

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/

ORDER R7-2019-0018



Order Information

Dischargers: Ormat Nevada Inc., Orni 17 LLC, Orni 19 LLC
Facility: North Brawley Geothermal Power Plant
Address: 4982 Hovley Road Brawley, CA 92227
County: Imperial County
WDID: 7A132241001
GeoTracker ID: T10000008564
Prior Order(s): R7-2008-0004, R7-2008-0032

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 November 14, 2019.

Original signed by

PAULA RASMUSSEN
Executive Officer

Table of Contents

Findings.....	1
Site History and Facility Operations.....	2
Geothermal Drilling Wastes	6
Drilling Waste Containment Basins/Mud Sumps	8
Hydrogeologic Conditions.....	9
Basin Plan, Beneficial Uses, and Regulatory Considerations.....	9
Antidegradation Analysis	11
Stormwater	13
CEQA and Public Participation	14
IT IS HEREBY ORDERED	15
A. Discharge Prohibitions	15
B. Discharge Specifications.....	16
C. Construction Specifications.....	18
D. Special Provisions.....	18
E. Standard Provisions	19
Attachment A—Site Map.....	1
Attachment B	1
Monitoring and Reporting Program R7-2019-0018	1
A. Sampling and Analysis General Requirements.....	1
B. Monitoring Requirements	3
C. Reporting Requirements	5

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN REGION

ORDER R7-2019-0018

WASTE DISCHARGE REQUIREMENTS
FOR
ORMAT NEVADA INC., OPERATOR
ORNI 17 LLC AND ORNI 19 LLC, OWNERS
NORTH BRAWLEY GEOTHERMAL POWER PLANT
WELL FIELD MUD SUMPS/CONTAINMENT BASINS
IMPERIAL COUNTY

The California Regional Water Quality Control Board, Colorado River Basin Region (Colorado River Basin Water Board) hereby makes the following Findings:

1. Ormat Nevada Inc. (Ormat) operates a 49.9-megawatt geothermal power plant; the North Brawley Geothermal Power Plant; and associated well fields and infrastructure (Facility) in the Imperial Valley. The power plant's address is 4982 Hovley Road Brawley, CA 92227. The power plant is owned by Orni 19 LLC, a wholly owned subsidiary of Ormat. A separate wholly owned subsidiary, Orni 17 LLC, leases private land from various surrounding landowners upon which are located the geothermal exploration; production; and injection wells associated with the power plant. Ormat, Orni 19 LLC, and Orni 17 LLC are hereinafter collectively referred to as the "Discharger."¹
2. This Order regulates the handling and disposal of wastes generated during drilling and testing of geothermal wells serving the North Brawley Geothermal Power Plant. Each geothermal well at the Facility has an associated temporary containment basin/mud sump used to store semi-solid drilling waste for a maximum of 1 year while the waste dries out.
3. The Facility is located within the Brawley Known Geothermal Resource Area (KGRA), approximately two miles north of the City of Brawley in Imperial County. Primary access to the Facility is via Hovley Road and farm access roads. The Facility location is depicted in **Attachment A** – Site Map, which is incorporated herein and made part of the Order. The Facility is assigned California Integrated Water Quality System (CIWQS) No. 7A132241001 and GeoTracker Global Identification No. T10000008564.

¹ The Discharger's corporate office is located at 6140 Plumas Street, Reno, NV 89519.

4. On December 17, 2018, the Discharger submitted an application, Report of Waste Discharge (ROWD), to the Colorado River Basin Water Board applying for updated Waste Discharge Requirements (WDRs) for the Facility.
5. The Facility was most recently regulated under two separate WDRs; Order R7-2008-0004 (North Brawley Geothermal Exploration Project), adopted on January 16, 2008, and Order R7-2008-0032 (Brawley 2 Geothermal Exploration Project²), adopted on May 21, 2008. The two orders regulated drilling waste generated at separate geothermal well fields within the Brawley KGRA, with the Discharger intending to build to separate power plants for each well field. However, a power plant was never constructed for the well field associated with the “Brawley 2 Geothermal Exploration Project,” and this same well field now serves the North Brawley Geothermal Power Plant. The Discharger has therefore requested that the Colorado River Basin Water Board combine the two orders to reflect current site operations.
6. This Order updates and combines the two prior WDRs to reflect current site operations and to comply with current laws and regulations applicable to the discharge. Accordingly, this Order supersedes Orders R7-2008-0004 and R7-2008-0032 upon the effective date of this Order, except for enforcement purposes.

Site History and Facility Operations

7. Early development of the North Brawley KGRA first began in the 1970s. Three companies drilled geothermal wells between 1970 and 1980: Union Oil Company (Unocal), Chevron Oil Company, and Grace Geothermal Company. A total of 52 thermal gradient wells, ranging in depth from 76 to 152 meters, and 16 deep exploratory wells were drilled during the early exploration period. (Matlick et al., 2008.³)
8. Between 1982 and 1985, Southern California Edison operated a 10-megawatt experimental power plant in the North Brawley KGRA, becoming the first successful flash-steam project in the United States. The power plant was decommissioned due to scaling and corrosion problems and a lease dispute. (Matlick et al., 2008.)
9. Further geothermal exploration took place in 2007 when Ormat began exploratory drilling in the North Brawley KGRA, producing a total of 5 new geothermal wells (OB-1, OB-3, OB-4, OB-5, AND OB-6). The purpose of the exploration was to gather scientific information on the geothermal resource and its power-generating potential. The Colorado River Basin Water Board regulated discharges of drilling waste from the exploration under Order R7-2007-0012.

² Also known as the East Brawley Geothermal Exploration Project.

³ Skip Matlick, Tim Jayne. 2008. *Brawley–Resurrection of a Previously Developed Geothermal Field*. Ormat Nevada Inc. GRC Transactions, Vol. 32:159-162.

