CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

Office
73-720 Fred Waring Dr. #100
Palm Desert, CA 92260
waterboards.ca.gov/coloradoriver/

WASTE DISCHARGE REQUIREMENTS ORDER R7-2023-0012

ORDER INFORMATION

Discharger:	Hudson Ranch Power I LLC
Facility:	Hudson Ranch Geothermal Power Plant I, Brine Pond, and Mud Sump
Address:	406 W McDonald Road, Calipatria, CA 92233
County:	Imperial County
WDID:	7A130118001
GeoTracker ID:	T10000007845
Prior Order(s):	R7-2013-0059, R7-2013-0044, R7-2008-0063, R7-2007-0042

CERTIFICATION

I, PAULA RASMUSSEN, Executive Officer, hereby certify that the following is a full, true, and correct copy of the order adopted by the California Regional Water Quality Control Board, Colorado River Basin Region, on June 27, 2023.

Orignal signed by
PAULA RASMUSSEN
Executive Officer

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE INDEX

FINDINGS

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

Introduction

1. This Order prescribes Waste Discharge Requirements (WDRs) to Hudson Ranch Power I, LLC[1] (Discharger) for the operation, maintenance, and closure of a class II surface impoundment (Brine Pond) at its Hudson Ranch Geothermal Power Plant I (Facility), in accordance with the Porter-Cologne Water Quality Control Act (Porter-Cologne Act), Water Code section 13000 et seq. and California Code of Regulations, title 27 (Title 27). This Order also prescribes WDRs for the construction and operation of a non-Title 27 surface impoundment for the temporary storage of geothermal waste (Mud Sump).

2. This Order is strictly limited in scope to Waste Discharge Requirements (WDRs) for the existing Brine Pond and the proposed Mud Sump. No other discharges of waste are authorized under this Order.

3. Construction activities are regulated under the State Board's Stormwater Construction General Permit and the Facility is also required to comply with the State Board's Stormwater Industrial General Permit.

4. The drilling, operation, and closure of geothermal wells, as well as the reinjection of geothermal brine from the well head into the geothermal aquifer, including but not limited to approval of wells for reinjection; flow rate and volume of geothermal fluids reinjected; well location; casing design; casing leak detection; additives; and leak detection and inspection is regulated by the Department of Conservation, Geologic Energy Management Division[2] (CalGEM).

---

[1] Although the Discharger is a corporate subsidiary of Cyrq Energy, LLC (Cyrq), a Delaware limited liability company, the Discharger is the Facility's sole owner and operator. Cyrq's mailing address is 15 W. South Temple, Suite 1900, Salt Lake City, Utah 84101

[2] Formerly Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR).

Facility

5. The Facility is a 49.9 Mega Watt (MW) geothermal power plant. It is located entirely within the Salton Sea Known Geothermal Resource Area (SSKGRA), approximately three miles southwest of the town of Niland in Imperial County. The Facility 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 [APN] 020-010-044). The address of the power plant is 409 McDonald Road, Calipatria 92233. The Facility is located at latitude 33.204393 and longitude -115.574734, as shown in **Attachment A**. The elevation of the Facility is approximately -195 to -225 feet below sea level.

6. The Facility is bounded on the north by McDonald Road, on the east by inactive duck ponds, and on the west and south by barren land. The Facility layout is shown in the figures in **Attachment A**.

7. The Facility's Brine Pond is used for the temporary storage of waste streams associated with the Facility's extraction, flashing, and reinjection of geothermal brine; the waste streams are produced during the energy generating process.

8. The Facility is assigned Waste Discharge ID (WDID) No. 7A130118001 and GeoTracker Global ID No. T10000007845.

Proposed Changes to Facility

9. On October 18, 2022, the Discharger submitted a Report of Waste Discharge (ROWD) to the Regional Water Board.

10. On December 29, 2022, the Discharger submitted a revised ROWD requesting inclusion of the construction of a single Mud Sump to temporarily (for less than 1 year) contain the drilling muds and rock cuttings generated during well drilling. While in the mud sump, the drilling muds and rock cuttings will be allowed to dry until they may be properly disposed.

11. The Discharger proposes to drill three geothermal exploration wells located on land owned by MidAmerican Energy Holdings Co. (CalEnergy), 7030 Gentry Road Calipatria, CA 92233.[3] The single Mud Sump is proposed to be located on APN 020-010-035, which has a latitude and longitude points of 33.21301N and -115.576097 W, as shown in **Attachment A**. The Well Pads will consist of three

[3] This Order does not cover discharges associated with the operation of these wells. Accordingly, CalEnergy is not a designated "discharger" under this Order.

geothermal exploration wells and a single Mud Sump that is composed of two separate cells, as shown in the schematic in **Attachment A**.

Regulatory History

12. WDRs were first prescribed per Order R7-2008-0063 on September 17, 2008, prior to the Facility's construction and installation of groundwater monitoring wells, which was completed in 2011.

13. On June 20, 2013, the Facility's WDRs were revised per Order R7-2013-0059 to reflect the addition of a Research & Development (R&D) facility leased operated by Simbol Inc. (Simbol). However, Simbol defaulted on its lease shortly after the permit modification. Operational responsibility then defaulted to Energy Source, the former "Discharger." The New Discharger has reported to the Regional Water Board that it does not plan to continue the R&D Facility.

14. A total of seven geothermal production or injection wells have previously 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 WDRs, per Order R7-2007-0042. After completion of the wells, the Mud Sumps were properly abandoned and the WDR's for these wells' Mud Sumps were rescinded on May 16, 2013, per WDRs Order R7-2013-0044. A total of three additional wells are proposed to be drilled, as shown in the maps and schematics of **Attachment A**.

15. This Order further revises the Facility's WDRs to comply with current laws and regulations, as set forth in the Water Code and California Code of Regulations, and to document changes to the Facility or operating procedures that could impact groundwater, including: updated mechanical separator Best Management Practices (BMPs) to more efficiently manage the buildup of geothermal solids generated during the power generation process, the classification of chemicals that are used that may interact with the Brine Pond, the definitions of a Reporting Threshold (RT) for each Leachate Collection and Removal System (LCRS) Sump, and the approval to construct up to one Mud Sump to be used for the handling and disposal of drilling wastes generated by the Discharger during geothermal well drilling, testing, and maintenance.

Facility Description

16. Most of the Brine Processing Facility (BPF) and all the Turbine-Generator Facility (TGF) are located within the geothermal power plant site itself.

a. The BPF includes the geothermal production wells, brine and steam handling facilities, solids handling system, a brine pond, a service water pond, and the injection wells. Geothermal fluid (450° to 500° F) produced from the production wells is delivered to the power plant site through above ground conveyance 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. The steam is then cooled and condensed and either used in the plant's cooling system or injected back into the geothermal reservoir. After the brine is used to generate electricity, it is chemically stabilized and physically separated in the solids handling system (primary and secondary clarifiers, thickener, and associated facilities) where solids are removed. Two booster pumps and two main injection pumps are used to pump the spent brine from the secondary clarifiers and inject it directly into the geothermal resource to replenish the geothermal reservoir. It is estimated that 85 percent of the produced brine is reinjected.

b. 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.

c. The Facility’s 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 (H2S) abatement system. The H2S abatement system used to control the emission of the H2S 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 the cooling towers that utilize steam condensate containing dissolved H2S for makeup water. The Biox system removes at least 95 percent of the H2S in the non-condensable gases and at least 98 percent of the H2S in the portion of the condensate used as cooling tower makeup water. When all the condensate is used (during the high temperature summer months), H2S 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, H2S 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. 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 brine injection pipeline is a combination of alloy pipeline and cement-lined carbon steel pipeline.

18. The well field includes numerous production and injection wells and insulated conveyance pipelines. Production wellheads are approximately fifteen feet above the ground surface. The wellheads consist of control valves, redundant isolation valves and bracing struts. Auxiliary equipment or motor control buildings are required at Site 1 and Site 2 injection well sites, but they are not required at Site 3. 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. Table 1 reflects the number and ownership of properties associated with the Facility's geothermal production and injection wells in operation at the time of permit adoption. Each injection well is remotely monitored for pressure, temperature, and flow rate.

Table 1 – Well Name, Use, Location and Ownership

Well ID	Well Type	APN	Owner
12-1	Production	020-010-044	Discharger
13-3	Production	020-010-044	Discharger
13-2	Production	020-010-044	Discharger
IW-1	Injection	020-010-044	Discharger
IW-2	Injection	020-010-044	Discharger
IW-3	Injection	020-010-044	Discharger
IW-4	Injection	020-010-044	Discharger
Well 13-4	Production	020-010-035	CalEnergy
TBD[4]	TBD	020-010-035	CalEnergy
TBD	TBD	020-010-035	CalEnergy

19. Three fluid storage basins have been constructed on the power plant site. These include the service water pond, the stormwater retention basin, and the Brine Pond. This Order does not regulate the operation of the service water pond nor

[4] To Be Determined

the Stormwater Retention Pond; it only regulates the Brine Pond and the Mud Sump. 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 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 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.

    i. 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. The potable water system consists of a pre-treatment filter to remove suspended and colloidal particles, followed by direct treatment. Backwash from the pre-treatment filter, consisting of solids and water from the IID canal system, is discharged into the service water pond.

b. Stormwater 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. Stormwater flows are directed to the retention pond via ditches, swales, and culverts. The stormwater 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. Water accumulated in the stormwater retention pond is allowed to evaporate or seep into the ground or is pumped into the aerated brine injection well. 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. The Brine Pond has been constructed with a flood berm around the pond up to the - 218-foot elevation below mean sea level.

c. Brine Pond: A class II surface impoundment has been constructed within the power plant site. The Brine Pond's primary purpose is the removal of precipitating geothermal solids from the brines. After which, the liquid is processed through the thickener and delivered to the main injection pumps or pumped to the aerated brine injection well for subsurface injection. The Brine Pond also holds fluids generated during other onsite activities that are described more fully in the section entitled Waste Unit Classification.

20. Chemicals are added to the cooling water system and brine handling process to prevent scaling, biological growth, and corrosion and to adjust the water's pH and inhibit undesirable chemical reactions. Chemical classes approved of at the time of permit adoption include Class 5 oxidizing organic peroxides and biocide in the cooling tower; Class 8 corrosives as industrial strength oxidants and biocides; hydrochloric acid for pH control at some locations in the process, and sodium hydroxide for control at other locations in the process, among other chemicals. **Table 2** includes a list of the chemical products currently used at the Facility. The use of new chemicals requires written approval by the Executive Officer but does not necessitate a Board Order update.

Table 2—Approved Chemical Products

Purpose	Chemical Product Names (Nalco)
Cooling Tower Dispersant	3D TRASAR 3DT121
Bio-detergent	73550, 73551
Towerbrom Tablets Oxidizing Biocide / H2S Abatement	TB960
Towerbrom granular Oxidizing Biocide / H2S Abatement	TB991
Stabilized Bromine Utility Water Treatment	ST70
Antifoam	7471
Scale Inhibitor NORMS	GEO901

Purpose	Chemical Product Names (Nalco)
Flocculant	9907, 8170
Silica Scale Inhibitor	GEO982
Calcium Sulfate Scale Inhibitor	GEO 906
Steam Corrosion Inhibitor	EC1304A
Anti-Scalent used for Injection Well Scaling	GEO 991
Hydrochloric Acid	HCL
Phosphoric Acid	H3PO4
Caustic	NaOH
Hydrogen Peroxide 35%	H2O2

Waste and Unit Classification

21. The Brine Pond and Mud Sump are summarized in **Table 3**, below. Although the Mud Sump is a surface impoundment WMU, it is exempted from the prescriptive standards of Title 27, pursuant to Title 27, section 20090. The requirements imposed under this Order are exclusively pursuant to the Regional Water Board's authority under the Porter-Cologne Act.

22. The Discharger is responsible for accurate characterization of wastes, including determinations of whether wastes will be compatible with containment features and other wastes at the WMUs, and whether the wastes are required to be managed as a "hazardous" waste or "designated" waste.

Table 3—Waste Management Units at Facility

Unit	Description	Status
Class II Surface Impoundment (Brine Pond)	The engineered brine pond, constructed in 2011, 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 High Density Polyethylene (HDPE) primary liner separated by a 6-inch cushion of sand. The primary liner is underlain with a 12-oz. nonwoven geotextile fabric (Geonet Geocomposite), under which is a six-inch thick drainage layer, a secondary 60-mil HDPE liner, and a compacted subgrade. The Brine Pond has a 981,816-gallon working capacity and a 392,726-gallon free board requirement for a total volume of 1,374,542- gallons. The Dimensions of the Brine Pond are 525 feet (ft) long, 50 ft wide, and 5 ft deep (plus 2 ft of free board space).	Active
Geothermal Mud Sump	The Well pad will be approximately 350 ft x 300 ft and the Mud Sump located on it will be approximately 300 ft long x 130 ft wide and contain two cells, each 100 ft long x 80 ft wide, with a dividing wall in between them. The dividing wall will have a notch cut within it to allow for fluids to spill out from one cell and into the other, where they will be used for drilling purposes or taken off-site for temporary disposal within the Brine Pond, before it is reinjected into the reservoir. The Mud Sump will be a lined impoundments by employing a minimum of twelve (12) inches of compacted clay with a maximum permeability of approximately 1x10-6 cm/sec.	Active

Brine Pond

23. The following wastes are generated during operation and maintenance of the Facility's Brine Pond. The waste streams are directed to the Brine Pond and/or to the injection wells for direct injection into the geothermal reservoir:

    a. **Geothermal brine** – The geothermal brine at the Facility is highly saline (over 100,000 mg/L total dissolved solids [TDS]) and may also contain high concentrations of metals. Therefore, the discharge is considered

"designated waste",[5] which is defined in Water Code section 13173 as nonhazardous waste containing pollutants that, under ambient environmental conditions at a WMU, could be released in concentrations with the potential to exceed water quality objectives for areal surface waters and groundwater or otherwise adversely affect beneficial uses of the waters of the state. The following table is a summary of the components of the Geothermal Brine as its produced and as its reinjected (after going through the secondary clarifier):

Table 4 — Production Well Geothermal Brine Composition

Brine Components	Maximum (mg/kg)	Minimum (mg/kg)	Average (mg/kg)
Sodium	57,100	55,450	56,275
Potassium	18,312	17,700	18,006
Calcium	32,600	26,955	29,778
Magnesium	49	36	43
Lithium	234	221	228
Strontium	508	124	316
Barium,	201	132	167

[5] Geothermal fluids managed in surface impoundments such as the Brine Ponds are expressly exempted from management as "hazardous waste" pursuant to Health and Safety Code section 25143.1.

