the ground) on pipeline supports installed approximately every 20 to 40 feet along the pipeline routes.

The average chemistry of the geothermal production fluid is provided in Table 1.

**Table 1**

<b>Hudson Ranch I Project Produced Geothermal Brine Composition</b>			
<b>Brine Components</b>	<b>Maximum (mg/kg)</b>	<b>Minimum (mg/kg)</b>	<b>Average (mg/kg)</b>
Na	57,100	55,450	56,275
K	18,312	17,700	18,006
Ca	32,600	26,955	29,778
Mg	49	36	43
Li	234	221	228
Sr	508	124	316
Ba	201	132	167
<b>Metals:</b>			
Fe	1,472	1,350	1,411
Mn	1,729	1,670	1,700
Zn	521	453	487
Pb	115	100	108
As	16.2	7.8	12
Cu	1	0.8	0.9
<b>Complexes:</b>			
SiO <sub>2</sub>	499	374	437
B	602	524	563
<b>Anions:</b>			
Cl	176,000	154,884	165,442
F	13.2	1.1	7.2
<b>TDS</b>	<b>298,000</b>	<b>259,280</b>	<b>278,640</b>

The brine injection pipeline is a combination of alloy pipeline and cement-lined carbon steel pipeline. Each injection well is remotely monitored for pressure, temperature, and flow rate.

### 15. Turbine Generator Facility (TGF)

The TGF includes a 49.9 MW (net) condensing turbine/generator set, a gas removal and emission abatement system, and a heat rejection system (i.e., condenser and cooling tower). Common facilities within the TGF area include a control building, warehouse, a service water pond, and other ancillary facilities. The TGF also includes a 230 kV switchyard and several power distribution centers.

The turbine generator system consists of a condensing turbine generator set with three steam entry pressures (HP, SP and LP). The turbine is directly coupled to a totally enclosed water and air-cooled (TEWAC) synchronous-type generator. The turbine-generator unit is fully equipped with all the necessary auxiliary systems for turbine control and speed protection, lubricating oil, gland sealing, generator excitation, and cooling.

Two 2,500 kW diesel generators provide “black start” capability and site power when the steam turbine generator is shutdown. An 800 kW emergency generator provides emergency backup electrical power for plant control, and a 360 kW diesel engine provides emergency power to the emergency fire water pump. The diesel engines meet California Air Resources Board (CARB) source emission limits.

### 16. Heat Rejection and Non-Condensable Gas Removal Systems

The heat rejection system is comprised of a shell-and-tube condenser, a counter flow cooling tower, and a non-condensable gas (NCG) removal system. Steam from the turbine is condensed in the condenser. Condensate from the condenser is mixed with the cooling water, and both are transferred to the cooling tower, cooled and returned to the condenser. Gases that accumulate in the condenser are evacuated by the NCG removal system. These NCGs are pressurized and vented to the hydrogen sulfide (H<sub>2</sub>S) abatement system. The composition of the NCG is summarized in Table 2.

**Table 2**

<b>Hudson Ranch I Project Geothermal Gases in Produced Brine</b>	
Noncondensable Gases	Nominal Concentrations
	(ppmw)
Carbon Dioxide (CO <sub>2</sub> )	1,532.00
Hydrogen Sulfide (H <sub>2</sub> S)	13.00
Ammonia (NH <sub>3</sub> )	47.00
Methane (CH <sub>4</sub> )	1.90
Nitrogen (N <sub>2</sub> )	4.70
Hydrogen (H <sub>2</sub> )	0.13
Argon (Ar)	0.02
Benzene (C <sub>6</sub> H <sub>6</sub> )	0.04
Total	1,598.79

The H<sub>2</sub>S abatement system used to control the emission of the H<sub>2</sub>S in the vent gases is a Biox process. The Biox system consists of an oxidizing biocide in contact with the cooling tower circulating water which converts dissolved hydrogen sulfide to water-soluble sulfates. Biocide assisted oxidation also prevents secondary emissions of hydrogen sulfide from cooling towers that utilize steam condensate containing dissolved H<sub>2</sub>S for makeup water. The Biox system removes at least 95 percent of the H<sub>2</sub>S in the non-condensable gases and at least 98 percent of the H<sub>2</sub>S in the portion of the condensate used as cooling tower makeup water. When all of the condensate is used (during the high temperature summer months), H<sub>2</sub>S emissions from both sources total less than 3.5 pounds per hour. Benzene emissions are less than 0.5 pounds per hour.