10. Following the initial exploration project, Ormat decided to move forward with construction of the North Brawley Geothermal Power Plant and to further develop the surrounding well field. Imperial County authorized the construction and operation of the power plant and a maximum of 40 geothermal wells, including the five existing wells. On January 16, 2008, the Colorado River Basin Water Board rescinded Order R7-2007-0012 and replaced it with Order R7-2008-0004, which continued to regulate Ormat's discharges of drilling waste, but increased the number of 40 geothermal wells from 5 to 40.
11. On May 21, 2008, the Colorado River Basin Water Board also issued Order R7-2008-0032, which allowed the Ormat to drill six geothermal exploration wells in a nearby, separate well field still within the North Brawley KGRA. Ormat planned to construct a power plant and further develop the well field. However, the exploration proved less successful than hoped, and the well field developed under Order R7-2008-0032 now serves the North Brawley Geothermal Power Plant. A second power plant was never constructed for the second geothermal exploration permit issued within the same North Brawley KGRA.
12. On January 15, 2010, the North Brawley Geothermal Power Plant was placed in service. The plant is connected to surrounding geothermal well fields by a series of conveyance pipes, which transport geothermal brine to and from the power plant. Inside the plant, heat exchangers utilize the geothermal fluid to heat and vaporize a secondary working, organic fluid, which generates vapors/steam that drive the generator turbine. The plant is a "closed loop" system that does not utilize a Class II surface impoundment (i.e., brine pond) under California Code of Regulations, title 27, 20005 et seq. The power plant directly reinjects cooled geothermal brine back into the reservoir in order to maintain the North Brawley KGRA.
13. Each geothermal production, injection, or exploration well has an associated mud sump; geothermal brine and other liquids generated during drilling and testing of wells is discharged into large portable tanks, and the remaining semi-solid drilling waste is placed in mud sumps to dry out prior to final disposal.
14. Table 1 reflects current information on the status of each well, the underlying landowner, the Assessor Parcel Number (APN), and associated mud sump for the Facility's 17 production wells:

Table 1 - Production Wells

Well Number	Status	Landowner	APN	Open Mud Sump
PW 25-16RD	Shut-in	Lee Living Trust	037-130-005	X
PW 11-21	Active	Benson Farms	037-130-054	X
PW 18-16	Active	Benson Farms	037-130-054	X

Well Number	Status	Landowner	APN	Open Mud Sump
PW 41-21	Active	Benson Farms	037-130-054	X
PW88-17RD	Shut-in	Benson Farms	037-130-054	X
PW62-20/OB-6	Shut-in	Benson Farms	037-130-054	
PW 24-16	Shut-in	4VC's	037-140-001	X
PW 54-16	Shut-in	4VC's	037-140-001	X
PW 54-16	Idle	4VC's	037-140-001	X
PW 61-16	Shut-in	4VC's	037-140-001	X
PW 15-15	Idle	4VC's	037-140-002	X
PW 37-15	Observation	ORNI 17	037-140-006	X
PW43A-22	Active	Loma Farms	037-160-016	X
PW45-22	Active	Loma Farms	037-160-019	X
PW 61-21	Shut-in	4VC's	037-160-047	X
PW63-21/OB-4	Shut-in	4VC's	037-160-047	
PW 78-16	Shut-in	4VC's	037-160-050	

15. Table 2 reflects current information on the status of each well, the underlying landowner, the Assessor Parcel Number (APN), and associated mud sump for the Facility's 19 injection wells:

Table 2 - Injection Wells

Well Number	Status	Landowner	APN	Open Mud Sump
IW86-17	Active	Lee Living Trust	037-130-005	X
IW58-17RD	Active	Benson Farms	037-130-041	X
IW58A-17RD	Active	Benson Farms	037-130-041	
IW23-21RD	Idle	Benson Farms	037-130-054	
IW28-16	Active	Benson Farms	037-130-054	X
IW28A-16	Active	Benson Farms	037-130-054	

Well Number	Status	Landowner	APN	Open Mud Sump
IW68-17	Idle	Benson Farms	037-130-054	
IW23-21/OB-5	Idle	Benson Farms	037-130-054	
IW22-16	Observation	4VC's	037-140-001	X
IW28A-9	Idle	4VC's	037-140-001	X
IW28B-9	Idle	4VC's	037-140-001	
IW78-9/OB-2	Shut-in	4VC's	037-140-002	
IW73-16/OB-1	Shut-in	4VC's	037-140-002	
IW 62-15	Active	Hannon Ranches	037-140-013	X
IW 62A-15	Active	Hannon Ranches	037-140-013	
IW 65-15	Active	DonBee Farms	037-140-015	X
IW65A-15	Active	DonBee Farms	037-140-015	
IW78A-16	Active	4VC's	037-160-050	X
IW45-21	Idle	Brawley Development Group	037-160-074	X

16. The actual number and location of production and injection well sites to be used at any time at the Facility will depend on the results of drilling, testing, and the response of the geothermal reservoir. The Discharger is permitted to construct of a total of 77 geothermal wells in the North Brawley KGRA under this Order. Presently, the Discharger has a total of 36 production and injection wells at the Facility. As new wells are constructed, the Discharger is required to provide notice to the Colorado River Basin Water Board as specified in Construction Specification C.2 below.

17. The California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) regulates 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:
 - a. approval of wells for re-injection;
 - b. flow rate and volume of geothermal fluids injected;
 - c. well location;

- d. casing design;
- e. casing leak detection;
- f. additives; and
- g. leak detection and inspection.