Brine Components	Maximum (mg/kg)	Minimum (mg/kg)	Average (mg/kg)
Metals:			
Iron	1,472	1,350	1,411
Manganese	1,729	1,670	1,700
Zinc	521	453	487
Lead	115	100	108
Arsenic	16.2	7.8	12
Copper	1	0.8	0.9
Complexes:			
Silicon Dioxide (SiO2)	499	374	437
Boron	602	524	563
Anions:			
Chloride	176,000	154,884	165,442
Fluoride	13.2	1.1	7.2
Total Dissolved Solids	298,000	259,280	278,640

Table 5— Injection Well Geothermal Brine Composition

Brine Components	Maximum (mg/kg)	Minimum (mg/kg)	Average (mg/kg)
Sodium	70,600	55,810	64,616
Potassium	22,950	16,880	20,064
Calcium	36,960	29,800	34,428
Magnesium	79.8	48.5	62.9

Brine Components	Maximum (mg/kg)	Minimum (mg/kg)	Average (mg/kg)
Lithium	328	211	260
Strontium	752	463	538
Barium	246	194	213
Metals:	-	-	-
Iron	1,770	1,400	1,589
Manganese	1,870	1,550	1,687
Zinc	681	558	610
Lead	168.0	48.2	133.1
Arsenic	23.9	6.6	16.0
Copper	37.2	0.9	6.8
Complexes:	-	-	-
Silicon Dioxide (SiO2)	329	138	165
Boron	N/A	N/A	N/A
Anions:	-	-	-
Chloride	189,610	154,430	175,466
Fluoride	41.8	35.0	38.5
Total Dissolved Solids	324,000	283,000	299,055
pH @ 25 C	5.08	4.82	4.94

Table 6 — Production Brine Gas Contents

Non-Condensable Gases	Nominal Concentrations Parts Per Million Weight (ppmw)
Carbon Dioxide (CO2)	1,532.00
Hydrogen Sulfide (H2S)	13.00
Ammonia (NH3)	47.00
Methane (CH4)	1.90
Nitrogen (N2)	4.70
Hydrogen (H2)	0.13
Argon (Ar)	0.02
Benzene (C6H6)	0.04
Total	1,598.79

b. **Geothermal Solids –** The primary source of solid waste is the precipitated solids from the geothermal brine once it is exposed to atmospheric conditions. 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 are 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.

i. The Discharger may use several mechanical separator systems to remove solids that are precipitated because of the energy generation process, as follows. Flow diagrams depicting the mechanical separator systems are included in Attachment A,

Geothermal Solids Management Schematic, Belt Filter System, incorporated herein:

(A) Periodically, the Discharger may need to remove solids from the Brine Pond that precipitate out of the liquid brine as it cools or settles. This is typically managed with an excavator. The filter cake is allowed to drain itself of liquids more thoroughly before being taken offsite for reuse or final disposal. The Discharger is responsible for conducting confirmation sampling of the removed solids and disposing of the solid waste at a proper final disposal facility. With proper maintenance, the Brine Pond will continue to function as designed and the required freeboard level of two feet can be maintained.

(B) Under normal operations, the filter cake recovered from the belt filter system or from the brine pond is recycled for beneficial use. 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.

(C) The mechanical separator systems either pump the filtrate back into the geothermal process circuit or the systems are placed on an impermeable surface next to the Brine Pond (such as inside a ‘roll-off bin’) and the liquid is allowed to return to the Brine Pond. In either case, the separated solids are retained in the separator system for eventual disposal offsite.

c. Cooling tower blowdown (liquids);

d. Condensate from the steam vent tanks (liquids);

e. Portable shower effluent (liquids);

f. Spills and water from hydroblasting (solids and liquids);

g. Wastewater generated from plant cleanups and washdowns, including water collected by the plant conveyance system (liquids);

h. Vehicle wash station effluent (liquids);

i. Lime sump effluent (liquids); and

j. Effluent from emission abatement equipment (liquids).

k. Reject water from the potable water treatment system.

l. Geothermal drilling wastes (solids and liquids);

Mud Sump

24. These WDRs require that drilling muds and rock cuttings generated during well drilling, testing, or maintenance will be discharged to the Mud Sump that is designed to temporarily (less than one year) contain the material while drying. The Mud Sump is considered a temporary containment pond that will be decommissioned and removed after completion of the well construction activities.

25. The following wastes are generated during construction, operation, and maintenance of geothermal exploration wells:

a. **Drilling muds with additives –** Drilling mud is inert mineral clay such as bentonite clay. Drilling mud additives may include sodium bicarbonate, soda ash, drilling soap, organic polymers, wood fibers, graphite, cottonseed hulls, walnut shells and cement. Drilling mud additives do not render the drilling mud hazardous when used according to manufacturer's specifications.

b. **Drill cuttings (rock)** – small rock fragments pulverized during drilling and forced to the surface by drilling mud, aerated mud, and/or air.

i. Solids discharged to the Mud Sump will be disposed of offsite or closed in place provided representative samples of solids are not hazardous or designated waste. The selected method of disposal will comply with federal, state, and county regulations.

c. **Drilling fluid** - Liquid wastes produced from drilling, testing, and maintenance of geothermal wells will be contained in portable tanks (the number of tanks required will be determined as drilling proceeds). Geothermal fluids and drilling fluids will be returned to the geothermal resource via injection, or properly discharged into the permanent Class II surface impoundments constructed pursuant to Title 27, California Code of Regulations, Sections 20250 et seq. (Title 27).

i. The Discharger shall submit to the Regional Water Board a shipping manifest or other appropriate documentation showing the geothermal brine disposal method and location.

26. Geothermal wells are drilled to minimize mixing of drilling mud and cuttings with geothermal fluids. Only a small amount of brine may commingle with drilling mud, primarily brines in that part of the formation displaced by the drill bit. Geothermal fluids will not be discharged into the Mud Sump. Standing fluid observed in the Mud Sump (if any) will be removed immediately, stored in portable tanks, and returned to the geothermal resource, or discharged offsite into a Class II Surface Impoundment constructed pursuant to Title 27. The Discharger shall submit to the Regional Water Board a shipping manifest or other appropriate documentation showing the geothermal fluid has been properly disposed of.

Other Facility Components

27. 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.

28. 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.

29. At the end of the Project’s useful life, equipment and facilities would be properly abandoned. The geothermal wells would be abandoned in conformance with the well abandonment requirements of CalGEM. 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 would prepare and implement a Site Abandonment Plan in conformance with Imperial County, Regional Water Board, and Cal GEM 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, pending final approval from regulatory agencies. The surface of the site would then be restored to conform to approximate pre-Project land uses.

Hydrogeologic and Climate Conditions

30. The Discharger reports that shallow groundwater in the area of the Facility occurs approximately 15 to 25 feet below ground surface, flows generally to the west-northwest towards the Salton Sea, has a background total dissolved solids concentration ranging from approximately 40,000 to 80,000 mg/L and often contains naturally occurring heavy metals (such as arsenic) at concentrations exceeding Primary and Secondary Maximum Contaminant Levels established under title 22 of the California Code of Regulations.

31. In accordance with Title 27, section 20240, subdivision (c), there is more than five feet of separation between the bottom of both the Brine Pod and the geothermal Mud Sump and the highest anticipated groundwater elevation.[6]

32. 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 oft-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 more recent assessment of the geohydrologic condition of the Imperial Valley groundwater has occurred.

33. 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.

34. In 2022 the average elevation of the Salton Sea was approximately 240 feet below mean sea level (Imperial Irrigation District). 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 the level of the Salton Sea is decreasing overtime, in part because of diminished irrigation inflow stemming from the Colorado River Quantification Settlement Agreement.

---

[6] The purpose of this prescriptive standard is to ensure that groundwater does not come into contact with the waste inside the WMU, thereby becoming leachate. (State Water Board, Statement of Reasons for 1984 Rule, Section II.B.6.a [Cal. Code Regs., tit. 23, § 2530], p. 3.8).

35. 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):

    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) and seepage from the All-American Canal and other canals has caused formation of localized perched groundwater and temporal/spatial variations to this general trend. 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.

    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. 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.

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 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.

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 and into the Salton Sea.

l. 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) onsite.

m. 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.

n. 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.

o. Geothermal fluids in this portion of the Salton Sea KGRA contain approximately 25% (by weight) dissolved solids and are rich in the anion chloride. 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 are 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.

36. The Facility is largely surrounded by farmland that is drained by an extensive network of ditches and drains in agricultural areas. These drains discharge into the Alamo and New Rivers, which are tributary to the Salton Sea. Canal seepage and tiled agricultural drains recharge the shallow aquifer, the Salton Sea, and potentially even recharge the deeper aquifer in the form of seepage from canals and irrigated agricultural lands. Sulfate-rich groundwater in the basin is constantly being mixed with imported Colorado River water that is used for irrigating large parts of the Imperial Valley. Colorado River water is generally of a calcium-sodium chloride-sulfate type. The Colorado River is located more than 50 miles east of the Facility. 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.

37. 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.

38. 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.

39. Federal Emergency Management Agency (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.

40. Climatological data obtained from 1903 to 2015 indicates an average seasonal precipitation of 3.15 inches, and an average annual pan evaporation rate greater than 100 inches.

41. The wind direction in the immediate vicinity of the Facility follows two general patterns:

    a. Seasonally from late fall through early spring, prevailing winds are from the west and northwest. Humidity is lowest under these conditions.

    b. Summer weather patterns are often dominated by an intense, heat-induced low-pressure area that forms over the interior deserts, drawing air from the south; humidity is highest under these “monsoon” conditions.

42. Seven groundwater monitoring wells are sampled semi-annually to monitor for a release to groundwater from the Brine Pond. Wells MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6 surround the Brine Pond. Well MW-7 is approximately 500 feet south (upgradient) of the Pond, near the Facility’s Stormwater Retention Pond. The location of the monitoring wells are shown **Figure 7—Monitoring Well Map**, incorporated herein.

43. Domestic wells are not located within 500 feet of the Facility or its geothermal wellfield.

Regional Geology

44. The Facility is located in Imperial Valley within the Salton Trough, a landward extension of the East Pacific Rise. The Salton Trough is a closed basin located below sea level and separated from the Gulf of California by the Colorado River delta. The Trough is a structural (bedrock) and topographic (ground surface) depression in the Earth’s crust that contains thousands of feet of heterogeneous Tertiary and Quaternary aged lacustrine and deltaic sediments associated with the Colorado River delta. The area is tectonically active and has numerous faults associated with the San Andreas Fault Zone. The lowest area of the basin is the Salton Sea at about 230 feet below mean sea level.

45. The Salton Trough was filled as it subsided by sediments from the Colorado River, which constructed a large transverse alluvial delta extending westward from the vicinity of Yuma, Arizona, to the western side of the Imperial Valley, effectively forming a dam across the southern end of the Salton Trough that prevented marine water from the Gulf of California from entering the basin. Thereafter, periodic diversions of the Colorado River northward into the Salton Trough (rather than flowing directly to the Gulf of California) supplied enormous volumes of water and sediments to the developing and subsiding land-locked basin. As a result, the sedimentary layers in the Salton Trough are up to 21,000 feet thick and comprised of sandstone, siltstone, and mudstones. Though individual sedimentary layers are discontinuous over long distances, internally consistent packages of sedimentary layers can be traced for miles across the geothermal well field.

46. The sedimentary sequence in the area is interpreted to encompass the Brawley and Borrego Formations, and possibly the Palm Springs Formation at great depth. The Brawley Formation, which is Pleistocene to Holocene in age, is dominated by a 1,000 to 1,300-foot-thick evaporate-bearing clay and siltstone unit that acts as the cap rock to the geothermal reservoir. Beneath this is the Pleistocene aged Borrego Formation down to a depth of at least 5,000 to 6,000 feet.

47. The geologic materials from 1,000 to about 3,500 feet are mostly mudstones with minor associated argillaceous siltstones and lesser amounts of very fine-grained subarkosic sandstones. These sandstones, which are obviously not hydrothermally altered, are partially cemented with diagenetic calcite. The estimated intrinsic inter-granular porosity tends to decrease with depth from about 30% to less than 10%. From about 3,500 feet to about 5,000 to 6,000 feet the material is more or less subequal amounts of mudstones, siltstones and fine-grained sandstones. There is a formational change below 5,000 to 6,000 feet to dominantly fine to medium grained subarkosic sandstones with subordinate amounts of siltstone and shale. This is tentatively interpreted to be the Pleistocene to Pliocene aged Palm Springs Formation. Mafic and silicic volcanic rocks are occasionally found from 5,000 feet to below 8,000 feet.

48. The Salton Sea geothermal reservoir occurs in fractured sedimentary rocks within the Salton Trough, a structural depression on the boundary between two tectonic plates. The northwest motion of the Pacific Plate on the west, relative to the North American Plate on the east, has created regional right-lateral faults,oriented Northwest-Southeast and local conjugate left-lateral faults, oriented Northeast-Southwest. The thermal anomaly of the Salton Sea field is aligned Northeast-Southwest and appears to be centered on major left-lateral faults some of which act as a conduit for geothermal brines upwelling from depth. Within the Salton Sea field, past volcanic activity is indicated by four outcrops of

rhyolite lava (Obsidian Butte, Rock Hill, Red Island and Mullet Island), as well as rhyolite sections of volcanic rocks encountered in several wells. Due to circulating groundwater through salt-bearing beds within the Salton Trough, the geothermal brines at the Salton Sea are highly saline, with TDS in the range of 21 to 28 percent by weight. Reservoir temperatures at the Salton Sea are among the hottest of any geothermal field in the world, with encountered temperatures in excess of 700 degrees Fahrenheit.

49. The Salton Sea KGRA's geothermal reservoir is hosted and capped by same formation (unlike the different formations found in oil/gas systems), the Borrego Formation (and possibly a thin overlaying veneer of the Brawley Formation). the transition from the reservoir to cap is not controlled by lithology but instead by the relative extent of hydrothermal alteration and underlaying intrusions that have penetrated that area. The increased hydrothermal alteration or metamorphism from intrusive bodies creates a more brittle and fractur-able rock compared to the unaltered, unlithified and intermixing sand, clay, and silt layers of the Borrego Formation. The altered rocks are more suitable for the formation of faults which may circulate the hot fluids closer to the ground surface, thereby altering the shallow rocks and creating a more accessible geothermal reservoir for humans to use. The cap rock area is estimated to exist at depths of around 1200 feet in the production field and 4000 feet in the injection field (the greater thickness of the cap rock in the injection field helps keep the injected brine "in").

Basin Plan and Other Regulatory Considerations

50. The Water Quality Control Plan for the Colorado River Basin Region (Basin Plan) designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. Pursuant to Water Code section 13263, subdivision (a), WDRs implement the Basin Plan and take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of Water Code section 13241.

51. The Facility is located in the Imperial Hydrologic Unit. The Basin Plan states that the beneficial uses of groundwater in the Imperial Hydrologic Unit are:

    a. Municipal and Domestic Supply (MUN), and

    b. Industrial Supply (IND).