During normal operating conditions, the plant generates less than 1 lb/hr of particulates as aerosols from the cooling tower. Particulate emissions from the cooling tower are minimized by maintaining a low total dissolved solids (TDS) concentration in the circulating water and by controlling cooling tower drift losses to not more than 0.0006 percent of the total circulation rate using high efficiency drift eliminators. Blowdown from the cooling tower is injected into the dedicated aerated brine injection well.

During plant start-up, a plant trip or load rejection, steam to the turbine is diverted to a rock muffler for venting to the atmosphere. During these events, H<sub>2</sub>S and other NCG will be released to the atmosphere.

A combination of best available control technology, management practices, and process monitoring equipment are used to minimize the air emissions from the power plant facilities. Permits to operate the facility have been obtained from the Imperial County Air Pollution Control District (ICAPCD).

## **17. Water Supply Source and Requirements**

The Project requires up to 1,200 acre-feet per year (afy) of additional (non-condensate) water when operating at full plant load.

The source of external freshwater for the facility is canal water made available under a supply contract with the IID. Water is obtained from the "O" lateral at existing gate 32, located east of the power plant site, with a backup connection to the "N" lateral, located south of the power plant site. Water is transferred to the power plant site via pipeline to a water storage basin on the power plant site. The water is used for dilution of geothermal brine, solids dewatering system, steam wash water, purged water for pump seals, the potable water system and, at times, cooling water makeup. The Project is designed to minimize reliance on external sources of water supply for process needs as well by using condensed steam from the geothermal steam condensate to the greatest extent practical. Canal water also serves as the source of water for maintenance purposes and firewater for the fire protection system.

The potable water system is used to treat canal water and provide a supply of drinking water, wash basin water, eyewash equipment water, water for showers and toilets in crew change quarters, and sink water in the sample laboratory.

## **18. Spent Fluid and Wastewater Handling**

Spent brine from the secondary clarifiers is injected directly into the primary injection wells to replenish the geothermal resource. Chemical characteristics of the processed brine are

summarized in Table 3. Brine which is directed to the brine pond (from the relief tanks, clarifiers or thickener during a plant upset or startup; condensate from the steam vent tanks; reject water from the potable water system; flow tests of the production wells; and from the R&D Facility is subsequently either processed through the thickener and delivered to the main injection wells or injected into the aerated brine injection well. The aerated brine injection well would also receive liquids from the filter press, liquids from the diked areas around the plant equipment, reject water from the potable water plant, treated sanitary waste water and cooling tower blowdown, although at times some of these fluids may be processed through the thickener and pumped into the main injection system. All subsurface fluid injection conforms to California Division of Oil, Gas and Geothermal Resources requirements.

**Table 3**

<b>Hudson Ranch I Project Post-Secondary Clarifier Geothermal Brine Composition</b>			
<b>Brine Components</b>	<b>Maximum (mg/kg)</b>	<b>Minimum (mg/kg)</b>	<b>Average (mg/kg)</b>
Na	70,600	55,810	64,616
K	22,950	16,880	20,064
Ca	36,960	29,800	34,428
Mg	79.8	48.5	62.9
Li	328	211	260
Sr	752	463	538
Ba	246	194	213
<b>Metals:</b>			
Fe	1,770	1,400	1,589
Mn	1,870	1,550	1,687
Zn	681	558	610
Pb	168.0	48.2	133.1
As	23.9	6.6	16.0
Cu	37.2	0.9	6.8
<b>Complexes:</b>			
SiO <sub>2</sub>	329	138	165
B	N/A	N/A	N/A
<b>Anions:</b>			
Cl	189,610	154,430	175,466
F	41.8	35.0	38.5
<b>TDS</b>	<b>324,000</b>	<b>283,000</b>	<b>299,055</b>
pH @ 25 C	5.08	4.82	4.94

To keep the dissolved solids concentration of the circulating water in the cooling towers at acceptable levels, a small stream of circulating water will be blown down from the cooling tower and injected into the aerated brine injection well.