Geothermal Drilling Wastes

18. During the drilling and testing of geothermal wells, semi-solid waste generated is in the form of a mixture of drill cuttings, drilling muds with additives, and geothermal brine (**drilling waste**), described below:
- a. **Drill cuttings (rock)** – Small rock fragments pulverized during drilling and forced to the surface by drilling mud, aerated mud, and/or air.
 - b. **Drilling muds with additives** – Drilling fluid, also known as mud, is used to aid the drilling process. Muds are circulated through the drill bit to lubricate and cool the bit, control the formation fluid pressure, and aid in carrying the drill cuttings to the surface. Drilling mud is a type of mineral clay (such as bentonite clay), which is considered inert, used to help lift drill cuttings from the borehole and may add contaminants to groundwater monitoring wells. 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 are not expected to render the drilling mud hazardous when used according to manufacturer's specifications.
 - c. **Geothermal brine** – Geothermal brines in the area of the North Brawley KGRA are hot saline solutions that contain Total Dissolved Solids (TDS) ranging from 12,000 to 60,000 mg/L. Based on the results from five exploration wells during the initial exploratory phase, major constituents of the brine are predicted to be the following:
 - i. Sodium (Na) 5,000 mg/L
 - ii. Chloride (Cl) 8,000 mg/L
 - iii. Calcium (Ca) 1,000mg/L
 - iv. Potassium (K) 300 mg/L
 - v. Sulfate (SO₄) 100 mg/L
 - vi. Lithium (Li) 5 mg/L
 - vii. Lead (Pb) 1 mg/L
 - viii. Arsenic (As) 0.13 mg/L
19. Geothermal wells are drilled to minimize mixing of drilling mud and cuttings with geothermal brine. Only a small amount of brine may commingle with drilling mud, primarily brines in the part of the formation displaced by the drill bit.

20. Bore cleanout and flow tests are generally performed at the completion of drilling to remove drilling cuttings and mud and evaluate the well for geothermal production. Flow testing of existing wells may also be periodically required.
21. The Discharger reported two distinct periods of drilling activity and drilling waste generation during the years 2015 to 2019, as shown below:

Table 3 – Drilling & Waste Generation 2015-2019

Well Number	Estimated Waste Generated	Reporting Period with Drilling Activity
Well 45-22	21,500 cubic feet	2nd Quarter 2018
Well 43A-22	10,500 cubic feet	3rd Quarter 2016

22. The chemical composition of the semi-solid drilling wastes from 2015 to 2019 was as follows:

Table 4 – Drilling Waste Composition 2015-2019

Chemical	3 rd Quarter 2018 (µg/L)	3 rd Quarter 2017 (µg/L)
Antimony	ND	<15
Arsenic	4.54	<20
Barium	187.0	<1.0
Beryllium	ND	<1.0
Cadmium	ND	<1.0
Chromium	31.2	8.3
Cobalt	2.59	3.3
Copper	17.6	3.9
Lead	10.8	5.3
Molybdenum	ND	<5.0
Nickel	810.5	6.5
Selenium	ND	<1.0
Silver	ND	<2.0
Thallium	ND	<5.0

Chemical	3 rd Quarter 2018 (µg/L)	3 rd Quarter 2017 (µg/L)
Vanadium	8.5	16.2
Zinc	48.8	20.7
Mercury	ND	<0.1
TPH (Gas)	0	ND
TPH (Diesel)	61	ND

Drilling Waste Containment Basins/Mud Sumps

23. Drilling waste generated during geothermal well drilling and testing is discharged to containment basins/mud sumps designed to temporarily (for one year or less) contain the material while drying.
24. Liquid wastes produced from drilling and testing of geothermal wells is contained in portable tanks and returned to the geothermal resource or discharged off-site to Class II surface impoundments built to the construction standards of California Code of Regulations, title 27, 20005 et seq. Standing fluid observed in mud sumps/containment basins (if any) is removed immediately, stored in portable tanks, and returned to the geothermal resource or discharged offsite into Class II surface impoundments.
25. Each mud sump must contain a compacted clay liner that is a minimum twelve inches thick with permeability of approximately 1×10^{-6} cm/sec, or a synthetic liner providing equivalent protection, for the duration of time the waste is being dried in the mud sump. Existing mud sumps at the Facility are approximately 100 feet by 250 feet by 7 feet deep and operated to maintain a minimum of two feet of freeboard.
26. A representative composite sample of the drilling waste is taken at the completion of drilling. If sample analysis confirms that the drilling waste is neither "designated" (as defined in Wat. Code, § 13173) nor "hazardous" (as defined in Cal. Code Regs., tit. 27, § 20164), the sump may remain open for future use. Wastes classified as "designated" or "hazardous" must be removed and transported to an appropriate disposal site no later than one year following their placement into the mud sump. The temporary, one-year requirement is based on the hydraulic conductivity of compacted clay layer. Any drilling waste subsequently discharged to the mud sump must be sampled as required for the initial discharge.
27. When a mud sump has been filled to within two feet of the top, or when it has been determined that there will be no further discharge to the sump, the Discharger may backfill with clean native soil capable of supporting vegetative growth, provided that all sampling and analyses have confirmed the contents of the sump to be

neither “hazardous” (as defined in Cal. Code Regs., tit. 27, § 20164) nor “designated” (as defined in Wat. Code, § 13173).

Hydrogeologic Conditions

28. The North Brawley KGRA is located within the Salton Trough area of southeast California. The Salton Trough is a tectonically active zone containing numerous faults associated with the San Andreas Fault Zone. The Facility is located on the north-central portion of the trough and is underlain by deltaic and lacustrine formations associated with the Colorado River delta. Bedrock in this part of the Salton Trough is approximately three miles below ground surface.
29. The regional groundwater flow direction within the Imperial Valley is toward the Salton Sea, which is a closed basin with a surface elevation of approximately 225 feet below sea level. The Facility is located approximately 120 feet below sea level; groundwater flows in a general northwest direction.
30. The Discharger reports that shallow groundwater in the area of the North Exploration Area occurs approximately ten feet below ground surface, flows generally to the northwest, and has a TDS concentration ranging from 10,000 to 20,000 mg/L. Groundwater depth, gradient, and quality in the area of the Brawley Exploration Area may be influenced, at times, by irrigation of adjacent agricultural fields, and by recharge from nearby canals.
31. Surface water in the area of the Facility consists of canals and agricultural drains operated and maintained by Imperial Irrigation District. The Discharger has determined that mud sumps/containment basins are not located in a 100-year flood zone.
32. Climate in the region is arid. Climatological data obtained from 1903 to 2015 indicate an average seasonal precipitation of 3.15 inches, and an average annual pan evaporation rate greater than 100 inches.