52. Surface waters in the area of the Facility include the Imperial Irrigation District (IID) irrigation delivery canals and surface drains, the Alamo River, and the

Salton Sea. The beneficial uses of surface waters in the area of the Facility are as follows:

a. Imperial Valley Drains

   i. Freshwater Replenishment (FRSH),

   ii. Water Contact Recreation (REC I),

   iii. Non-contact Water Recreation (REC II),

   iv. Warm Freshwater Habitat (WARM),

   v. Wildlife Habitat (WILD), and

   vi. Preservation of Rare, Threatened, or Endangered Species (RARE).

b. Alamo River

   i. Freshwater Replenishment (FRSH),

   ii. Water Contact Recreation (REC I),

   iii. Non-Contact Water Recreation (REC II),

   iv. Warm Freshwater Habitat (WARM),

   v. Wildlife Habitat (WILD),

   vi. Hydropower Generation (POW), and

   vii. Preservation of Rare, Threatened, or Endangered Species (RARE).

c. Salton Sea

   i. Aquaculture (AQUA),

   ii. Industrial Service Supply (IND),

   iii. Water Contact Recreation (RECI),

   iv. Noncontact Water Recreation (RECII),

   v. Warm Water Habitat (WARM),

   vi. Wildlife Habitat (WILD), and

vii. Preservation of Rare, Threatened, or Endangered Species (RARE).

53. This Order establishes WDRs pursuant to division 7, chapter 4, article 4 of the Water Code for discharges that are not subject to regulation under Clean Water Act section 402 (33 U.S.C. § 1342).

54. These WDRs implement numeric and narrative water quality objectives for groundwater and surface waters established by the Basin Plan and other applicable state and federal laws and policies. The numeric objectives for groundwater designated for municipal and domestic supply (MUN) include the Maximum Contaminant Levels (MCLs) and bacteriological limits specified in California Code of Regulations, title 22, section 64421 et seq. The Basin Plan states that groundwater for use as domestic or municipal water supply (MUN) must not contain taste- or odor-producing substances in concentrations that adversely affect beneficial uses as a result of human activity.

55. 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 the Discharger to maintain waste containment systems that prevent discharges of waste to waters of the state.

56. These WDRs implement state regulations applicable to the discharge of solid/designated waste to land found in California Code of Regulations, title 27 (Title 27), division 2, subdivision 1, commencing with section 20005. These regulations contain classification criteria for wastes and for disposal sites, and prescribe minimum standards for the siting, design, construction, monitoring, and closure of the Brine Pond. The Mud Sump is exempted from Title 27 prescriptive standards.

57. This Order is issued in part pursuant to subdivision (b)(1) of Water Code section 13267, which provides that the Regional Water Board may require that "any person … who proposes to discharge waste within its region … shall furnish, under penalty of perjury, technical or monitoring program reports…," provided that burden of submitting such reports bears a reasonable relationship to the need for their submittal and the benefits to be obtained. **Attachment B** contains a Monitoring and Reporting Program (MRP) with monitoring and reporting requirements that are necessary to ensure compliance with the WDRs. The Executive Officer may issue a Revised MRP as a standalone order, pursuant to her delegated authority under Water Code section 13223 and Regional Water Board Resolution R7-2022-0036. Upon issuance, the Revised MRP shall supersede the provisions of Attachment B.

58. The discharge of waste is a privilege, not a right, and adoption of this Order does not create a vested right to continue. (Wat. Code, § 13263, subd. (g).)

59. Effective January 1, 2023, Water Code section 13149.2, subdivision (d) requires that the Colorado River Basin Water Board, "[w]hen issuing … individual waste discharge requirements … that regulate activity or a facility that may impact a disadvantaged[7] or tribal community,[8] and that includes a time schedule in accordance with subdivision (c) of Section 13263 for achieving an applicable water quality objective, an alternative compliance path that allows time to come into compliance with water quality objectives, or a water quality variance…," must include finding(s) regarding "potential environmental justice, tribal impact, and racial equity considerations" that are relevant to the permitting action. (Assem. Bill No. 2108 (2021-2022 Reg. Sess.) § 3.) This Order does not incorporate a time schedule for compliance with applicable WQOs, or any of the other provisions described in Water Code section 13149.2, subdivision (d). Accordingly, no additional findings are necessary under section 13149.2.

Antidegradation Analysis

60. State Water Board Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California* (Antidegradation Policy), generally prohibits the Regional Water Board from authorizing discharges that will result in the degradation of high quality waters, unless it is demonstrated that any change in water quality will: (a) be consistent with maximum benefit to the people of the state, (b) not unreasonably affect beneficial uses, and (c) not result in water quality less than that prescribed in state and regional policies (e.g., violation of one or more water quality objectives). The discharger must also employ best practicable treatment or control to minimize the degradation of high-quality waters. High quality waters are surface waters or areas of groundwater that have a baseline water quality better than required by water quality control plans and policies.

---

[7] For the purposes of this requirement, a "disadvantaged community" is defined as a "community in which the median household income is less than 80 percent of the statewide annual median household income level." (Wat. Code, § 13149.2, subd. (f)(1).)

[8] For the purposes of this requirement, a "tribal community" is defined as a "community within a federally recognized California Native American tribe or nonfederally recognized Native American tribe on the contact list maintained by the Native American Heritage Commission for the purposes of Chapter 905 of the Statutes of 2004." (Wat. Code, § 13149.2, subd. (f)(2).)

61. In accordance with Title 27, this Order requires total containment of all wastes discharged to the Brine Pond (§ 20310, subds. (a)-(b)), and in the event of a release, corrective action (§ 20340). Compliance with these WDRs will preclude any degradation in quality of the waters of the State of California. Accordingly, this Order is consistent with the Antidegradation Policy.

62. Based on the chemical characteristics of the projected discharges to the brine pond from the flashed Salton Sea geothermal brine and potential clarifier overflow discharge, the following list of monitoring parameters is proposed. 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.

    a. Cations: Barium, Boron, Calcium, Magnesium, Manganese, Iron, Lead, Potassium, Sodium, Strontium, and Zinc;

    b. Anions: Ammonium, Bicarbonates, Chloride and Sulfate; and

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

63. With respect to the Mud Sump, discharges and temporary storage of the proposed geothermal exploration wastes (described in the findings above) will not result in any degradation of groundwater quality.

Stormwater

64. Federal regulations for stormwater discharges were promulgated by the U.S. Environmental Protection Agency on November 16, 1990 (40 C.F.R. parts 122, 123, and 124) to implement the Clean Water Act's stormwater program set forth in Clean Water Act section 402(p) (33 U.S.C. § 1342(p)). In relevant part, the regulations require specific categories of facilities that discharge stormwater associated with industrial activity to "waters of the United States" to obtain National Pollutant Discharge Elimination System (NPDES) permits and to require control of such pollutant discharges using Best Available Technology Economically Achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) to prevent and reduce pollutants and any more stringent controls necessary to meet water quality standards.

65. The State Water Board adopted Order 2014-0057-DWQ (NPDES No. CAS000001), *General Permit for Storm Water Discharges Associated with Industrial Activities* (Industrial General Permit), which became effective on July 1,

2015.[9] The Industrial General Permit regulates discharges of stormwater associated with certain industrial activities, excluding construction activities, and requires submittal of a Notice of Intent (NOI) to be covered under the permit. The Discharger indicates that it has not enrolled in the Industrial General Permit (IGP) because it does not fall within the covered facilities in Attachment A of the IGP.

66. In 1998, the Water Code was amended to require entities who are requested by the Water Boards to obtain General Permit coverage, but that have a valid reason to not obtain General Permit coverage, to submit a Notice of Non-Applicability (NONA). (Wat. Code, § 13399.30, subd. (a)(2)). The NONA covers multiple reasons why an entity is not required to be permitted including (1) facility closure, (2) not the legal owner, (3) incorrect SIC code, (4) eligibility for the Conditional Exclusion (No Exposure Certification), and (5) the facility not discharging to a water of the U.S. ("No Discharge"). State Water Board General Order 97-03-DWQ (superseded by General Order 2014-0057-DWQ) contained definitions, requirements, and guidance that entities may reference to determine whether they are eligible to select any of the first four NONA reasons for not obtaining General Permit coverage. However, neither General Order 97-03-DWQ nor the Water Code provided definitions, requirements, and guidance for entities to determine whether they are eligible to indicate "No Discharge" on the NONA as a reason for not obtaining General Permit coverage.

    State Water Board General Order 2014-0057-DWQ addresses and resolves the issues discussed above by establishing consistent, statewide eligibility requirements in Section XX.C for entities submitting NONAs indicating "No Discharge." When requested by the Water Boards to obtain General Permit coverage, entities must meet these "No Discharge" eligibility requirements or obtain General Permit coverage.

67. The Discharger states that under normal working conditions, the capacity of the Brine Pond and facility conveyance system is large enough to accept wastewater generated at the Facility, as well as precipitation within the footprint of the Brine Pond for a 24-hour storm event with a 1000-year occurrence interval.

68. The Discharger must comply with all pertinent stormwater requirements contained in Title 27 and in this Order.

[9] As amended by Order No. 2015-0122-DWQ and Order No. 2018-0028-DWQ.

Financial Assurances

69. The State Water Board-promulgated provisions of Title 27 require maintenance of appropriate financial assurance mechanisms to cover all expenses related to the Brine Pond for the following:

    a. Closure Activities (Title 27, § 22207) – in at least the amount of the current cost estimate for closure; and

    b. Corrective Action (Title 27, § 22222) – for initiating and completing corrective action for all known or reasonably foreseeable corrective action.

70. Because the Discharger has an approved Preliminary Closure Plan to "clean close" the Brine Pond (see Cal. Code Regs., tit. 27, § 21400), financial assurances are not required for post-closure maintenance. In the event the Discharger is unable to clean-close the pond, such financial assurances will be required.

71. **Within 90 days** following the issuance of this Order, the Discharger must provide justified assurances of financial responsibility for closure and for corrective action in compliance with Title 27.

CEQA and Public Participation

72. The Imperial County Planning and Development Services Department (Lead Agency), acting as the Lead Agency for the *California Environmental Quality Act* (CEQA), Public Resources Code, section 21000 et seq. (See Cal. Code Regs., tit. 14, § 15301.) and *the County of Imperial's Rules and Regulations to Implement CEQA* (as amended) issued a Mitigated Negative Declaration (MND) #2007091021 on August 27, 2007 for the initial construction of the Geothermal Power Plant.

73. The Discharger proposes to drill a new well (13-4) in the Hudson Ranch Unit of the Salton Sea Known Geothermal Resource Area (KGRA). The new pad will be located on the Discharger's geothermal lease within the Hudson Ranch Unit of the Salton Sea KGRA in Imperial County and will be used specifically in order to test and develop specific geophysical or geologic targets to continue resource development and maximize plant output. The proposed project consists of four primary components: 1) well pad; 2) geothermal well; 3) pipeline that would connect the geothermal well to the existing Hudson Ranch Geothermal Power Plant; and 4) an access road to the well pad as well as an access road generally along the pipeline extent. The Lead Agency issued a Notice of Intent on April 13, 2023, to prepare a MND for the Initial Study (#22-0034) for the Project. The Notice of Intent included a public comment period from April 18, 2023, to May 18,

2023.The MND was approved by the Lead Agency in a public hearing on May 24, 2023.

74. The Regional Water Board has notified the Discharger, and all known interested agencies and persons of its intent to issue waste discharge requirements for this discharge and provided them with an opportunity for a public meeting and to submit comments.

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

REQUIREMENTS

IT IS HEREBY ORDERED, pursuant to Water Code sections 13263 and 13267, that Waste Discharge Requirements Order R7-2013-0059 is rescinded (except for enforcement purposes), and the Discharger shall comply with the following:

A. Discharge Prohibitions

1. The storage, treatment, or disposal of wastes from the Facility shall not cause contamination, pollution, or nuisance as defined in Water Code section 13050, subdivisions (k), (l), and (m).

2. Waste classified as “hazardous,” as defined by Title 27, section 20164 shall not be discharged at the Facility.

3. Wastes shall not be discharged to a WMU when such wastes are:

    a. Incompatible with existing wastes in the WMU; or

    b. Are such that, when mixed or commingled with other wastes, may create heat, pressure, fire, explosion, toxic by-products, or other chemical reactions that:

    c. Impair the integrity of the containment structures, or

    d. Generate products requiring a higher level of containment than provided by the waste management unit into which the wastes are placed.

4. Waste shall not be discharged to a location (e.g., outside of authorized WMUs) or in a manner inconsistent with the findings of this Order.

5. Authorized discharges of waste under this Order are strictly limited to the two WMUs described in the findings (i.e., Brine Pond and Mud Sump). Except as expressly authorized under separately issued WDRs, waste shall not be discharged to:

    a. Land not owned or controlled by the Discharger[10]; and

    b. Surface waterbodies, surface drainage courses, the unsaturated (vadose) zone or to groundwater.

6. Geothermal fluids or cooling tower liquids shall not be applied as dust control on access roads, well pads, or other developed project locations.

7. Solid geothermal waste (i.e., brine particulates or precipitates) shall not be discharged to the Brine Pond as a final form of disposal.

8. Domestic waste; burning waste and ashes; oil and greasy waste; and/or sewage shall not be discharged to the Facility WMUs.

B. Brine Pond Discharge and Operation Specifications

1. Discharges to the Brine Pond shall be limited to the following waste streams:

    a. Geothermal drilling wastes, well cleanout fluids, well-test fluids, and production-well startup fluids;

    b. Geothermal brine and brine precipitates (solids and sludge);

    c. Wastewater generated from plant cleanups and washdowns discharged via the conveyance system;

    d. Cooling tower blowdown;

    e. Portable shower effluent;

    f. Water from hydroblasting;

    g. Vehicle washing station effluent;

---

[10] This prohibition does not apply to discharges via injection wells, which are regulated by CalGEM.

h. Filtrate of Brine Pond-solids dewatering that is being returned to the Brine Pond from the filter press or other dewatering process allowed by this permit;

i. Lime sump effluent; and

j. Effluent from air emission abatement equipment.

2. The Discharger shall comply with all applicable provisions of Title 27, including those not specifically referenced herein.

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. Discharges to the Brine Pond shall not result in the concentration of any Constituent of Concern (including Monitoring Parameters), as defined in the operative Monitoring and Reporting Program, to exceed its representative Water Quality Protection Standard (WQPS) Concentration Limit in any monitoring medium.[11]

5. The Discharger shall promptly notify the Regional Water Board of any slope failure occurring at the Brine Pond. The Discharger shall promptly correct any failure which threatens the integrity of containment features or the unit in accordance with the method approved by the Regional Water Board's Executive Officer.

6. The Discharger shall promptly remove and properly dispose of any unpermitted wastes that are discharged at the Facility in violation of these requirements.

7. All leachate collected from the Brine Pond LCRS shall be returned to the Brine Pond.

8. At least **30 days prior** to the use of a new chemical class for control of microbes, pH, scale, and corrosion of cooling tower water and/or geothermal brine, the Discharger shall notify the Regional Water Board's Executive Officer in writing. The use of a new class of chemicals may not

[11] The concentration limit for each constituent will be set in accordance with the MRP. Data analysis shall be performed in accordance with the MRP.

be utilized until approved in writing by the Regional Water Board's Executive Officer.[12]

9. The Discharger shall maintain sufficient freeboard in the Brine Pond at all times to accommodate seasonal precipitation and to contain a 1,000 year 24-hour storm event, but in no case no less than two (2) feet of freeboard (measured vertically).

10. Any direct-line discharge to the Brine Pond shall have fail-safe equipment or operating procedures to prevent overfilling. Discharges shall be stopped in the event of any containment system failure which causes a threat to water quality.