The sanitary drains discharge to a sanitary waste holding tank which initially digests the sewer effluent. Any sludge retained in the holding tank is pumped out of the tank by licensed contractors as needed and transported to a sanitary water treatment plant. Liquid waste is pumped to an on-site waste water treatment system and, following tertiary treatment, is used as cooling tower makeup water or injected into the aerated brine injection well.



Rain and storm water drainage is collected in the storm water retention pond on the southeast corner of the facility site. The retention pond is designed to hold the drainage from a 24-hour, 100-year storm event. Water accumulated in the storm water retention pond will be allowed to evaporate, seep into the ground, or be pumped into the aerated brine injection well.

## 19. Solid Wastes

The construction and operation of the facility will generate both non-hazardous and hazardous wastes (see Table 4).

**Table 4**

Waste Stream	Typical Waste Classification	Handling
<b>Representative Drilling and Construction Waste Streams:</b>		
Scrap wood, steel, glass, plastic, paper, calcium silicate insulation, mineral wood insulation	Nonhazardous	Waste disposal facility
Empty hazardous material containers - drums	Recyclable Hazardous	Recondition or recycle
Used and waste oil	Recyclable Hazardous	Recycle
Oil absorbent materials	Nonhazardous	Waste disposal facility or laundry
Oily rags	Nonhazardous	Waste disposal facility or laundry
Spent batteries; lead acid	Hazardous Recyclable	Recycle
Spent batteries; alkaline type	Hazardous	Waste disposal facility
Sanitary Waste-Portable Chemical Toilets and Construction Office Holding Tanks	Sanitary	Pumped by licensed contractors and transported to sanitary water treatment plant
Drilling Waste Cuttings and Mud	Nonhazardous	Waste disposal facility
<b>Representative Power Plant Operating Waste Streams:</b>		
Filter-cake of brine solids from dewatering process	Non-hazardous <sup>1</sup>	Recycle for beneficial use or waste disposal facility
Used hydraulic fluids, oils, grease, oily filters	Recyclable Hazardous	Recycle
Spent batteries; lead acid	Recyclable Hazardous	Recycle
Laboratory Waste	Hazardous <sup>1</sup>	Waste disposal facility
Used oil from oil/water separator	Recyclable Hazardous	Recycle
Oily rags	Non-hazardous	Laundry
Cooling Tower Blowdown	Non-hazardous	Aerated brine injection well
Clarifier Effluent	Non-hazardous	Aerated brine injection well
Brine Pond	Non-hazardous	Aerated brine injection well
Brine Pond Solids	Hazardous <sup>1</sup>	Waste disposal facility
Scale and Cleaning Solvents	Hazardous <sup>1</sup>	Waste disposal facility
<sup>1</sup> Waste will be sampled and characterized before being transported to an offsite waste disposal facility authorized to accept the wastes		

## 20. Non-Hazardous Wastes

The primary source of solid waste is the precipitated solids from the geothermal resource fluid. After leaving the steam separators, the geothermal resource fluid is treated through clarifiers where some of the silica, iron, and manganese contained in the brine is removed.

Following this separation process, the solids slurry discharging from the bottom of the clarifiers is directed to a belt filter system. Approximately 25 tons per day of solids is removed by the belt filter system. On average it is expected that 95 percent of the filter cake will be characterized as non-hazardous. Liquids from the belt filter system are routed to a thickener for additional solids removal. Slurry discharged from the thickener is discharged back to the filtration system. Overflow from the thickener, substantially free of suspended solids, is routed to the main injection system. The filter cake from the belt filter system may be further dried in an air drying process using air heated by atmospheric steam from the dilution water heater.

Under normal operations, the filter cake is recycled for beneficial use. The Project has approached several end users, including cement kiln operators, IID and Imperial County Public Works. Before any filter cake material is removed from the plant site, it is sampled and laboratory tested. If not recycled for beneficial use, it is delivered to a landfill authorized to accept the waste for proper disposal.

Office waste and general refuse is removed by a local sanitation service.

## **21. Abandonment**

The projected life of the Project is a nominal 30 years. At the end of the useful life of the Project, equipment and facilities will be properly abandoned.