Basin Plan, Beneficial Uses, and Regulatory Considerations

33. The Water Quality Control Plan for the Colorado River Basin Region (Basin Plan), adopted on November 17, 1993 and most recently amended on January 8, 2019, 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 must 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.
34. The Facility is located within the Imperial Hydrologic Unit, and the Basin Plan designates the following beneficial uses for groundwater:

- a. Municipal Supply (MUN); and
 - b. Industrial Supply (IND).
35. The Basin Plan notes that the actual MUN usage of the Imperial Hydrologic Unit “is limited only to a small portion of that ground water unit.” Pursuant to State Water Board Resolution 88-63 (as revised by Resolution 2006-0008), also known as the “Sources of Drinking Water” Policy, all surface waters and groundwaters of the state are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Water Boards. However, a waterbody may be exempted from such designation if the TDS in the waterbody exceeds 3,000 mg/L and the waterbody is not reasonably expected to supply a public water system. An additional exemption is provided where the aquifer is regulated as a geothermal energy producing source. The Basin Plan incorporates the Sources of Drinking Water Policy by reference. First-encountered groundwater beneath the Facility is not currently used for municipal supply purposes because of its relatively high salt concentrations (TDS > 10,000 mg/L) and is not reasonably expected to supply a public water system. Additionally, the groundwater is regulated as a geothermal energy producing source.
36. 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. All American Canal System
 - i. Municipal (MUN);
 - ii. Agricultural (AGR);
 - iii. Aquaculture Supply (AQUA);
 - iv. Freshwater Replenishment (FRSH);
 - v. Industrial (IND);
 - vi. Groundwater Recharge (GWR);
 - vii. Water Contact Recreation (REC I);
 - viii. Non-Contact Water Recreation (REC II);
 - ix. Warm Freshwater Habitat (WARM);
 - x. Wildlife Habitat (WILD);
 - xi. Hydropower Generation (POW); and
 - xii. Preservation of Rare, Threatened, or Endangered Species (RARE).

37. 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). 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.
38. Discharges of drilling mud and cuttings from well-drilling operations are exempt from the requirements of California Code of Regulations, title 27, section 20005 et seq. This exemption is based on section 20090, subdivision (g), which applies to operations where:
 - a. Discharges of wastes are to on-site sumps and do not contain halogenated solvents, and
 - b. The Discharger either:
 - i. removes all wastes from the sump, or
 - ii. The Discharger removes all free liquid from the sump and covers residual solid and semi-solid wastes, provided that representative sampling of the sump contents after liquid removal shows residual solid wastes to be nonhazardous. If the sump has appropriate containment features, it may be reused.
39. Water Code section 13267 authorizes the Colorado River Basin Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (MRP) establishes monitoring and reporting requirements to implement state requirements and demonstrate compliance with this Order. The State Water Resources Control Board's (State Water Board) electronic database, GeoTracker Information Systems, facilitates the submittal and review of facility correspondence, discharger requests, and monitoring and reporting data. The burden, including costs, of the MRP bears a reasonable relationship to the need for the information and the benefits to be obtained from that information.
40. Pursuant to Water Code section 13263, subdivision (g), the discharge of waste is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

Antidegradation Analysis

41. State Water Board Resolution 68-16, *Statement of Policy with Respect to Maintaining High Quality Waters in California* (Resolution 68-16), generally prohibits the Colorado River Basin 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., the

violation of one or more water quality objectives). The discharger must also employ best practicable treatment or control (BPTC) 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.

42. Geothermal drilling waste naturally varies in its chemical makeup and may be hazardous or nonhazardous depending on the location of drilling and variation over time of the geothermal resource. Based on analytical data gathered from previous drilling and exploratory activities at this Facility, the main Potential Constituents of Concern (PCOCs) for this Facility include TDS, heavy metals, and petroleum hydrocarbons. These PCOCs are monitored for when any new drilling waste is temporarily stored in the mud sumps. The geothermal drilling waste is only temporarily stored in the lined mud sumps while drying, the sump has a liner design of a twelve inch compacted clay liner or equivalent to contain the waste, and the liner is certified by a Professional Engineer or Geologist who is registered with the state of California. If the Discharger wishes to reuse the mud sump after cleaning out waste from a previous drilling event, the Discharger is responsible for conducting confirmation sampling of the liner to confirm that it has not been compromised and will continue to function as designed. If the Discharger no longer wishes to use the mud sump and/or the one year containment period is reached, the Discharger will either clean close the mud sump by removing the waste and disposing of it in a certified final disposal facility or, if the waste is neither hazardous nor designated waste, the Discharger may close the sump with the waste in place with the permission of the Colorado River Basin Water Board's Executive Officer. Migration of PCOCs through the mud sump liner and into the soil surrounding the mud sumps or the local groundwater is not expected to occur, and therefore no degradation should occur of the state's surface water, groundwater, or soils.
43. The discharge of drilling waste to the mud sumps/evaporation basins, as permitted herein, reflects BPTC. These WDRs incorporate specific containment requirements for all discharged materials, including:
 - a. Temporary storage of geothermal drilling waste (less than one (1) year);
 - b. No discharge of geothermal brine, except for the small amount in that part of the formation displaced by the drill bit that may commingle with drilling mud.
 - c. Lining with a minimum of twelve (12) inches of compacted clay with 1×10^{-6} cm/sec permeability, or synthetic liner with equivalent permeability;
 - d. Operation and maintenance with a minimum of two (2) feet of freeboard; and
 - e. Construction outside the 100-year floodplain.

44. Although no degradation from discharge to the mud sumps is expected to occur, any minimal degradation of groundwater by some of the typical waste constituents associated with drilling waste is consistent with the maximum benefit to the people of the state. The discharge is necessary to accommodate essential public services for several areal cities and communities by helping provide electricity to local municipalities, businesses, and residents, which is an important benefit to the state. The Discharger also supports the economic prosperity of the community by the employment of full-time and part-time personnel at the Facility. Accordingly, the discharge as authorized is consistent with the antidegradation provisions of Resolution 68-16.