11. If during the active life of the Brine Pond, the wastes are removed and the bottom of the impoundment is cleaned down to the liner, an inspection shall be made of the bottom of the liner prior to refilling of the impoundment to confirm that the liner has not been damaged. A copy of the inspection's findings and recommendations shall be sent to the Water Board. Any excessive leachate producing events shall follow the appropriate reporting requirements.

12. The Brine Pond's LCRS shall be designed, constructed, maintained, and operated to collect, store, and remove twice the maximum anticipated daily volume of leachate from the WMU.

13. The Brine Pond LCRS shall be operated to function without clogging through the scheduled WMU closure and during the post-closure maintenance period (if clean closure does not occur). The LCRS shall be tested at least annually to demonstrate proper operation and system continuity. The results of the tests shall be compared with earlier tests made under comparable conditions and reported to the Regional Water Board in the annual monitoring report.

14. The liquid entering the LCRS sump shall not accumulate and extend out of the LCRS sump and into the collection portion of the LCRS. The Discharger shall remove fluids from the LCRS sump as often as needed to prevent the liquid in the LCRS from backing up into the collection portion of the LCRS.

---

[12] The Regional Water Board's Executive Officer may revise the Monitoring and Reporting Program to incorporate the new class of chemical(s) as a monitored Constituent of Concern.

15. LCRS maintenance and repair plans shall be submitted to the Regional Water Board in advance of any work. The Discharger is only authorized without prior approval to conduct ongoing, minor maintenance repairs to minimize the exposure of the liner and keep any tears from the edges of the liner from worsening. Surface impoundment repair plans and liner Construction Quality Assurance (CQA) Plans shall be developed and stamped by a licensed professional experienced in this type of work prior to it being conducted.

16. Residual solids removed from the Brine Pond shall be discharged at a solid waste management facility (landfill) permitted to receive such wastes. The Discharger shall maintain legible records on the volume and type of waste removed from the Brine Pond and shall submit a shipping manifest or other appropriate documentation showing the disposal method and location for wastes removed during a monitoring period within each respective monitoring report.

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. 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.

19. Public contact with material containing geothermal wastes shall be precluded through fences, signs, or other appropriate alternatives.

20. The Brine Pond shall be operated, and maintained to limit, to the greatest extent possible, erosion, slope failure, overtopping, inundation or washout, and damage resulting from natural disasters such as: flood volumes from a 24-hour storm event having a predicted frequency of once in 1,000 years, pursuant to Title 27, section 20375; the Maximum Credible Earthquake (MCE) pursuant to section 20310, Table 4.1; and severe wind storms.

C. Mud Sump Construction, Discharge and Closure Specifications

1. The Discharger shall maintain sufficient freeboard in the Mud Sump at all times to accommodate seasonal precipitation and to contain a 1,000 year 24-hour storm event, but in no case no less than two (2) feet of freeboard (measured vertically).

2. Permanent (longer than one year) disposal or storage of drilling waste to the Mud Sump is prohibited, unless authorized by the Regional Water Board Executive Officer. The discharge of solid geothermal waste to the Mud Sump as a final means of disposal is prohibited without authorization by the Regional Water Board Executive Officer.

3. The Mud Sump must be lined. Drilling waste shall not penetrate the lining during the containment period based on the estimated hydraulic conductivity of the liner system and the duration of waste containment.

4. The Mud Sump shall be constructed, operated and maintained to ensure their effectiveness, in particular:

    a. Erosion control measures shall be implemented;

    b. Liners in the Mud Sump shall be maintained to ensure proper function, and

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

5. Based on representative sampling, clay liners must be certified by a Civil Engineer or Certified Engineering Geologist, registered by the State of California, to have a minimum thickness of one-foot, maximum hydraulic conductivity of $1x10^{-6}$ cm/sec, and relative compaction of at least 90 percent. Synthetic liners must be certified by a Civil Engineer or Certified Engineering Geologist, registered by the State of California, that installation was in accordance with manufacturer recommendations, and that no damage occurred during placement. The certification must be submitted in writing to the Regional Water Board prior to use of the Mud Sump. After cleanout of discharged solids, the integrity of the liner must be re-certified before reuse.

D. Monitoring, Reporting and Notification Requirements

1. **Monitoring and Reporting Program.** The Discharger shall comply with the operative Monitoring and Reporting Program (MRP) attached as

Attachment A, including all monitoring and reporting activities required thereunder. In the event that a Revised MRP is issued by the Executive Officer, the Discharger shall comply with the provisions of the Revised MRP in lieu of those set forth in Attachment A.

2. **Title 27 Monitoring for Brine Pond.** In accordance with the operative MRP, the Discharger shall conduct the following water quality monitoring and response programs for the Brine Pond:

   a. Detection Monitoring Program (Title 27, § 20420)

   b. Evaluation Monitoring Program (Title 27, § 20425), when there is "measurably significant evidence of a release" (see § 20164) or significant physical evidence of the same[13]; and

   c. Corrective Action Monitoring Program, as necessary.

3. **Sample Collection and Analysis Plan.** Within **90 days** of the adoption of these WDRs, the Discharger shall submit, for review and written approval by the Executive Officer, a comprehensive Sample Collection and Analysis Plan[14] (SCAP) that shall describe in detail the methods to be used to perform all monitoring activities for all onsite features, including:

   a. Sample collection procedures describing purging techniques, sampling equipment, and decontamination of sampling equipment;

   b. Sample preservation information and shipment procedures;

   c. Sample analytical methods and procedures;

   d. Sample quality assurance/quality control (QA/QC) procedures;

---

[13] Significant physical evidence of a release includes unexplained volumetric changes in surface impoundments, unexplained stress in biological communities, unexplained changes in soil characteristics, visible signs of leachate migration, and unexplained water table mounding beneath or adjacent to the unit and any other change to the environment that could reasonably be expected to be the result of a release from WMU.

[14] Once the SCAP is approved, the Discharger may request changes to the approved SCAP, as needed, but shall use the procedures described in the approved SCAP until otherwise authorized in writing by the Regional Water Board’s Executive Officer.

e. Chain of custody control; and

f. Sample analysis information including sample preparation techniques to avoid matrix interferences, method detection limits (MDLs), practical quantitation limits (PQLs) and reporting limits (RLs), and procedures for reporting trace results between the MDL and PQL.

4. **Slope Failures Notification.** The Discharger shall promptly notify the Regional Water Board of any slope failure occurring at the Brine Pond or the Mud Sump.

5. **Geothermal Brine Spill Notification.** If leaks or failures in the aboveground pipelines carrying geothermal solution occur in excess of 150 gallons, or if there is any spill of geothermal fluid from the Brine Pond,[15] the Discharger shall do the following:

a. Orally report to the Regional Water Board office and the Office of Emergency Services within **24 hours** of when the Discharger becomes aware of the incident. If noncompliance occurs outside of business hours, the Discharger shall leave a message on the Regional Water Board's office voicemail.

b. Provide a written report within **five business days** of the time the Discharger becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance. The Discharger shall estimate the total volume as well as the vertical and horizontal extent of the spill/leak/release.

c. If the leak or failure was not captured in appropriate secondary containment, the Discharger shall submit a follow-up report within **30 days** of receipt of final test results that includes **confirmation sampling results** indicating that cleanup goals have been achieved.

6. **General Reporting Requirements.**

[15] Such releases constitute unauthorized discharges of waste.

a. **Technical Reports**. The following requirements are applicable to Technical Reports[16] submitted under the Waste Discharge Requirements Order or the Morning and Reporting Program.

i. The Technical Report shall be prepared by, or under the direct supervision of, a California-licensed civil engineer or engineering geologist that is competent and proficient in the field and subject matter of the submittal (Qualified Professional).

ii. The Technical Report shall be signed and stamped by the Qualified Professional.

iii. The Technical Report shall include a brief summary of the Qualified Professional's qualifications.

b. **Certifications**. All submittals (including non-Technical Reports) shall be accompanied by the certification language below, signed under penalty by a Senior Vice President or equivalent principal executive (Required Signatory) or their Authorized Representative of perjury.

To act as an Authorized Representative for a Required Signatory, an individual must be identified[17] and duly authorized in writing by the Required Signatory; this written authorization shall be provided to the Board beforehand, or concurrently with the first submittal signed by the Authorized Representative.

> 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,

[16] Technical reports are those that contain work plans, describe the conduct of investigations and studies, or contain technical conclusions and recommendations concerning engineering and/or geology.

[17] This identification may be in reference to the Authorized Representative's title or position, provided it is one that customarily has the responsibility of supervising a facility's overall operation (e.g., facility manager, superintendent).

including the possibility of fine and imprisonment for knowing violations.

c. **Transmittal Letter.** Each Self-Monitoring Report (SMR) shall be accompanied by a transmittal letter that:

i. Explains the essential points in the SMR; and

ii. At a minimum, identifies any violations found since the last report was submitted, and if the violations were corrected (f no violations have occurred since the last submittal, this shall be stated in the transmittal letter).

d. **Tabulated Data.** In reporting monitoring data SMRs, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to clearly illustrate whether the Facility is operating in compliance with the WDRs. Where appropriate, the Discharger shall include supporting calculations (e.g., for monthly averages).

e. **Certification.** Each SMR shall contain the following certification language, signed by an Authorized Signatory:

I certify under the penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. 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.

f. Electronic Submittals. All SMRs and technical reports under this Order (including the MRP) shall but submitted electronically via the State Water Board's GeoTracker database. Documents formerly mailed by the Discharger to the Regional Water Board, such as regulatory documents, narrative monitoring reports or materials, and correspondence, shall be uploaded into GeoTracker in the appropriate Microsoft Office software

application format, such as Word or Excel files, or as a Portable Document Format (PDF) file. Large documents must be split into appropriately labelled, manageable file sizes and uploaded into GeoTracker.

g. **Electronic Submittal of Information.** The Discharger shall comply with all applicable Electronic Submittal of Information (ESI) requirements.

7. **Additional Monitoring.** Whenever the Discharger conducts any monitoring and/or analytical activities not otherwise required under this Order (including the operative MRP), or conducts required activities on a more frequent basis, the results of such activities shall be included in the SMR for the subject monitoring period.

E. Brine Pond Closure and Financial Assurances Specifications

1. Within 90 days of Executive Officer approval in writing of the Closure Plan, the Discharger shall submit documentation demonstrating that it has obtained an appropriate financial assurance mechanism specified under Title 27 for clean-closure and corrective action related to the Brine Pond.

2. On June 1 of each year, the Discharger shall a report calculating the increase in the cost estimates for closure and corrective action due to the inflation factor (specified in Title 27, § 22236) for the previous calendar year.

3. The Discharger shall notify the Executive Officer in writing at least 90 days before initiating closure activities.

4. Clean Closure activities shall be conducted in accordance with the Closure Plan approved by the Executive Officer in writing.

5. A final Closure Report certifying that closure was completed according to the approved Closure plan and approved CQAQC plan shall be submitted to the Executive Officer for written approval.

6. The Brine Ponds shall not be closed as a landfill without the adoption of revised WDRs explicitly approving such closure activities.

7. Following an earthquake that generates significant ground shaking (Modified Mercalli Intensity Scale V or greater) at or near the Facility, the Discharger shall submit a detailed post-earthquake inspection and

corrective action plan. The plan shall address damage to and corrective measures for: containment structures; leachate control and stormwater management systems; wells and equipment to monitor groundwater; and any other system/structure potentially impacted by static and seismic deformations of the Brine Pond and Mud Sump. The Discharger shall notify the Executive Officer immediately, but no later than **24 hours**, of damage to either WMUs due to an earthquake, and provide a post-earthquake inspection report within **15 business days**.

F. Other Facility Provisions

1. All wastes removed from WMUs (including the Mud Sump) for offsite disposal shall be transported and disposed of in accordance with applicable laws and regulations.

2. Diversion and drainage facilities shall be designed, constructed, and maintained to:

    a. Accommodate the anticipated volume of precipitation and peak flows from surface runoff and under the precipitation conditions for the waste management unit.

    b. Effectively divert sheet flow runoff laterally, via the shortest distance, into the drainage and collection facilities.

    c. Prevent surface erosion through the use of energy dissipators, where required, to decrease the velocity of runoff, slope protection, and other erosion control measures where needed to prevent erosion.

    d. Control and intercept run-on, in order to isolate uncontaminated surface waters from water that might have come into contact with waste.

    e. Take into account:

        i. The possible effects of the waste management unit’s drainage pattern on and by the regional watershed.

        ii. The design capacity of drainage systems of downstream and adjacent properties by providing for the gradual release of retained water downstream in a manner which does not exceed the expected peak flow rate at the point of

discharge if there were no waste management units or facility.

iii. Preserve the system's function. The Discharger shall periodically remove accumulated sediment from the sedimentation or retention basins as needed to preserve the design capacity of the system.

3. Collection and holding facilities associated with precipitation and drainage control systems shall be emptied immediately following each storm or otherwise managed to maintain the design capacity of the system.

4. **Spill Prevention Plan.** Within **90 days** of the adoption of this Order, the Discharger shall submit the Spill Prevention Plan for approval by the Regional Water Board's Executive Officer. The Discharger shall develop and implement a plan for immediate detection of leaks or failures in the aboveground pipelines carrying geothermal fluids. If an automatic pump is being used, an alarm or shutoff device shall be installed on the pump used in the pipelines. Pumping of geothermal fluids shall be suspended immediately following major pipeline failure. The plan shall include routine inspection of the entire length of the aboveground line in operation at the time, and the maintenance of an inspection log. Leaks shall be repaired or halted immediately upon being identified. A sign should be posted to identify the fluid being pumped and alerting the public of the potential danger.

5. **Proper Operation and Maintenance.** The Discharger shall at all times properly operate and maintain all systems and components of collection, treatment, and control installed or used by the Discharger to achieve compliance with this Order. Proper operation and maintenance includes, but is not limited to, effective performance, adequate process controls, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities/systems when necessary to achieve compliance with this Order. All systems in service or reserved shall be inspected and maintained on a regular basis. Records of inspections and maintenance shall be retained and made available to the Regional Water Board on request.

6. **Reporting of Noncompliance.** The Discharger shall report any noncompliance that may endanger human health or the environment. Information shall be provided orally to the Regional Water Board office and the Office of Emergency Services within 24 hours of when the Discharger becomes aware of the incident. If noncompliance occurs

outside of business hours, the Discharger shall leave a message on the Regional Water Board's office voicemail. A written report shall also be provided within five (5) business days of the time the Discharger becomes aware of the incident. The written report shall contain a description of the noncompliance and its cause, the period of noncompliance, the anticipated time to achieve full compliance, and the steps taken or planned, to reduce, eliminate, and prevent recurrence of the noncompliance. All other forms of noncompliance shall be reported with the Discharger's next scheduled Self-Monitoring Reports (SMRs), or earlier if requested by the Regional Water Board's Executive Officer.

7. **Duty to Mitigate.** The Discharger shall take all reasonable steps to minimize or prevent any discharge in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment.