The geothermal wells will be abandoned in conformance with the well abandonment requirements of the California Division of Oil Gas and Geothermal Resources (CDOGGR). Abandonment of a geothermal well involves plugging the well bore with clean drilling mud and cement sufficient to ensure that fluids would not move across into different aquifers. The well head (and any other equipment) would be removed, the casing cut off at least six feet below ground surface, and the well site reclaimed.

At the end of power plant operations, the Project will prepare and implement a Site Abandonment Plan in conformance with Imperial County and CDOGGR requirements. The Plan would describe the proposed equipment dismantling and site restoration program in conformance with the wishes of the respective landowners/lessors and requirements in effect at the time of abandonment. Typically, above-ground equipment would be dismantled and removed from the site. Some below ground facilities may be abandoned in place. The surface of the site will then be restored to conform to approximate pre-Project land uses.

## **22. Surface Water Resources**

The three principal surface water bodies at the north end of the Imperial Valley are the Salton Sea, the Alamo River and the New River. The Project power plant site is located approximately 0.75 miles from the edge of the Salton Sea coastline. The nearest section of the Alamo River to the power plant site is approximately 0.63 miles southwest. This section of the Alamo River flows to the northwest through a levee system and empties into the Salton Sea about 2.45 miles west of the power plant site. The nearest sections of the New River are about 8 miles south of the power plant site.

The Salton Sea water surface elevation was measured by the USGS, as of September, 2012 to be 232 feet below mean sea level (USGS 2012). Flow into the Salton Sea is primarily irrigation drainage water via surface water flows and ground water percolation. Storm water runoff also contributes to the Salton Sea during the rainy season. The level of

the Salton Sea rises during periods of peak irrigation water usage, but overall the level of the Salton Sea is decreasing, in part as a result diminished irrigation inflow stemming from the Colorado River Quantification Settlement Agreement.

The Alamo and New Rivers are both perennial rivers with headwaters in Mexico. Both the Alamo and New Rivers convey predominantly agricultural irrigation drainage and some treated wastewaters. The New River also receives a considerable portion of untreated wastewater flows from Mexicali, Mexico.

Irrigation water for the portion of the Imperial Valley near the Project area is imported from the Colorado River through the All American Canal and the East Highline Canal. A series of Imperial Irrigation District (IID) irrigation laterals (canals) and drains flow from east to west in the Project vicinity to the Salton Sea. The "O" Lateral terminates near the northeast corner of the power plant site and is the primary source of service water for power plant operations. McDonald Road is aligned east-west immediately north of the "O" Lateral, and the "O" Drain is immediately north of and parallel to McDonald Road. The "O" Lateral empties into the "O" Drain just north of the power plant site across McDonald Road. The "N" Drain lies about one-quarter mile south and down-gradient of the proposed project facilities. The east-west "N" Drain is located immediately north and parallel to Schrimpf Road. Schrimpf Road is immediately north of the "N" Lateral. The "N" Lateral empties into the "N" Drain west of Davis Road, and the "N" Drain empties into the Alamo River about 0.85 miles west of Davis Road. The Alamo River flows west into the Salton Sea. All of the IID drains in the vicinity of the Project area drain toward and into the Salton Sea.

FEMA flood hazard maps show that the 100-year flood zone (Zone A) overlaps the southwestern corner of the power plant site. However, as discussed above, the Salton Sea has been receding in recent years and is projected to continue receding; thereby further diminishing the small potential for a flood event in the Project area. A Floodplain Development Permit for the Project has been obtained from the Imperial County Floodplain Administrator in conformance with FEMA and County requirements, and a four-foot berm has been constructed around the western and southern boundaries of the power plant site. The remaining portions of the power plant site (including the subject brine pond) and Project area are within a FEMA Zone C flood hazard area with minimal potential for flooding.

### **23. Ground Water Resources**

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

- d. 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.
- e. 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).
- f. 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 now that the eastern section of the canal is lined.
- g. 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.
- h. 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).
- i. Hely et al. (1966) estimated the groundwater discharge to the Salton Sea to be less than 2,000 acre-feet a year and IID and Reclamation (2002a) have 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 using 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.
- j. 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).