Stormwater

45. Federal regulations for stormwater discharges were promulgated by the U.S. Environmental Protection Agency (USEPA) 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.
46. 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. 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 Facility filed a Notice of Non-Applicability (NONA) under Industrial General Permit on the basis that the Facility is not hydrologically connected to waters of the United States.
47. The State Water Board also adopted Order 2009-0009-DWQ (NPDES NO. CAS000002), *General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit), which regulates Dischargers whose projects disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres. Construction of additional geothermal wells may require the Discharger's enrollment under the Construction General Permit, if applicable.

CEQA and Public Participation

48. On September 7, 2006, the Imperial County Planning Commission, acting as lead agency under the California Environmental Quality Act (CEQA) (Public Resources Code, § 21000 et seq.), adopted a Negative Declaration for the initial North Brawley Geothermal Exploration Project, which analyzed environmental impacts from the construction and drilling of up to six exploratory geothermal wells in the North Brawley KGRA. The Colorado River Basin Water Board relied upon this CEQA document in adopting Order R7-2007-0012.
49. On November 14, 2007, the Imperial County Planning Commission adopted a Mitigated Negative Declaration (State Clearinghouse [SCH] No. 2007101058) for Conditional Use Permit (CUP) No. 07-0017, analyzing environmental impacts from the expansion of the North Brawley Geothermal Exploration Project, including the construction of the North Brawley Geothermal Power Plant and additional exploration, production, and injection geothermal wells. The accompanying CUP authorized a total of up to 41 wells; 19 to 25 production wells (though 6 could be production or injection) and 10 to 16 injection wells (although 6 could be production or injection). The Colorado River Basin Water Board relied upon this CEQA document in adopting Order R7-2008-0004.
50. On March 26, 2008, the Imperial County Planning Commission adopted a Mitigated Negative Declaration for CUP 07-0029, known as the East Brawley Geothermal Exploration Project or Brawley 2 Geothermal Exploration Project. The environmental document analyzed environmental impacts from the construction and drilling of up to six exploratory geothermal wells in a separate well field within the North Brawley KGRA. The Colorado River Basin Water Board relied upon this CEQA document in adopting Order R7-2008-0032.
51. On June 13, 2012, the Imperial County Planning Commission adopted a Final Environmental Impact Report (SCH No. 2010061054) for CUP 08-0023, authorizing the expansion of the East Brawley Geothermal Exploration Project through the construction of a new power plant and up to 36 geothermal wells (including the 6 already authorized under CUP 07-0029).
52. On October 22, 2013, the Imperial County Board of Supervisors adopted a Negative Declaration for minor amendments to both CUP No. 07-0017 and CUP No. 08-0023. The amendments allowed the permitted well field for the East Brawley Geothermal Project to be used to service the North Brawley Power Plant. The amendments did not add any acreage to either project not already analyzed under prior CEQA documents. The Negative Declaration was challenged in a lawsuit filed on November 22, 2013, *Hector Casillas et al. v. County of Imperial, et al.*, Imperial County Superior Court Case No. ECU07973. However, judgment was entered in favor of the defendants, and there was no appeal filed.
53. The Negative Declaration adopted October 22, 2013, the Mitigated Negative Declaration adopted November 14, 2007, and the Final Environmental Impact

Report adopted June 13, 2012, function as the environmental documents under CEQA necessary for the issuance of this Order. These documents analyzed potential environmental impacts from the construction of the North Brawley Geothermal Power Plant and up to 77 geothermal wells in nearby well fields—specifically, 41 wells in the North Brawley wellfield and 36 wells in the East Brawley wellfield. To date, the Discharger has constructed 38 such geothermal wells in addition to the power plant. This Order combines the prior two orders regulating the Facility, Orders R7-2008-0004 and R7-2008-0032, and requires that no more than 77 geothermal wells be constructed, unless the Discharger obtains a revised permit and additional CEQA analysis is performed. There are no substantial changes in the surrounding circumstances which would require major revisions to the 2007, 2012, and 2013 environmental documents nor any significant new information, as that term is used in CEQA. Therefore, the 2007, 2012, and 2013 environmental documents provide the environmental analysis under CEQA for this Order and no subsequent environmental document is required pursuant to California Code of Regulations, title 14, section 15162.

54. The Colorado River Basin Water Board has notified the Discharger and all known interested agencies and persons of its intent to update the WDRs for this discharge and has provided them with an opportunity for a public meeting and to submit comments.
55. The Colorado River Basin Water Board, in a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED that this Order supersedes Orders R7-2008-0004 and R7-2008-0032 upon the effective date of this Order, except for enforcement purposes, and pursuant to Water Code sections 13263 and 13267, that the Discharger shall comply with the following:

A. Discharge Prohibitions

1. The discharge of semi-solid or solid drilling waste to mud sumps as a final means of disposal is prohibited if such waste is classified as “designated,” as defined in Water Code section 13173, or “hazardous,” as defined California Code of Regulations, title 27, section 20164.
2. Permanent (longer than one year) disposal or storage of drilling waste to mud sumps/containment basins is prohibited, unless authorized by the Colorado River Basin Water Board’s Executive Officer.
3. Drilling waste shall not penetrate the lining of the mud sumps during the containment period.
4. The discharge of process wastewater to a location or in a manner different from that described this Order is prohibited.

5. The discharge of waste to land not owned or controlled by the Discharger, or not authorized for such use, is prohibited.
6. The discharge of waste to surface waters or surface drainage courses (including canals, drains, or subsurface drainage systems) is prohibited, except as authorized under an appropriate NPDES permit such as the Construction Stormwater Permit.
7. 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).