8. **Material Changes.** Before initiating a new discharge or making a material change in the character, location, or volume of an existing discharge, the Discharger shall report all pertinent information in writing to the Regional Water Board, and if required by the Regional Water Board, obtain revised requirements before any modifications are implemented. A material change includes, but is not limited to, the following:

    a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements;

    b. A significant change in disposal method, location, or volume (e.g., change from land disposal to land treatment);

    c. A change in the type of waste being accepted for disposal; or

    d. A change to previously approved liner systems or final cover systems that would eliminate components or reduce the engineering properties of components.

9. **Familiarity with Order.** The Discharger shall ensure that all site-operating personnel are familiar with the content of this Order and maintain a copy of this Order at the site.

10. **Inspection and Entry.** The Discharger shall allow the Regional Water Board, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to:

a. Enter the premises regulated by this Order, or the place where records are kept under the conditions of this Order;

a. Have access to and copy, at reasonable times, records kept under the conditions of this Order;

b. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and

c. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Order or as otherwise authorized by the Water Code, any substances or parameters at this location.

11. **Changes in Facility Ownership or Operators.**

a. Prior to any changes in Facility ownership, or any changes in operators (including parties responsible for performing activities to comply with this Order), the Discharger shall notify (in writing) the prospective owners or operators of the existence of this Order and the operative Monitoring and Reporting Program. Copies of this written notification shall be provided to the Board.

b. At least 30 days prior to the effective date of the transfer, the Discharger shall notify the Board of the effective date, and submit a signed statement by the new parties, affirming that they will comply with this Order and the operative Monitoring and Reporting Program as of the transfer date.

c. To assume ownership or operation under regulatory coverage of this Order, the new owner or operator shall apply in writing to the Board requesting transfer of coverage within 14 days of assuming ownership or responsibility for operation. The request shall contain the applicant's full legal name; place of incorporation (if corporation); names, addresses and telephone numbers of designated contact persons, and a signed statement affirming that the new owner or operator assumes full responsibility for compliance with this Order and the operative Monitoring and Reporting Program.[18]

[18] Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code.

12. **Monitoring Wells.** The Discharger shall comply with all notice and reporting requirements of the California Department of Water Resources and with any well permitting requirements imposed by a local agency regarding the construction, alteration, destruction, maintenance, or abandonment of any monitoring wells used for compliance with this Order (including MRP).

ADMINISTRATIVE REVIEW

Any person aggrieved by this Regional Water Board action may petition the State Water Board for review in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 et seq. The State Water Board must receive the petition by 5:00 p.m. on the 30th day after the date of this Order; if the 30th day falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the statutes and regulations applicable to filing petitions are available on the State Water Board's website and can be provided upon request.