- k. 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).
- l. 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.
- m. 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 than 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.
- n. 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 and into the Salton Sea.
- o. Samples analyzed from the brine pond monitoring wells confirm that the shallow groundwater is high in total dissolved solids (40,000 to 84,000 mg/L).
- p. The shallow groundwater gradient beneath the Project area appears to mimic that of the overlying surface topography, and is reported to generally flow toward the axis of the Imperial Valley, and then northward to the Salton Sea (Westec 1981). At depths of between 100 and 200 feet, the average groundwater gradient has been estimated at about 28 feet per mile toward the northeast near Niland and about 9 feet per mile toward the southeast near Calipatria. The main source of ground water recharge in both of these areas is suspected to be seepage from the East Highline and Coachella Canals. Historical records of water wells completed at relatively shallow depths of about 100 to 150 feet are reported to indicate an upward vertical movement of groundwater near the Salton Sea (Westec 1981). This condition is consistent with discharge of groundwater from these depths toward the Salton Sea. Groundwater discharge from the Imperial Valley into the Salton Sea has been estimated to be about 1,000 afy.
- q. 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.

- r. No specific Design Storm requirements apply to the Brine Pond Class II Surface Impoundment. However, the Brine Pond has been constructed with a flood berm around the pond up to the -218-foot elevation.
- s. Geothermal fluids in this portion of the Salton Sea KGRA contain approximately 25% (by weight) dissolved 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 design and construction is adequate for the geothermal fluids and related materials discharged into it, considering the toxicity, persistence, degradability, solubility, and other biological, chemical and physical properties of the wastes.

24. The Water Quality Control Plan for the Colorado River Basin Region of California (Basin Plan) was adopted on November 17, 1993, and amended on November 16, 2012, designates the beneficial uses of ground and surface water in this Region.

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

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

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)

25. It is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking and sanitary purposes. This order promotes that policy by requiring discharges to meet maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.
26. The facility is located in a desert environment, in the northern portion of Imperial Valley. The desert climate is characterized by hot summers and mild winters. Normal annual precipitation in the area is 2.5 to 3.0 inches and normal annual surface evaporation is approximately 100 inches.
27. Monitoring Parameters: Based on the chemical characteristics of the discharges to the brine pond from the flashed Salton Sea geothermal brine and potential clarifier overflow discharge, the following list of monitoring parameters are being used. 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, Calcium, Magnesium, Manganese, Iron, Lead, Potassium, Sodium, Strontium, and Zinc;
- Anions:** Ammonium, Bicarbonates, Chloride and Sulfate; and
- Other:** Total Dissolved Solids, Specific Conductivity, and pH.
28. In accordance with Section 15301, Chapter 3, Title 14 of the CCRs, the issuance of these WDRs, which govern the operation of an existing facility involving negligible or no expansion of use beyond that previously existing, is exempt from the provisions of the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 *et. seq.*)
29. There are no domestic wells within 500 feet of the facility or well field described in Findings 1 through 4 above.
30. Federal regulations for storm water discharges were promulgated by the U.S. Environmental Protection Agency (40 CFR Parts 122, 123, and 124). These regulations 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. Per the February 23, 1993 State Water Resources Control Board memorandum, Geothermal Power Plants are excluded from the regulations pertaining to industrial storm water pollution.
31. The State Water Resources Control Board adopted Order 97-03-DWQ (General Permit 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 the Permit. Per the February 23, 1993 State Water Resources Control Board memorandum, Geothermal Power Plants are excluded from the regulations pertaining to industrial storm water pollution.

32. The monitoring and reporting requirements in Monitoring and Reporting Program R7-2013-0059, and the requirement to monitor the installed groundwater monitoring wells, are necessary to determine compliance with these WDRs, and to determine the facility's impacts, if any, on receiving water.
33. The Regional Water 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.
34. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, that Order R7-2008-0063 is rescinded upon the effective date of this Order except for enforcement purposes and in order to meet the provision contained in Division 7 of the CWC and regulations adopted thereunder, the Discharger shall comply with the following:

A. Specifications

1. The treatment or disposal of wastes at this facility shall not cause a condition of pollution or nuisance, as defined in Sections 13050 (l) and (m), respectively, of Division 7 of the CWC.
2. The Discharger will maintain the onsite groundwater monitoring wells in good working order at all times. Well maintenance may include periodic well re-development to remove sediments.
3. Thirty days prior to introduction of a new waste stream into the brine pond, the Discharger must receive approval from the Regional Water Board's Executive Officer.
4. Waste material shall be confined or discharged to the brine pond.
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, the Regional Water Board's Executive Officer of the proposed change.
6. Containment of waste shall be limited to the areas designated for such activities. Any revision or modification of the designated waste containment areas, 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 Regional Water Board's Executive Officer for review and approval before the proposed change in operations or modification of the designated areas is implemented.
7. 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 Regional Water Board's Executive Officer for review and approval.
8. If any portion of the brine pond is to be closed, the Discharger shall notify the Regional Water Board's Executive Officer at least 180 days prior to beginning any partial or final closure activities.