B. Discharge Specifications

1. Geothermal wells shall be drilled to minimize mixing of drilling mud and cuttings with geothermal brine. Only a small amount of brine may commingle with drilling mud and cuttings, primarily brines in that part of the formation displaced by the drill bit.
2. All petroleum products, acids, hydraulic fluids, drilling mud additives or other liquid materials shall be stored and used in such a manner that all spills are contained.
3. Liquid wastes produced from drilling, testing, and maintenance of geothermal wells must be contained in portable tanks and returned to the geothermal resource or discharged off-site to Class II surface impoundments built to construction standards of California Code of Regulations, title 27, 20005 et seq. The Discharger shall submit to the Colorado River Basin Water Board a shipping manifest or other appropriate documentation showing the disposal method and location.
4. All geothermal mud sumps/containment basins shall be lined with a minimum thickness of 12 inches compacted clay, or an equivalent geosynthetic liner, certified and tested to ensure the permeability is no more than 1×10^{-6} cm/sec. If a geosynthetic liner is used, a suitable underliner shall be used to prevent liner damage. In order to prevent perforation of the sump liner by root growth, sumps and sump berms shall be kept free of vegetative growth.
5. Clay liner compaction must be certified by a Professional Engineer or Certified Engineering Geologist registered by the State of California. Synthetic liner placement and welding must be certified by the installer to verify factory requirements were satisfied, and no damage occurred during placement. Such certification shall be submitted, in writing, to the Colorado River Basin Water Board, prior to use of the mud sump. After cleanout of discharged drilling waste solids, the integrity of the liner must be re-certified before reuse.

6. For the mud sumps that have not been used for more than 10 years and may have developed cracks due to periods in which the liners were desiccated, the Discharger shall re-compact these liners and retest them to confirm that the permeability requirement is being met prior to reuse. Tests for all sump liners must be conducted by, or under the supervision of, a licensed Professional Engineer or Certified Engineering Geologist registered in the State of California.
7. The Discharger shall maintain minimum freeboard of two feet in open mud sumps at all times.
8. Mud sumps/containment basins shall be constructed, operated, and maintained to ensure their effectiveness, in particular:
 - a. Erosion control measures shall be implemented;
 - b. Liners in mud sumps/containment basins shall be maintained to ensure proper function; and
 - c. Solid material shall be removed from mud sumps/containment basins in a manner that minimizes the likelihood of damage to the liner.
9. Standing fluid observed in mud sumps/containment basins (if any) must be removed immediately, stored in portable tanks, and returned to the geothermal resource or discharged offsite into Class II surface impoundments. The Discharger must submit to the Colorado River Basin Water Board a shipping manifest or other appropriate documentation showing the disposal method and location.
10. A representative composite sample of the drilling waste must be taken at the completion of drilling. If sample analysis confirms that the drilling waste is neither "designated" (as defined in Wat. Code, § 13173) nor "hazardous" (as defined in Cal. Code Regs., tit. 27, § 20164), the sump may remain open for future use. Wastes classified as "designated" or "hazardous" shall be removed and transported to an appropriate disposal site no later than one year following their placement into the mud sump. The Discharger must submit to the Colorado River Basin Water Board a shipping manifest or other appropriate documentation showing the drilling waste disposal method and location. Any drilling waste subsequently discharged to the mud sump must be sampled as required for the initial discharge.
11. When it is determined that there will be no further discharge to a mud sump, or when a sump is full, and samples demonstrate that in-place wastes are neither "designated" (as defined in Wat. Code, § 13173) nor "hazardous" (as defined in Cal. Code Regs., tit. 27, § 20164), the mud sump shall be backfilled and ground graded to contour. The mud sump shall be capped with one foot of clay having a permeability of no greater than 1×10^{-6} cm/sec.

A minimum of one foot of soil capable of supporting vegetative growth shall be placed over the clay cap. The Discharger shall obtain approval of the Colorado River Basin Water Board's Executive Officer prior to closing a mud sump.

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

C. Construction Specifications

1. All geothermal wells shall be drilled and constructed in accordance with DOGGR regulatory standards to prevent degradation of groundwater or intermixing of groundwater from different aquifers.
2. The Discharger shall submit a notice, in writing, to the Colorado River Basin Water Board **at least seven days** prior to any construction associated with well drilling. The notice shall include:
 - a. Proposed construction dates;
 - b. Location and description of the well(s) and any associated infrastructure;
 - c. Method of construction; and
 - d. Proposed location of disposal of drilling waste.
3. A licensed Professional Engineer or Certified Engineering Geologist registered in the State of California shall be responsible for the design and construction of mud sumps/containment basins, including material testing, construction, inspection, maintenance, and closure.
4. The Discharger shall submit a written certification to the Colorado River Basin Water Board after construction or reconstruction of a mud sump/containment basin and prior to any discharge of drilling waste to the unit. The certification shall include the following information:
 - a. Permeability of the disposal sump liner;
 - b. As built construction drawings and specifications; and
 - c. Thickness of the disposal sump liner.

D. Special Provisions

1. **Spill Prevention Plan.** The Discharger shall develop and implement a plan for immediate detection of leaks or failures in the aboveground pipelines carrying geothermal fluid. An alarm or shutoff device shall be installed on

the pump used in the geothermal fluid transfer pipeline. Pumping of geothermal fluids shall be suspended immediately following major pipeline failure. The plan shall include daily inspection of the entire length of aboveground line in operation at the time, and the maintenance of a daily log. Minor leaks shall be repaired immediately upon being identified. Lines should be sign posted or marked to identify the fluid being pumped and alerting the public of the potential danger.

2. **Geothermal Brine Spill Reporting.** If leaks or failures in the aboveground pipelines carrying geothermal fluid occur, or if there is any spill of geothermal fluid, the Discharger shall do the following:
 - a. Orally report to the Colorado River Basin 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 Colorado River Basin 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. Submit a follow-up report **within 30 days** that includes confirmation sampling results indicating that cleanup goals have been achieved.

All spills and releases of geothermal brine must be reported as well as the analytical data that acts as quality assurance that the cleanup was satisfactorily completed.

E. Standard Provisions

1. **Noncompliance.** The Discharger shall comply with all of the terms, requirements, and conditions of this Order and Monitoring and Reporting Program R7-2019-0047. Noncompliance is a violation of the Porter-Cologne Water Quality Control Act (Water Code, § 13000 et seq.) and grounds for: (1) an enforcement action; (2) termination, revocation and reissuance, or modification of these waste discharge requirements; or (3) denial of an Order renewal application.
2. **Enforcement.** The Colorado River Basin Water Board reserves the right to take any enforcement action authorized by law. Accordingly, failure to timely comply with any provisions of this Order may subject the Discharger to

enforcement action. Such actions include, but are not limited to, the assessment of administrative civil liability pursuant to Water Code sections 13323, 13268, and 13350, a Time Schedule Order (TSO) issued pursuant to Water Code section 13308, or referral to the California Attorney General for recovery of judicial civil liability.