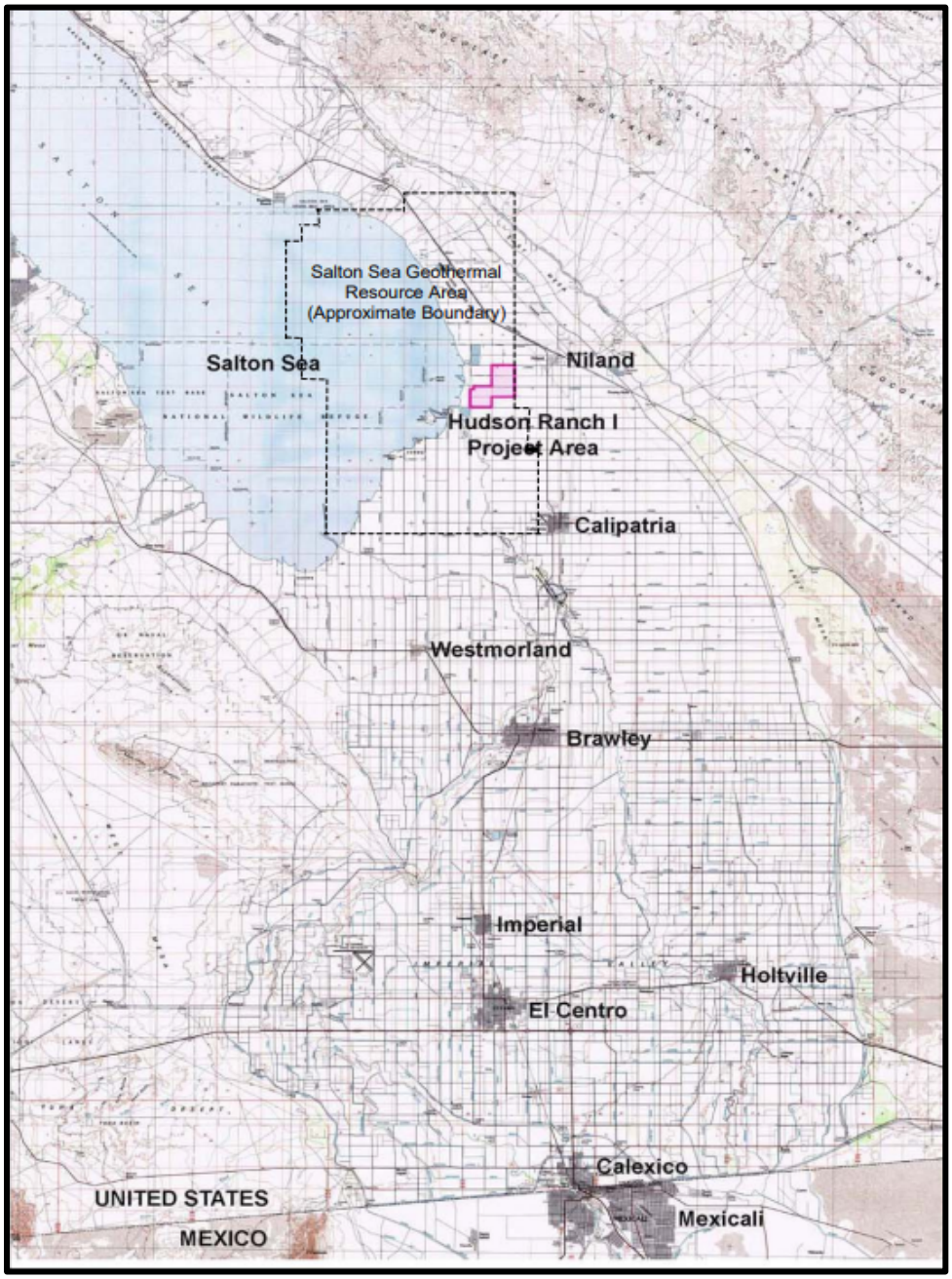
ORDER ATTACHMENTS

Attachment A—Maps and Schematics

Attachment B—Monitoring and Reporting Program

ATTACHMENT A—MAPS AND SCHEMATICS

Figure 1—Facility Location Map



ATTACHMENT A—MAPS AND SCHEMATICS

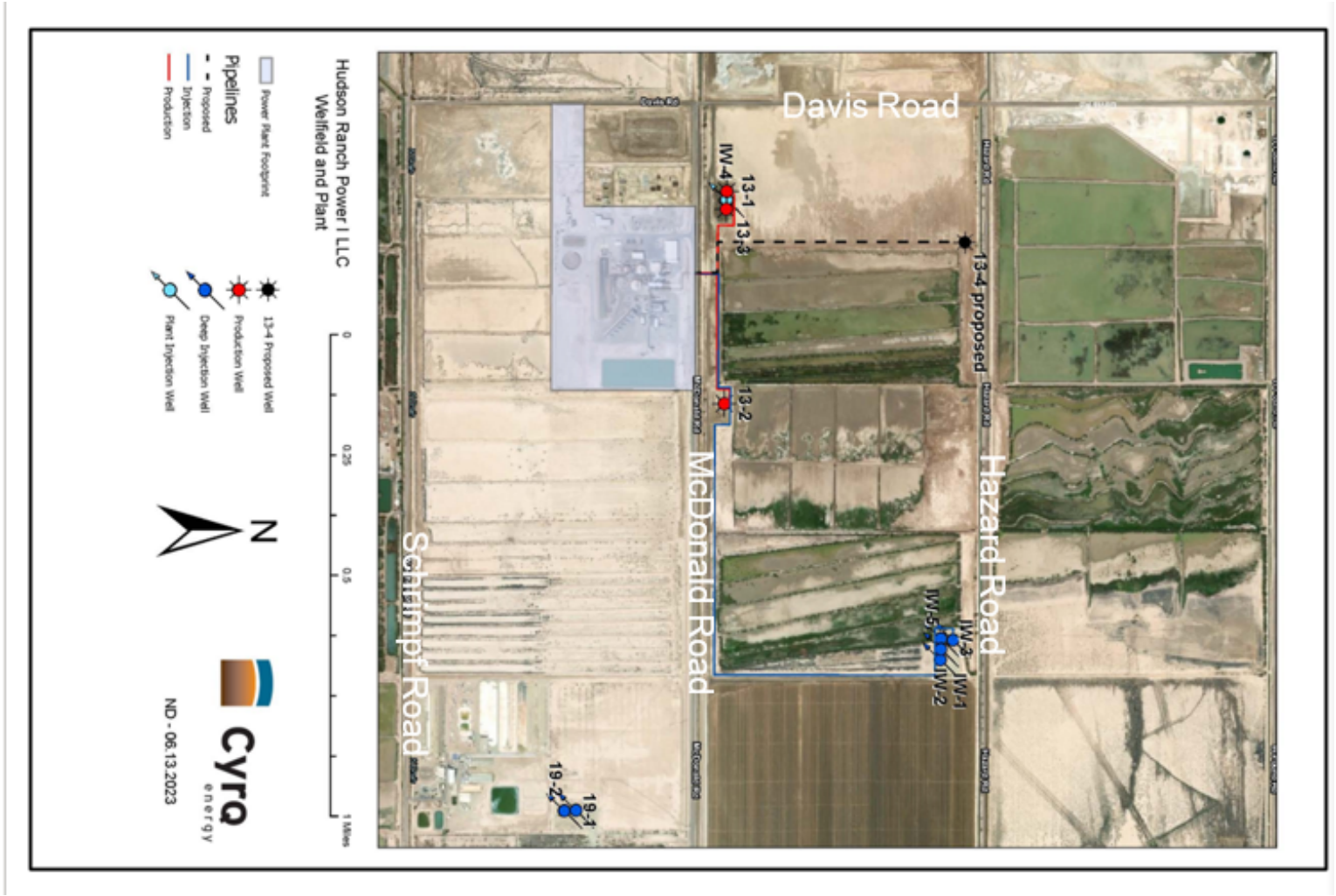


Figure 2—Geothermal Pipeline Location Map

ATTACHMENT A—MAPS AND SCHEMATICS

Figure 3—General Facility Map

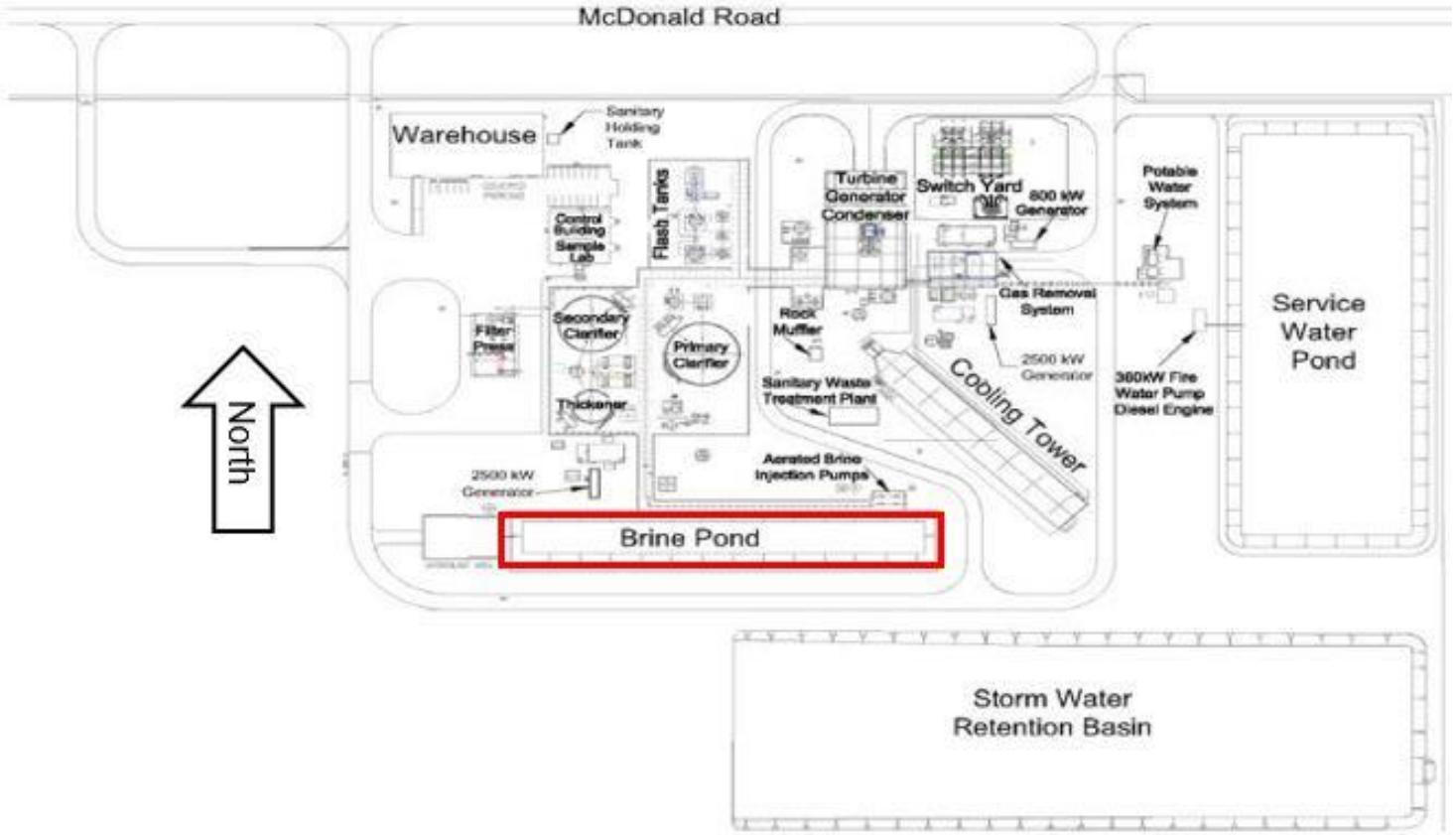


Figure 4—Geothermal Solids Management Schematic, Belt Filter System

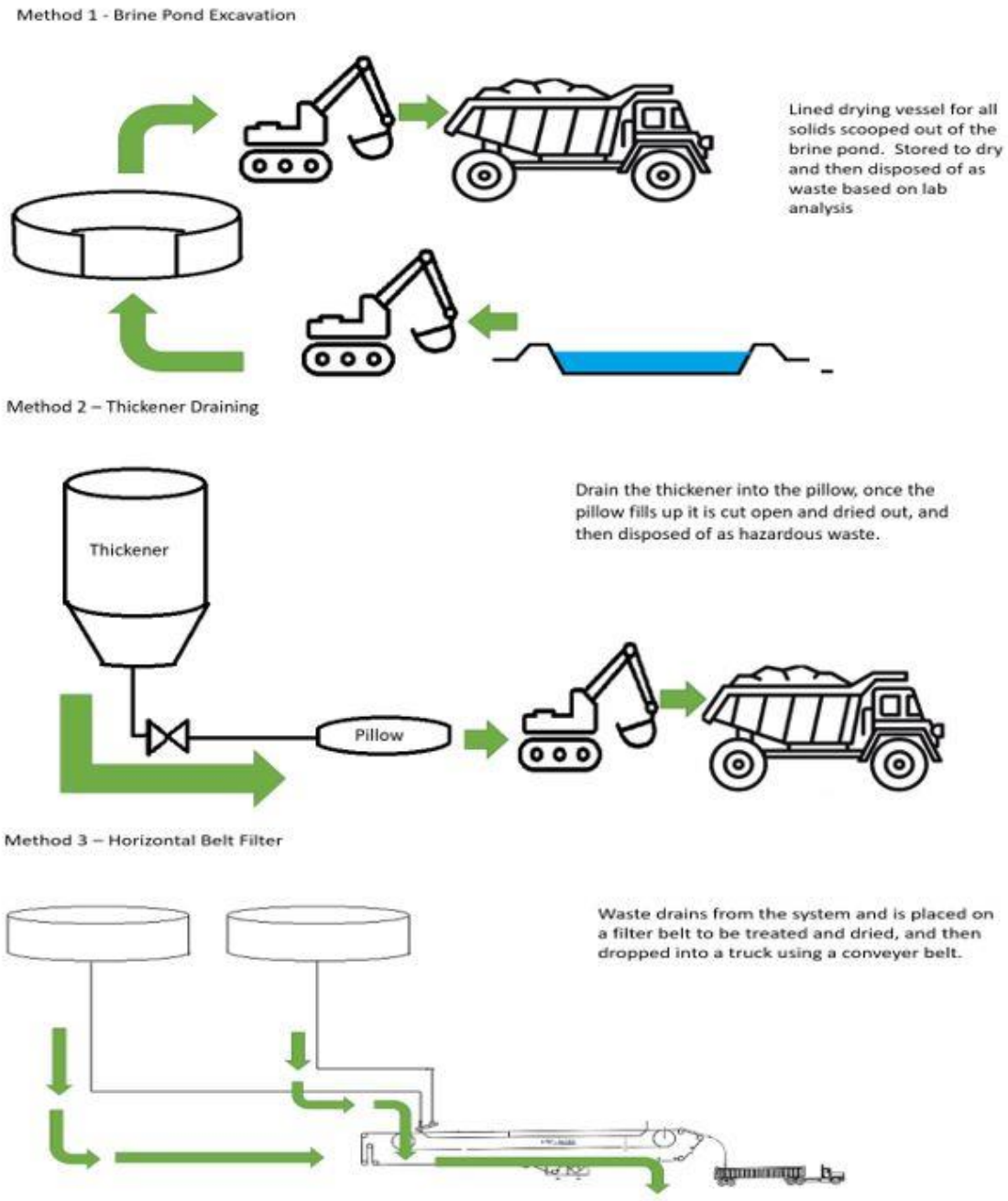
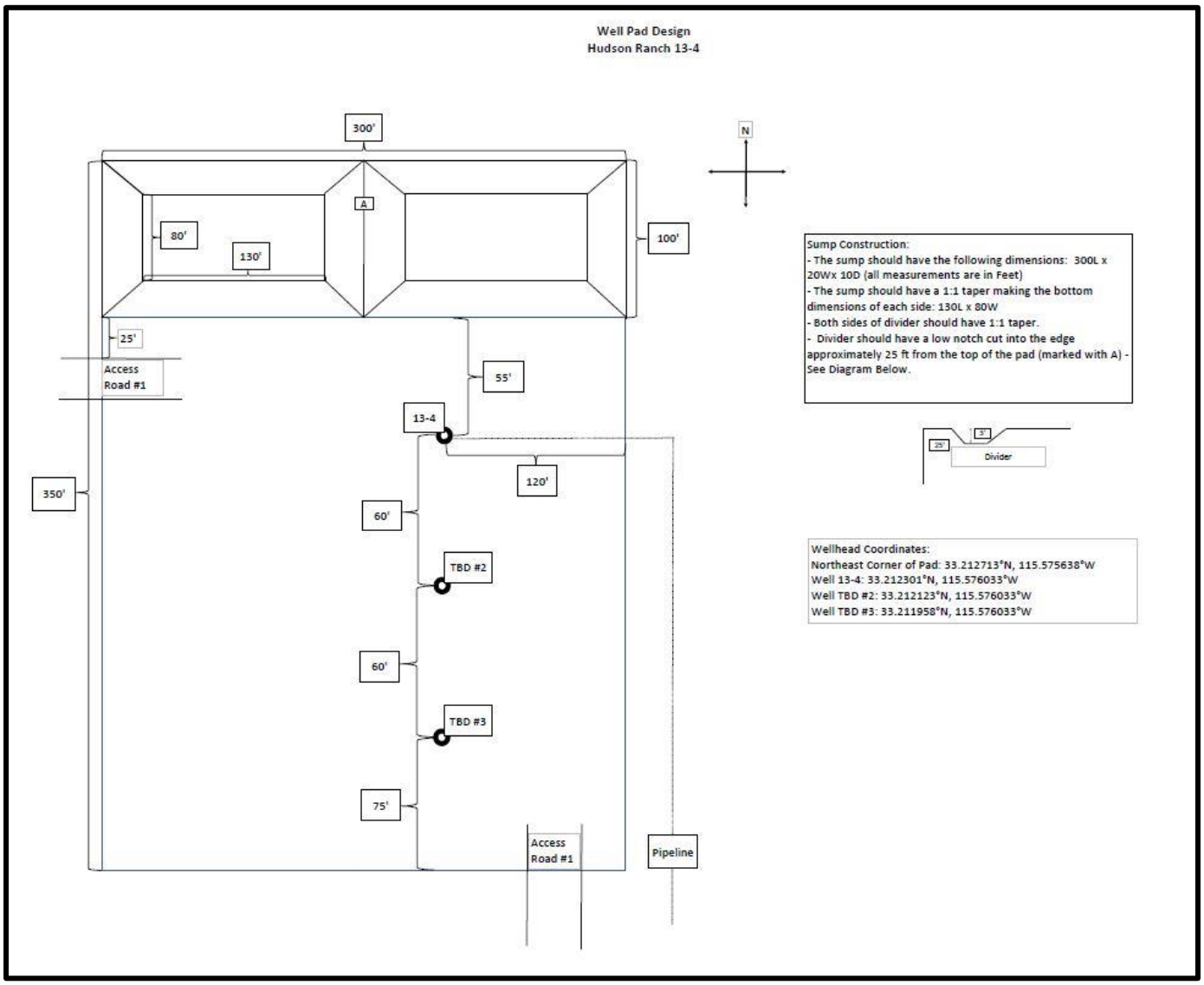


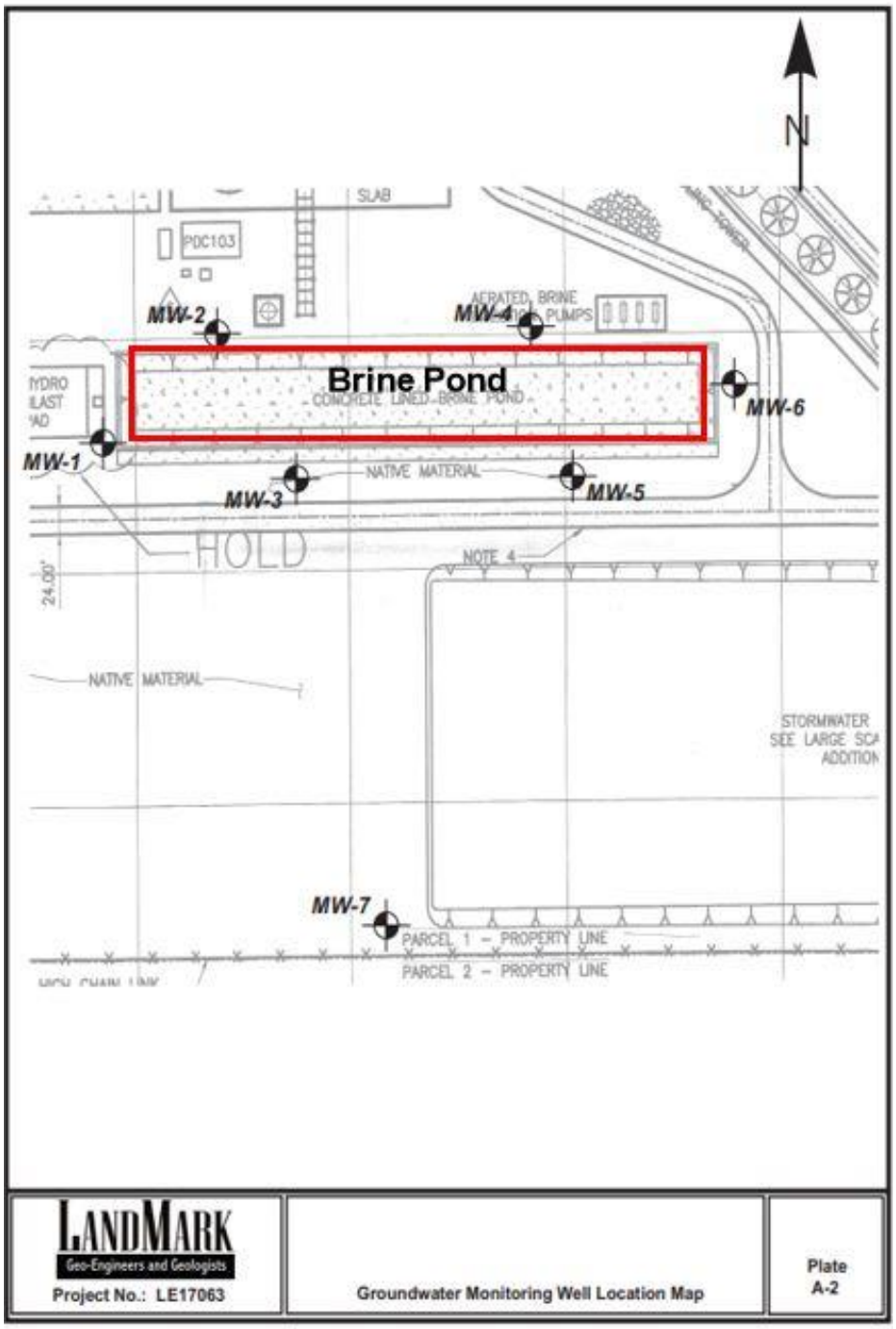
Figure 5—Geothermal Mud Sump Location Map

Figure 6—Schematic of Well Pad



ATTACHMENT A—MAPS AND SCHEMATICS

Figure 7—Monitoring Well Map



ATTACHMENT B—MONITORING AND REPORTING PROGRAM

A. General Sampling and Analysis Requirements

1. **Analytical Methods.** Specific methods of analysis for monitored waste constituents shall be identified in the SCAP. If the Discharger proposes to use methods other than those in the latest edition of the U.S. Environmental Protection Agency's (USEPA) *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium* (SW-846) or *Guidelines Establishing Test Procedures for Analysis of Pollutants*, 40 C.R.R. part 136, the SCAP must explain the rationale for the change. The change must be approved, in writing, by the Regional Water Board's Executive Officer prior to use.

2. **Monitoring Test Procedures.** The collection, preservation, and holding times of all samples shall be in accordance with protocols included in USEPA's SW-846 or 40 C.F.R. part 136, or as otherwise approved by the Regional Water Board. The Regional Water Board may, in its discretion, provide written requirements for methods that are more sensitive than those specified by USEPA, if determined necessary by the Regional Water Board's Executive Officer.

3. **30-Day Sample Procurement Limitation.** For any given monitored medium, the samples collected from all monitoring points and background monitoring points to satisfy the data analysis requirements for a given reporting period shall all be collected within a span not to exceed 30 days, unless a longer period is approved, in writing, by the Regional Water Board's Executive Officer and shall be collected in a manner that ensures sample independence to the greatest extent feasible. The 30-day limit does not apply to media that (1) are resampled to confirm the results of the initial round of samples, or (2) are resampled due to errors in the original sampling and analysis, but the Discharger shall conduct the resampling as expeditiously as practical.

4. **Laboratory Certification.** Unless otherwise approved, in writing, by the Regional Water Board's Executive Officer, all analyses shall be conducted by a laboratory certified by the State Water Resources Control Board (State Water Board), Division of Drinking Water's Environmental Laboratory Accreditation Program (ELAP).

5. **Reporting Levels.** All analytical data shall be reported with method detection limits (MDLs) and with either the reporting level or limits of

quantitation (LOQs) according to 40 C.F.R. part 136, Appendix B. The laboratory reporting limit for all reported monitoring data shall be no greater than the practical quantitation limit (PQL).

6. **QA/QC Data.** All quality assurance / quality control (QA/QC) data shall be reported, along with the sample results to which they apply, including the method, equipment, and analytical detection limits, the recovery rates, an explanation of any recovery rate that is less than 80 percent, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analyses, and the name and qualifications of the person(s) performing the analyses. Sample results shall be reported unadjusted for blank results or spike recovery. 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, but the analytical results shall not be adjusted.

7. **Instrumentation and Calibration**. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated, as necessary, to ensure their continued accuracy. If continuous monitoring equipment is out of service for a period greater than 24 hours, the Discharger shall obtain representative grab samples each day the equipment is out of service. The Discharger shall correct the cause(s) of failure of the continuous monitoring equipment as soon as practicable. The Discharger shall report the period(s) during which the equipment was out of service and if the problem has not been corrected, shall identify the steps which the Discharger is taking or proposes to take to bring the equipment back into service and the schedule for these actions.

8. **Field Test Instruments.** Field test instruments (e.g., those used to test pH, dissolved oxygen, and electrical conductivity) may be used provided:

   a. The user is trained in proper use and maintenance of the instruments,

   b. The instruments are field calibrated prior to monitoring events at the frequency recommended by the manufacturer,

   c. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency, and

   d. Field calibration reports are submitted.

9. **Records Retention.** The Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, for a minimum of five years from the date of the sampling or measurement. This period may be extended by written request from the Regional Water Board's Executive Officer at any time. Records of monitoring information shall include:

    a. The date, exact place, and time of sampling or measurement(s);

    b. The individual(s) who performed the sampling or measurement(s);

    c. The methods used for groundwater purging/sampling;

    d. The date(s) analyses were performed;

    e. The individual(s) who performed the analyses;

    f. The analytical techniques or method used; and

    g. All sampling and analytical results, including:

        i. units of measurement used,

        ii. minimum reporting limit for the analyses,

        iii. results less than the reporting limit but above the method detection limit (MDL),

        iv. data qualifiers and a description of the qualifiers,

        v. quality control test results (and a written copy of the laboratory quality assurance plan),

        vi. dilution factors, if used, and

        vii. sample matrix type.