9. Fluids and/or materials discharged to and/or contained in the brine pond shall not overflow the pond.
10. 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 Regional Water Board's Executive Officer in writing.
11. For the liquids in the brine pond, a minimum freeboard of two (2) feet shall be maintained at all times.
12. 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.
13. Final disposal of residual waste from cleanup of the brine pond shall be accomplished to the satisfaction of the Regional Water Board's Executive Officer upon abandonment or closure of operations.
14. The brine pond shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods having a predicted frequency of once in 100 years.
15. Geothermal well clean out fluid, test and production fluid, production and injection well startups and cleanouts shall be discharged in metal tanks, the brine pond, or containers approved by the Regional Water 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.
16. 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. This includes soil sampling to determine the condition of soil beneath the mud sump and backfilling of the mud sump.
17. 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.
18. 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.
19. 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.
20. Public contact with wastes containing geothermal fluids shall be precluded through such means as fences, signs, or other acceptable alternatives.
21. The brine pond shall be managed and maintained to ensure its 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 pond in a manner that minimizes the likelihood of damage to the liner.
22. Ninety days prior to the cessation of discharge operations at the facility, the Discharger shall submit a workplan, subject to approval of the Regional Water 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 and twenty days following workplan approval, the Discharger shall submit a technical report presenting results of the contamination assessment. A California Registered Civil Engineer or Certified Engineering Geologist must prepare the workplan, contamination assessment, and engineering report.
23. 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.
24. In accordance with the financial assurance requirements prescribed in Title 27 CCR, the Discharger shall maintain an irrevocable bond for closure in an amount acceptable to the Regional Water 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.
25. Surface drainage from tributary areas or subsurface sources shall not contact or percolate through the waste discharged at this site.
26. The Discharger shall use the constituents listed in Monitoring and Reporting Program R7-2013-0059 and revisions thereto, as "Monitoring Parameters".
27. The Discharger shall implement the attached Monitoring and Reporting Program R7-2013-0059 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 (caused by) discharges of waste to the brine pond.
28. The Discharger shall follow the Water Quality Protection Standard (WQPS) for detection monitoring established by the Regional Water Board. The following are parts of WQPS as established by the Regional Water 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 Program R7-2013-0059 and revisions thereto.
  - b. Concentration Limits – The concentration limit for each monitoring parameter and constituent 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 Region Water Board's Executive Officer.
29. Water used for the process and site maintenance shall be limited to the amount necessary in the process, for dust control, and for plant cleanup and maintenance.
  30. 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.
  31. The Discharger must implement and maintain a Hazardous Materials Business Plan (HMBP), which will include, at a minimum, procedures for:
    - Hazardous materials handling, use, and storage;
    - Emergency response;
    - Spill control and prevention;
    - Employee training; and
    - Reporting and record keeping.
  32. Hazardous materials expected to be used during any new 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.
  33. 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 LORS, including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping.
  34. During power plant operations, chemicals are to be stored in chemical storage facilities appropriately designed for their individual characteristics. Bulk chemicals stored outdoors are on impervious surfaces in aboveground storage tanks with secondary containment. Secondary containment areas for bulk storage tanks do not have drains. Any chemical spills in these areas will be removed with portable equipment and reused or disposed of properly. Other chemicals are stored and used in their delivery containers.
  35. 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 aerated brine injection well or the other geothermal brine injection wells. 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 are managed in accordance with applicable laws, ordinances, regulations, and standards.

36. Small quantities of hazardous wastes may be generated over the course of any new construction. These may include 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 recycled 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 waste disposal facilities authorized to accept these wastes.
37. 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 any new 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.

### **38. Monitoring Program**

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

#### **A. Detection Monitoring Program:**

The leachate collection and removal system must be used to provide preliminary detection monitoring of leaks through the primary 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.