3. **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 Colorado River Basin Water Board on request.
4. **Reporting of Noncompliance.** The Discharger shall report any noncompliance that may endanger human health or the environment. Information shall be provided orally to the Colorado River Basin Water Board office and the Office of Emergency Services within twenty-four (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 Colorado River Basin 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 Report (SMR), or earlier if requested by the Colorado River Basin Water Board's Executive Officer.
5. **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.
6. **Material Changes.** Prior to any modifications which would result in any material change in the quality or quantity of wastewater treated or discharged, or any material change in the location of discharge, the Discharger shall report all pertinent information in writing to the Colorado River Basin Water Board, and if required by the Colorado River Basin Water Board, obtain revised requirements before any modifications are implemented.

7. **Operational Personnel.** The Facility shall be supervised and operated by persons possessing the necessary expertise in the construction, operation, and maintenance of geothermal wells and disposal of drilling waste.
8. **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.
9. **Inspection and Entry.** The Discharger shall allow the Colorado River Basin 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;
 - b. Have access to and copy, at reasonable times, records kept under the conditions of this Order;
 - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
 - d. Sample or monitor at reasonable times, for the purpose of assuring compliance with this Order or as otherwise authorized by the Water Code, any substances or parameters at this location.
10. **Records Retention.** The Discharger shall retain copies of all reports required by this Order and the associated MRP. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report, or application. Records may be maintained electronically. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Colorado River Basin Water Board's Executive Officer.
11. **Change in Ownership.** This Order is not transferable to any person without written approval by the Colorado River Basin Water Board's Executive Officer. Prior to any change in ownership of this operation, the Discharger shall notify the Colorado River Basin Water Board's Executive Officer in writing at least 30 days in advance. The notice must include a written transfer agreement between the existing owner and the new owner. At a minimum, the transfer agreement must contain a specific date for transfer of responsibility for compliance with this Order and an acknowledgment that the new owner or operator is liable for compliance with this Order from the date of transfer. The Colorado River Basin Water Board may require modification or revocation and reissuance of this Order to change the name of the Discharger and incorporate other requirements as may be necessary under the Water Code.

12. **Format of Technical Reports.** The Discharger shall furnish, under penalty of perjury, technical monitoring program reports, and such reports shall be submitted in accordance with chapter 30, division 3, title 23 of the California Code of Regulations, as raw data uploads electronically over the Internet into the State Water Board's GeoTracker database, found at: <https://geotracker.waterboards.ca.gov/>. Documents that were formally mailed to the Colorado River Basin Water Board by the Discharger, such as regulatory documents, narrative monitoring reports or materials, and correspondence, shall also be uploaded into GeoTracker in the appropriate Microsoft Office software application format, such as Word or Excel files, or a Portable Document Format (PDF) file. Large documents must be split into appropriately-labelled, manageable file sizes and uploaded into GeoTracker.
13. **Qualified Professionals.** In accordance with Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of California registered professionals (i.e., civil engineer, engineering geologist, geologist, etc.) competent and proficient in the fields pertinent to the required activities. All technical reports required under this Order that contain work plans, describe the conduct of investigations and studies, or contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall contain a statement of qualifications of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal. Additionally, all field activities are to be conducted under the direct supervision of one or more of these professionals.
14. **Certification Under Penalty of Perjury.** All technical reports required in conjunction with this Order shall include a statement by the Discharger, or an authorized representative of the Discharger, certifying under penalty of perjury under the laws of the State of California, that the reports were prepared under his or her supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted, and that based on his or her inquiry of the person or persons who manage the system, the information submitted is, to the best of his or her knowledge and belief, true, complete, and accurate.
15. **Violation of Law.** This Order does not authorize violation of any federal, state, or local laws or regulations.

16. **Property Rights.** This Order does not convey property rights of any sort, or exclusive privileges, nor does it authorize injury to private property or invasion of personal rights.
17. **Modification, Revocation, Termination.** This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for an Order modification, rescission, or reissuance, or the Discharger's notification of planned changes or anticipated noncompliance, does not stay any Order condition. Causes for modification include, but are not limited to, the violation of any term or condition contained in this Order, a material change in the character, location, or volume of discharge, a change in land application plans or sludge use/disposal practices, or the adoption of new regulations by the State Water Board, Colorado River Basin Water Board (including revisions to the Basin Plan), or federal government.
18. **Severability.** The provisions of this Order are severable. If any provision of this Order is found invalid, the remainder of these requirements shall not be affected.