B. Site-Specific Monitoring Requirements

1. **Groundwater Monitoring.** The Discharger shall operate and maintain a groundwater monitoring system for the Brine Pond that complies with the applicable provisions of Title 27, sections 20415 and 20420. Monitoring shall be performed in accordance with the locations, frequencies, and parameters described below.

    a. **Monitoring Well Locations.** The groundwater flow direction is predominantly NW, towards the topographical low point, the Salton Sea. One well (MW-7) is located approximately 500 feet south from the Brine Pond and is traditionally considered a background/upgradient monitoring point. MW-5, MW-7, and MW-6 (in order) have shown the lowest historical concentrations of TDS, followed by MW-4 and MW-3, and finally MW-1 and MW-2. This trend in TDS concentrations is consistent with the historical groundwater gradient but shows sizeable difference in concentrations of ~ 20,000 ppm between the lowest concentration and the highest concentrations.

    The Discharger has proposed to use the intrawell method (versus interwell, also known as upgradient/downgradient) for the determination of a measurable release from the Class II Surface Impoundment. The groundwater monitoring network consists of the monitoring wells **MRP Table 1** and any new monitoring wells added at the Facility (as approved by the Regional Water Board's Executive Officer).

MRP Table 1—Monitoring Wells Summary

Well	Location	Status	Frequency
MW-1	Southwestern Corner	Detection	Semiannually
MW-2	North Side, West	Detection	Semiannually
MW-3	South Side, West	Detection	Semiannually
MW-4	North Side, East	Detection	Semiannually
MW-5	South Side, East	Detection	Semiannually

Well	Location	Status	Frequency
MW-6	Northeastern Side	Detection	Semiannually
MW-7	South of Pond	Detection	Semiannually

2. **Parameters/Constituents Monitored.** Groundwater samples shall be collected from the detection monitoring wells and any additional wells added as part of the approved groundwater monitoring system. The collected samples shall be analyzed for the Monitoring Parameters specified below per the specified methods and frequencies.[19]

3. **Monitoring Parameters.** "Monitoring Parameters" shall consist of the (1) Field Monitoring Parameters and (2) Laboratory Monitoring Parameters specified below:

   a. Field Monitoring Parameters – During each groundwater monitoring event (Title 27, § 20415, subd. (e)(13)), the Discharger shall measure the field parameters listed in **MRP Table 2**.

   b. Laboratory Monitoring Parameters –Semiannually (2x/yr.), the Discharger shall, at a minimum, analyze the parameters listed below in **MRP Table 2**.

4. **Five-Year Constituents of Concern.** In addition to the Monitoring Parameters listed above, groundwater samples shall be analyzed at least once every five years for the additional Constituents of Concern (COC) listed in **MRP Table 3**, with the next monitoring event to be performed in **2024**. The results shall be reported in the annual monitoring report.

[19] "**Monitoring Parameters**" and "**Constituents of Concern**" shall have the meaning specified in Title 27, section 20164. "Monitoring Parameters" means the group of constituents specified below and includes physical parameters, waste constituents, reaction products, and hazardous constituents that provide a reliable indication of a release from a WMU. "Constituents of Concern" (COCs) include a larger group of waste constituents and mean any waste constituents, reaction products, and hazardous constituents reasonably expected to be in or derived from waste contained in a WMU.

MRP Table 2—Monitoring Parameter Requirements

Parameter	Unit	Sample Type	Reporting Freq.
pH	pH units	Grab	Semiannually
Depth to groundwater	Feet Below Elevation Datum	Measurement	Semiannually
Groundwater elevation	Feet above/below Elevation Datum	Measurement	Semiannually
Groundwater density	kg/L	Grab	Semiannually
Specific conductance	Micromhos/cm	Grab	Semiannually
Temperature	Degrees F	Grab	Semiannually
Total Dissolved Solids (TDS)	mg/L	Grab	Semiannually
Arsenic	µg/L	Grab	Semiannually
Barium	µg/L	Grab	Semiannually
Cadmium	µg/L	Grab	Semiannually
Lead	µg/L	Grab	Semiannually
Zinc	µg/L	Grab	Semiannually
General Chemistry (Ca, Mg, Na, K, SO_4, Cl, $HCO_{3)}$	mg/L	Composite	Annually

MRP Table 3—List of 5-Year COCs

Constituent
17 Heavy Metals (Cal. Code Regs., tit. 22, § 66261.24 / CAM 17)

5. **Unsaturated Zone Monitoring.** There is no unsaturated/vadose zone action monitoring program required at this time. Groundwater is known to exist 15-25 feet beneath ground surface (seasonal fluctuations).

6. **Surface Water Monitoring.** Numerous, highly incised, and unlined agricultural canals exist nearby the Facility that typically parallel the perimeter of agricultural plots in the area, adjacent to the paved roads and dirt access roads, including one immediately to the north (downgradient) of the Facility that parallels McDonald Road.

   Perennial streams are not located at the Facility and the occurrence of surface water should be limited to (1) immediately after significant storm events, and (2) if seeps develop along the perimeter of the Brine Pond.

7. **Observed Surface Water Monitoring.** If surface water is observed near the Brine Pond or Mud Sump, the source of the surface water shall be identified, and observations of the following shall be included in the next semiannual self-monitoring report (SMR):

   a. Flow rate and source of water;

   b. Floating and suspended materials of waste origin: Presence or absence, source, and size of affected area;

   c. Discoloration and turbidity: Description of color, source, and size of affected area;

   d. Evidence of odors: Presence or absence, characterization, source, and distance of travel from source; and

   e. Weather conditions: Wind direction and estimated velocity, total precipitation during the previous five (5) days and on the day of observation.

8. **Seep Monitoring.** If a seep is identified in proximity to the Brine Pond or Mud Sump:

   a. The location, flow rate, and other characteristics (such as color and odor) shall be orally reported to the Regional Water Board within **48 hours**, and a written report concerning the seep shall be submitted to the Regional Water Board **within seven (7) days**.

   b. Flow from the seep shall be contained to preclude the seep from adversely affecting surface waters.

c. A sample of the seepage shall be collected and tested for the Field Monitoring Parameters.

d. If the Field Monitoring Parameters indicate the seepage is not groundwater, or if it is unlikely the source of the seep is groundwater, the sample shall be analyzed for the Monitoring Parameters and 5-Year COCs.

e. The results of all testing shall be reported to the Regional Water Board **within seven days** of receipt of the written laboratory report.

f. Seeps that continue to exist for more than one reporting period shall be monitored during each reporting period and the results shall be included in the next semiannual SMR.

9. **Brine Pond Capacity Monitoring.** The Brine Pond shall be monitored at least monthly and included in the semiannual SMR for the following:

a. The daily average available freeboard in each pond and/or pond cell for that month.

b. The average monthly volume and maximum monthly volume of wastewater and/or freshwater discharged into the surface impoundments in gallons.

c. The average daily volume and maximum daily volume of wastewater and/or freshwater removed from the surface impoundment in gallons.

d. Observations of erosion, settlement, and/or subsidence along the visible areas of the surface impoundment(s), including the top of the berm, outer slopes, and upper region of the inner slope. Repairs shall be performed as needed and documented in the inspection logs.

10. **Geothermal Solids Monitoring.** When solid geothermal waste is removed from the Brine Pond for final disposal at a proper facility, the solid waste shall be monitored and sampled in accordance with Table 5 and Table 6, and the information shall be included in each SMR:

MRP Table 4—Geothermal Solids Monitoring

Parameter	Unit	Monitoring Frequency	Reporting Frequency
Volume of solids removed	Tons	Monthly	Semiannually
Location of final disposal	Facility Name	Monthly	Semiannually
Volume of solids/liquids contained	Gallons	Monthly	Semiannually

MRP Table 5 —Geothermal Solids Sampling

Constituents	Units	Sample Type	Reporting Freq.
Arsenic	µg/kg	Grab	Semiannually
Barium	µg/kg	Grab	Semiannually
Cadmium	µg/kg	Grab	Semiannually
Lead	µg/kg	Grab	Semiannually
Zinc	µg/kg	Grab	Semiannually

11. **Geothermal Wastewater Monitoring.** Samples of wastewater shall be collected from the Brine Pond and analyzed in accordance with Table 6 below.

MRP Table 6 —Brine Pond Class II Surface Impoundment Monitoring (Title 27)

Constituents	Units	Sample Type	Reporting Freq.
pH	mg/L	Grab	Semiannually
Total Dissolved Solids	mg/L	Grab	Semiannually
Specific Conductance	mg/L	Grab	Semiannually

Arsenic	µg/L	Grab	Semiannually
Barium	µg/L	Grab	Semiannually
Cadmium	µg/L	Grab	Semiannually
Lead	µg/L	Grab	Semiannually
Zinc	µg/L	Grab	Semiannually
General Chemistry (Ca, Mg, Na, K, SO_4, Cl, HCO_3)	mg/L	Grab	Annually

2. **Mud Sump Monitoring.** Samples from each Mud Sump shall be collected and analyzed in accordance with Table 7 below each time new drilling waste is added to the mud sump.

MRP Table 7 —Mud Sump Impoundment Monitoring (Non-Title 27)

Constituents	Units	Sample Type	Reporting Freq.
Volume of Solids Discharged into Mud Sump	Tons	-	Semiannually
Mud Sump Waste Volume Shipped to Offsite Waste Mgmt. Facility	Tons	-	Semiannually
Estimate Volume of Geothermal Brine (Commingled with Drilling Mud) Discharged in Tanks	Gallons	-	Semiannually
Name and Location of Waste Mgmt. Facility	Written	-	Semiannually
Description of General Conditions of Mud Sumps Including Observation of Erosion or Plant Growth	Written	-	Semiannually
Description of Mud Sump Construction or Maintenance	Written	-	Semiannually
Heavy Metals (Title 22)	mg/L	Grab	Semiannually
Total Petroleum Hydrocarbons (TPH)	mg/L	Grab	Semiannually
Inorganic Salts	mg/L	grab	Semiannually

12. **LCRS Monitoring and Maintenance.**

a. The Discharger shall test each LCRS sump annually to demonstrate proper operation and that the system is not blocked or otherwise restricted. (See Title 27, § 20340, subd. (d).) Except for the first annual test, the results of any leachate or condensate samples taken during testing shall be compared to earlier tests made under comparable conditions.

b. If the LCRS sump has a high-water alarm system that is functioning properly, the Facility shall monitor the height of liquid in each LCRS sump at least **quarterly** to an accuracy of one-quarter (1/4) inch. If the alarm system is not functioning properly, the frequency of this monitoring shall be **weekly**. The Discharger shall record the data in the monitoring logs and include the data in the SMR.

c. The Discharger shall measure the electrical conductivity and pH of any liquid removed from the sumps at least **quarterly**.

d. The Discharger shall remove fluids from each LCRS sump as often as needed to prevent the liquid in the sump from backing up into the collection portion of the LCRS. The removed liquid may be discharged back into the surface impoundment for that sump. The volume removed shall be measured and used to identify the leakage rate into each sump. The removal dates, volumes, and calculated leakage rates shall be included in the SMR and compared to each sump's specific Reporting Threshold (RT).

e. If an automated sump-pump is installed, an alarm shall also be installed to indicate if the sump fills beyond the upper limit of the sump-pump settings. Automated systems shall also include a means of monitoring changes in the height of liquid in the sump and measuring the frequency and volume of pumping. This data shall be converted to a daily leakage rate and summarized in the SMR. Automated sump pumps shall be tested at least annually to ensure they are functioning properly.

If leakage rates exceed the RT, which shall be by default one half of the LCRS sumps total volume or a site specific/LCRS-specific value that is determined based on historical performance of a LCRS and that has been approved by the Regional Water Board's Executive Officer in writing, the Discharger shall follow the steps in

Site Specific Monitoring Requirements B.14, Excessive Leachate Production. The default RT for this Facility's three LCRS sumps, within a 24-hour period, shall be specified in Table 8 below.

A workplan describing proposed changes to the LCRS monitoring system shall be submitted to the Regional Water Board for review and approval **prior** to implementing any proposed changes in the liner system that do not include regular inspection, maintenance, and repair of the existing, approved liner system.

MRP Table 8—Reporting Thresholds for LCRS Sumps

Sump #	Reporting Threshold (Gallons per 24-hour period)
West	75
Mid	75
East	75

13. Evaluation Monitoring

a. **Notification of a Release.** Should the Discharger discover a release from the Facility, the Discharger shall:

i. Initial Notification. Notify the Regional Water Board by phone or e-mail within 24 hours, and by mail within seven days, when the Discharger determines from monitoring results that there is measurably significant evidence of a release. (Title 27, § 20420, subd. (j)(1).)

ii. Retest. The Discharger may immediately initiate the verification procedure specified in 3.B.1, Determination of Measurably Significant Evidence of a Release, to verify that there is "measurably significant" evidence of a release of a

particular constituent.20 (Title 27, § 20420, subd., subd. (j)(2).)

iii. Notice to Nearby Landowners. The Discharger shall, within 14 days of confirming measurably significant evidence of a release, notify all persons who own the land or reside on the land that directly overlies any portion of the plume of contamination, if sampling of detection monitoring wells indicates contaminants have migrated off-site. (40 C.F.R. § 258.55(g)(1)(iii).)

b. **Evaluation of a Release.** If the Discharger determines that a previously unknown release from the Facility has occurred, the following actions shall be taken:

i. **Non-Statistical COC Scan.** If the detection was made based upon sampling and analysis for Monitoring Parameters, the Discharger shall immediately sample all monitoring points in the affected medium at that waste management unit and determine the concentration of all Monitoring Parameters and Constituents of Concern for comparison with established concentration limits. Because this scan does not involve statistical testing, the Discharger will only need to collect and analyze a single water sample from each monitoring point in the affected medium. (Title 27, § 20420, subd. (k)(1).)

ii. **Amended ROWD for Evaluation Monitoring Program (EMP).** The Discharger shall, **within 90 days** of confirming measurably significant evidence of a release, submit an amended Report of Waste Discharge (ROWD) proposing an evaluation monitoring program that meets the requirements of California Code of Regulations, title 27, sections 20420(k)(5) and 20425. The evaluation monitoring program shall be designed for the collection and analysis of all data necessary to assess the nature and extent of the release and to determine the spatial distribution and concentration of each constituent throughout the zone

[20] Under California Code of Regulations, title 27, section 20420(k)(7), the Discharger may also demonstrate that a source other than the waste management unit caused the release.

affected by the release. (Cal. Code Regs., tit. 27, §§ 20420, subd. (k)(5) and 20425(b).) The evaluation monitoring program shall also include any additional proposals necessary to comply with 40 C.F.R. § 258.55, particularly the additional monitoring wells required by 40 C.F.R. § 258.55(g)(1)(ii). Additionally, the Discharger shall add any 5-Year COC, or other COC that is reasonably suspected to have originated form the Facility, for which there is a confirmed measurably significant release to the list of Monitoring Parameters.

iii. **Preliminary Engineering Feasibility Study (EFS).** The Discharger shall, **within 180 days** of confirming measurably significant evidence of a release, submit to the Regional Water Board a preliminary engineering feasibility study (EFS) report for a corrective action program that meets the requirements of California Code of Regulations, title 27, sections 20420(k)(6) and 20430. At a minimum, the feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all COCs.

iv. **Additional EMP Required Actions.** The Discharger shall, **within 90 days** of establishing an evaluation monitoring program (i.e., from the date of Regional Water Board approval of the program), complete and submit the following:

(A) A report with the results and assessment/delineation of the release based on the approved evaluation monitoring program. (Cal. Code Regs, tit. 27 § 20425(b).)