Groundwater monitoring wells have been 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:

1. 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;
2. 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;
3. Providing a sufficient number of monitoring points and background monitoring points installed at appropriate locations and depths to yield ground water samples from

portions of the zone of saturation not monitored to provide the best assurance of the earliest possible detection of a release from the brine pond;

4. 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
5. Selecting monitoring point locations and depths that include the zone(s) of highest hydraulic conductivity in the ground water body monitored.

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.

## **B. Sampling Program**

1. The monitoring and reporting requirements contained in Monitoring and Reporting Program R7-2013-0059, and the requirements to install groundwater monitoring wells, are necessary to determine compliance with these WDRs, and to determine the Facility's impacts, if any, on receiving water.

## **C. Prohibitions**

1. The discharge or deposit of solid geothermal waste to the brine pond as a final form of disposal is prohibited, unless authorized by the Regional Water 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 Water Board's Executive Officer;
  - e. Oily and greasy liquid waste; unless specifically approved by this Order or by the Regional Water 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. Permanent (longer than one year) disposal or storage of geothermal waste in on-site temporary mud sumps is prohibited, unless authorized by the Regional Water Board's Executive Officer.
  8. Geothermal fluids or any fluids in the brine pond shall not enter any canal, drainage, or drains (including subsurface drainage systems) which could provide flow to the Salton Sea.
  9. The Discharger shall appropriately dispose of any materials, including fluids and sediments, removed from the brine pond.
  10. 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.
  11. Direct or indirect discharge of any waste to any surface water or surface drainage courses is prohibited.
  12. 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 R7-2013-0059.

#### **D. Provisions**

1. The Discharger shall comply with Monitoring and Reporting Program R7-2013-0059 and future revisions thereto, as specified by the Regional Water Board's Executive Officer.
2. Unless otherwise approved by Regional Water 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.

3. The laboratory shall use detection limits less than or equal to Environmental Protection Agency (EPA) Action Level/Maximum Contaminant Levels (MCLs) or California Department of Public Health (CDPH) Notification Level/MCL 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 the Order to the succeeding owner/operator, and forward a copy of the transmittal letter to the Regional Water Board.
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 Regional Water Board's Executive Officer and obtain revised requirements before any modification is implemented.
6. The Simbol R&D Facility is for research purposes only. Upon closure or expansion of the R&D Facility or within the ninth year from the date of the adoption of Order R7-2013-0059, the Discharger shall submit an updated Report of Waste Discharge. The updated Report of Waste Discharge shall describe the disposition of all equipment associated with the R&D Facility.
7. 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.
8. The Discharger shall ensure that all site-operating personnel are familiar with the content of this Order, and shall maintain a copy of this Order at the site.
9. The Order does not authorize violation of any federal, state, or local laws or regulations.
10. The Discharger shall allow the Regional Water 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 this Order, or the place where records must be kept under the conditions of the Order;
  - b. Have access to and copy, at reasonable times, any records that shall be kept under the condition of this Order;
  - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
  - d. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Order or as otherwise authorized by the CWC or Regulation, any substances or parameters at this location.
11. The Discharger shall comply with all of the conditions of this Order. Any noncompliance with this Order constitutes a violation of the Porter-Cologne Water Quality Act and is grounds for enforcement action.

12. 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 this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures.
13. This Order does 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.
14. 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 the Order, and records of all data used to complete the application for this Order, 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 Regional Water Board's 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 this Order or approved by the Regional Water Board's Executive Officer.
15. All monitoring systems shall be readily accessible for sampling and inspection.
16. The Discharger is the responsible party for the 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 Water Board Orders or court orders, requiring corrective action or imposing civil monetary liability or in modification or revocation of these WDRs by the Regional Water Board.
17. 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 Regional Water Board's Executive Officer. Such specifications are subject to periodic revisions as may be warranted.
18. The Discharger may be required to submit technical reports as directed by the Regional Water Board's Executive Officer.



19. The procedure for preparing samples for the analyses shall be consistent with the Monitoring and Reporting Program R7-2013-0059 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 and signed by a California Professional Engineer or Professional Geologist.

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

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 June 20, 2013.

*Original Signed By*

---

ROBERT PERDUE  
Executive Officer