(B) An updated engineering feasibility study for corrective action based on the data collected to delineate the release and data from the ongoing monitoring program required under title 27, section 20425(e). (Title 27, § 20425(c).)

(C) An amended ROWD to establish a corrective action program meeting the requirements of title 27, section 20430 based on the data collected to delineate the release and based on the updated

engineering feasibility study. (Title 27, § 20425(d).)

14. **Excessive Leachate Production**

a. If leakage rates in any LCRS sump exceed the default RT of 75 gallons per 24-hour period, or a site-specific RT that has been approved by the Regional Water Board's Executive Officer, the Discharger shall report this to the Regional Water Board within 48 hours and propose further actions to evaluate whether investigations or repairs are needed. Unless a Facility-specific RT is approved by the Regional Water Board, the default RT shall be one half of the volume of the sump per 24-hour period.

b. If further action is proposed, the Discharger shall submit a Workplan that includes a Construction Quality Assurance and Quality Control (CQAQC) section to the Regional Water Board prior to implementing any investigation or repairs. All investigations and repairs shall be conducted under the supervision of a licensed professional with appropriate experience for the proposed work.

c. The Discharger shall submit a final workplan that summarizes the result of the investigation, any work completed, or samples taken and shall demonstrate compliance with the previously submitted CQAQC section of the Workplan, for written approval by the Regional Water Board's Executive Officer within 30 days of completing any investigation, repairs, or obtaining sampling results.

d. The first instance excessive liquid is found in the LCRS sump:

i. The Regional Water Board shall be notified verbally within seven days,

ii. The Discharger shall summarize the occurrence within the monitoring report that corresponds with the reporting period it occurred in.

iii. Collect at least one sample of the leachate within 30 days and analyze it for the Monitoring Parameters and 5-Year COCs used for groundwater monitoring.

e. Any further instances of excessive liquid found in the LCRS sump:

i. The Discharger shall summarize the occurrence within the monitoring report that corresponds with the reporting period it occurred in.

ii. Collect at least one sample of the leachate each monitoring period and analyze it for the Monitoring Parameters and 5-Year COCs used for groundwater monitoring.

C. Monitoring Data Evaluation

1. **Water Quality Protection Standard.** The Water Quality Protection Standard (WQPS or Water Standard) consists of all COCs (§ 20395), the concentration limit for each COC (§ 20400), and the points of compliance for each monitored medium (§ 20405) for the duration of the compliance period (§ 20410).

   a. **Constituents of Concern (COCs).** The COCs are as defined above in Site-Specific Monitoring Requirements B.4, and include both Monitoring Parameters and Five-Year Constituents of Concern (5-Year COCs).

   b. Concentration Limits.

      i. Non-natural Constituents. For COCs that are not naturally occurring, the concentration limit shall be the detection limit of the laboratory testing procedure.

      ii. Naturally Occurring Constituents. For naturally occurring COCs, the concentration limit shall be the background concentration determined through either inter-well or intra-well comparisons.

      iii. Procedure for Approval of Concentration Limits. The Discharger shall submit a report proposing applicable background concentrations for each COC in the next Annual Monitoring Report. The Regional Water Board will review proposed concentration limits from the Discharger and approve, modify, or disapprove each proposed limit. (Title 27, § 20400.) Following initial approval of the concentration limits, the Discharger shall reevaluate and propose any updates to the concentration limits **every five years** thereafter, coinciding with the extended 5-year MRP event, **MRP Table 3**.

c. **Compliance Period.** The compliance period for each waste management unit includes the active life of each waste management unit, the closure period, the post-closure maintenance period, and any compliance period under Title 27, section 20410.

d. **Points of Compliance.** All monitoring wells established for the detection monitoring program shall constitute the points of compliance for the Water Standard.

2. **Statistical and Non-Statistical Analysis of Data.**

a. **General Requirements**

i. Title 27, section 20415, subdivision (e) describes a range of statistical and non-statistical data analysis methods that can be used to evaluate data collected during monitoring. In addition, USEPA published *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (EPA 530/R-09-007) in 2009.

ii. The Discharger shall evaluate the data obtained during a monitoring period using either a statistical or non-statistical method described in Title 27 or may propose another method for approval by the Regional Water Board's Executive Officer, as long as it achieves the goal of the monitoring program at least as well as the most appropriate method described in title 27, section 20415.

iii. The Discharger shall propose data analysis methods to be used in evaluating water quality monitoring data for each COC. (Title 27, § 20415, subd. (e)(7).) The specifications for each data analysis method shall include a detailed description of the criteria to be used for determining "measurably significant" (as that term is defined in title 27, section 20164) evidence of any release from the waste management unit and for determining compliance with the Water Quality Protection Standard.

iv. Monitoring reports shall describe the statistical or non-statistical method used for each COC at each monitoring point.

b. **Background Values**

i. Pursuant to Title 27, section 20415, subdivision (e)(10), the Discharger shall in a technical report justify the use of a procedure for determining the background value for each COC.

ii. Inter-well comparisons may be used where upgradient and downgradient wells intercept the same aquifer and are expected to have similar concentrations of naturally occurring constituents. Intra-well comparisons shall be used where uncontaminated background wells are not present, or the chemical composition of upgradient and downgradient wells are significantly different.

iii. In establishing COC background values, the Discharger shall ensure that sampling methods used comply with Title 27, section 20415, subdivision (e)(12), including that the number and kinds of samples collected must be appropriate for the form of data analysis employed and, in the case of statistical data analysis, follow generally accepted statistical principles. The sampling method (including the sampling frequency and the interval of time between successive samples) shall be appropriate for the medium from which samples are taken (e.g., groundwater, surface water, and soil-pore liquid). (See Title 27, § 20415, subd. (e)(6).) For groundwater, sampling shall be scheduled to include the times of expected highest and lowest elevations of the potentiometric surface.

3. **Determination of Measurably Significant Evidence of a Release**

a. **Initial Determination of Measurably Significant Evidence of a Release.** The Discharger shall use a statistical or nonstatistical data analysis method that complies with Title 27, section 20415, subdivision (e)(7)-(10) to compare the concentration of each COC with its respective background concentration to determine whether there has been measurably significant evidence of a release from the waste management unit. Whenever a COC is detected at a detection monitoring point at a concentration that exceeds the concentration limit from the Water Standard, the Discharger shall preliminarily conclude that there is measurably significant evidence of a release and follow the notification procedures 3.b.i.,

Determination of Measurably Significant Evidence of a Release (Title 27, § 20420, subd. (i).), immediately below.

b. **Confirmation of Measurably Significant Evidence of Release.** If there is a preliminary indication of a release, within **30 days** of such indication (Title 27, § 20415, subd. (e)(8)(E)(3)), the Discharger may implement a verification procedure/retest option in accordance with Title 27, section 20415(e)(8)(E).[21]

i. **Retest Method.** The verification procedure shall include either: (1) a single "composite" retest (i.e., a statistical analysis that augments and reanalyzes the data from the monitoring point that indicated a release), or (2) at least two "discrete" retests (i.e., statistical analyses, each of which analyzes only newly acquired data from the monitoring point that indicated a release). (Title 27, § 20415, subd. (e)(8)(E).) The Discharger may use an alternate method with prior approval by the Regional Water Board that complies with the requirements of title 27, section 20415, subdivision (e)(8)(E) in addition to the performance standards of subdivision (e)(9).

ii. **Retest Samples.** The retest samples shall be collected from the monitoring point where the release is preliminarily indicated and shall be analyzed for the constituents that caused the need for the retest. (Title 27, § 20415, subd. (e)(8)(E)(7).)

iii. **Retest Reporting.** The Discharger shall report to the Regional Water Board the results of both the initial statistical test and the results of the verification procedure, as well as all concentration data collected for use in these tests, **within seven days** of the last laboratory analysis of the samples collected for the verification procedure. (Title 27, § 20415, subd. (e)(8)(E)(6).)

If the retest results of one or more of the retest data suites confirm the original indication, the Discharger shall conclude that measurably significant evidence of a release

[21] Under Title 27, section 20420(k)(7), the Discharger may also demonstrate that a source other than the WMU caused the release.

has been confirmed. The Discharger shall then follow the procedures identified in 3. D.1.Determination of Measurably Significant Evidence of a Release, immediately below.

D. Reporting

1. **Semiannual Reporting.** Except as otherwise specified herein,[22] the results of all monitoring activity shall be reported on a semiannual basis in Self-Monitoring Reports (SMRs), which shall be submitted in accordance with MRP Table 9 below. For each monitored medium, all monitoring results shall be reported semi-annually Reports shall include, at a minimum, the following:

MRP Table 9—Semiannual Reporting Schedule

Monitoring Period	Report Deadline
January 1 to June 30	August 15
July 1 to December 31	March 15

a. **Topographic Map.** A topographic map (or copy of an aerial photograph), at an appropriate scale, identifying the Facility, the locations of observation stations, monitoring points, background monitoring points, and the groundwater elevation contours with interpreted groundwater flow direction and gradient.

b. **Groundwater Elevations.** The method and time of groundwater elevation measurements, a description of the method used to purge the well and collect groundwater samples, and quality assurance/quality control (QA/QC) procedures used. The groundwater elevations shall be corrected for groundwater density using field measurements of groundwater density, depth to groundwater and depth to the bottom of the wells. A figure

[22] Examples of non-semiannual monitoring are where notifications or special reports are required to be submitted within a certain number of days following a given event, or where reporting is expressly specified as done annually.

depicting the groundwater elevation contours, corrected for density, shall be included in the report.

c. **Field Logs.** Field logs used during well purging and sampling. At a minimum, the field logs should include the following:

   i. The well number,

   ii. The sampling date and time,

   iii. The method of monitoring Field Monitoring Parameters and calibration of equipment used to monitor Field Monitoring Parameters,

   iv. The purge method (if a pump is used, include the depth of pump placement in each well and the pumping rate), and

   v. The purge and sample collection information such as: date each well was purged; well recovery time; method of disposal of the purged water; an estimate of the volume of water purged from each well; the results of all field analyses; depth to groundwater prior to purging, at the conclusion of purging, and when the sample was collected; the method of measuring the water level; and field personnel names and signature.

d. **Data Tables.** Cumulative tabulated monitoring data for all monitoring points and constituents (including the Monitoring Parameters and 5-Year COCs). Concentrations below the laboratory reporting limit shall not be reported as “ND,” unless the reporting limit is also given in the table. Otherwise, they shall be reported “<” next to the reporting limit (e.g., <0.10). Upon request of Regional Water Board staff, data files shall be provided electronically in a file format approved by the Regional Water Board. Electronic files shall not be password protected.

e. **Graphical Display.** For monitoring wells in corrective action or evaluation monitoring, a graphical display of groundwater concentrations for all COCs for which there is measurably significant evidence of a release, including all historical data for those COCs from at least 5 years prior to the detection of a release at that location. Each graph shall plot the concentration of one or more constituents at an appropriate scale that allows

changes in concentrations to be discerned, including the use of a semi-log scale for concentrations that change by more than three orders of magnitude.

f. **Summary of Groundwater Conditions.** A written summary of the monitoring results and any changes to the groundwater monitoring system from the previous report. The written summary shall include a discussion of the groundwater flow rate and direction,[23] the appearance of trends or other information that may indicate a potential change in the hydrogeologic conditions beneath and adjacent to the Facility.

g. **Evaluation of Groundwater Data.** An evaluation of the groundwater monitoring data analyzed according to the methods described in **Section C** of this MRP, and whether the analysis indicates a release of waste constituents or waste degradation products from the Facility.

h. **Leachate Evaluation.** A summary of leachate data for the Brine Pond, including any laboratory results and measurements of the height of liquids in LCRS sumps. The Discharger shall also calculate the leakage rate and compare the value to the RT for each LCRS sump.

b. **Summary of Excessive Leachate Production Events.** The Discharger shall summarize any excessive leachate production events that occurred during the reporting period, including the amounts and water quality characterization of leachate produced, any proposed investigations and repairs, the results of any investigations and repairs, and any further action or samples taken.

i. **Sludge/Solids Evaluation.** A summary of sludge data for the Brine Pond.

---

[23] The estimated quarterly groundwater flow rate and direction in the uppermost aquifer, in any zones of perched water, and in any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report. (Cal. Code Regs., tit 27, § 20415(e)(15).)

j. **Waste Volumes.** A summary of all required information concerning waste volumes for the Brine Pond.

2. **Annual Reporting.** In addition to the information listed above, the second semiannual SMR (due March 15) shall contain the following information:

a. **Summary of Groundwater Monitoring Data.** A written summary of the groundwater monitoring results, indicating any changes made or observed since the previous Annual Summary Report. If a 5-year COC event was performed, then these parameters shall be presented in tabular format. All analytical data obtained during the previous year shall be presented in tabular form. Upon request of the Regional Water Board, the data shall be provided electronically in a file format and media acceptable to the Regional Water Board.

b. **Graphical Display.** A graphical display for all data collected for each monitoring point and background monitoring point. Each graph shall plot the concentration of one or more constituents over time for a given monitoring point. For any given constituent, the scale for all plots should be the same to facilitate comparison and identification of trends. On the basis of any outliers noted in the plotted data, the Regional Water Board may direct the Discharger to carry out a preliminary investigation, in accordance with Monitoring Data Evaluation 3.b.1, to determine whether a release is indicated. Trend analyses shall include identification of current trends, a comparison to previously identified trends, and a discussion of any significant changes in the trends.

c. **Background Concentration Limits Update.** Reevaluate background concentration limits (required every five years per Monitoring Data Evaluation3.b.iii) and propose any appropriate changes.

d. **Leachate Data Summary.** A summary of leachate data for the Brine Pond, consisting of the monthly total volume of leachate collected during the reporting year from the LCRS and any other leachate collection systems to demonstrate the effectiveness of the LCRS. This summary shall contain a brief discussion of the leachate sampling results and volume produced and how the leachate was disposed of during the reporting period. This summary shall also include a table consisting of the last five years

of leachate data collected at the Facility. The Discharger shall propose any updates to the RT for each LCRS sump during this time period based on the historical performance of each individual sump.

e. **Annual Waste Summary.** An annual summary consisting of the total volume of geothermal wastes generated at the waste management unit. The summary shall contain a table that lists each category of waste and the volume accepted at the waste management unit during the reporting period.

f. **Site Conditions Summary.** Include a comprehensive discussion regarding the condition of the Facility, including, but not limited to, interim cover areas, the current operational area, maintenance roads, the erosion and drainage control measures implemented to control run-on and run-off during the rainy season, the condition of monitoring wells, piezometers, and any other monitoring device located at the Facility. The discussion should also highlight any areas of noncompliance observed and repaired during the previous year and should be documented with photographs and inspection reports.

g. **Compliance Summary.** Include a comprehensive discussion of the compliance issues during the reporting period (the past year), and of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the Order or this MRP.

h. **Integrity Summary.** Include a summary of any major repairs to any groundwater monitoring wells geothermal conveyance pipelines, the mud sump, or the Brine Pond that occurred during the year.