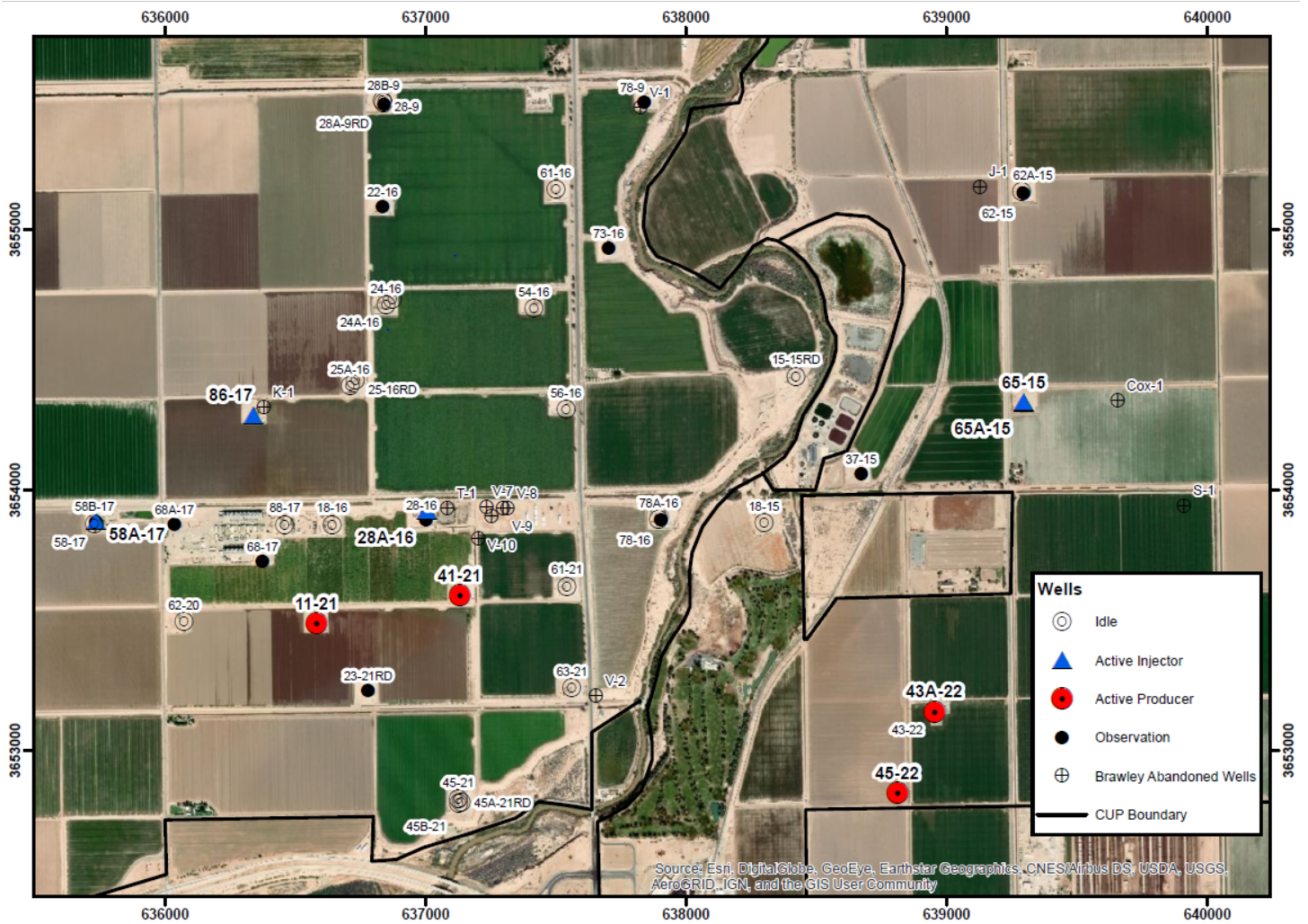
Any person aggrieved by this Colorado River Basin Water Board action may petition the State Water Board for review in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 et seq. The State Water Board must receive the petition by 5:00 p.m. on the 30th day 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

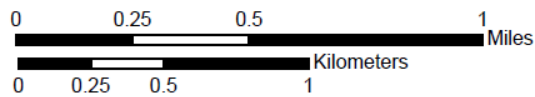
Attachment A—Site Map

Attachment B—Monitoring and Reporting Program R7-2019-0018

ATTACHMENT A—SITE MAP



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN

ATTACHMENT B
MONITORING AND REPORTING PROGRAM R7-2019-0018
FOR
ORMAT NEVADA INC., OPERATOR
ORNI 17 LLC AND ORNI 19 LLC, OWNERS
NORTH BRAWLEY GEOTHERMAL POWER PLANT
WELL FIELD MUD SUMPS/CONTAINMENT BASINS
IMPERIAL COUNTY

This Monitoring and Reporting Program (MRP) is issued pursuant to Water Code section 13267 and describes requirements for monitoring the relevant wastewater system. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Colorado River Basin Water Board or its Executive Officer.

The Discharger owns and operates the wastewater system that is subject to Order R7-2019-0018. The reports required herein are necessary to ensure that the Discharger complies with the Order. Pursuant to Water Code section 13267, the Discharger shall implement this MRP and shall submit monitoring reports described herein.

A. Sampling and Analysis General Requirements

1. **Testing and Analytical Methods.** The collection, preservation, and holding times of all samples shall be in accordance with U.S. Environmental Protection Agency (USEPA)-approved procedures. All analyses shall be conducted in accordance with the latest edition of either the USEPA's *Guidelines Establishing Test Procedures for Analysis of Pollutants Under the Clean Water Act* (40 C.F.R. part 136) or *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium* (SW-846), unless otherwise specified in the MRP or approved by the Colorado River Basin Water Board's Executive Officer.
2. **Laboratory Certification.** All analyses shall be conducted by a laboratory certified by the State Water Board, Division of Drinking Water's Environmental Laboratory Accreditation Program (ELAP), unless otherwise approved by the Colorado River Basin Water Board's Executive Officer.
3. **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 Code of Federal Regulations part 136, Appendix B. The laboratory reporting limit for all reported monitoring data shall be no greater than the practical quantitation limit (PQL).

4. **Sampling Location(s).** Samples shall be collected at the location(s) specified in the WDRs. If no location is specified, sampling shall be conducted at the most representative sampling point available.
5. **Representative Sampling.** All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the chain of custody form for the sample. If composite samples are collected, the basis for sampling (time or flow weighted) shall be approved by Colorado River Basin Water Board staff.
6. **Instrumentation and Calibration.** All monitoring instruments and devices used by the Discharger shall be properly maintained and calibrated to ensure their continued accuracy. Any flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices. In the event that 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.
7. **Field Test Instruments.** Field test instruments (such as those used to test pH, dissolved oxygen, and electrical conductivity) may be used provided that:
 - 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.
8. **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 (5) years from the date of the sampling or measurement. This period may be extended by the Colorado River Basin Water Board's Executive Officer. 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 date(s) analyses were performed;
- d. The individual(s) who performed the analyses;
- e. The analytical techniques or method used; and
- f. 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. Monitoring Requirements

1. **Drilling Waste Monitoring.** Before adding drilling waste (including drill cuttings and drilling mud mixed with incidental amounts of geothermal brine) to a mud sump, the waste shall be sampled for the following:

Table 1. Drilling Waste Monitoring

Constituents	Units	Sample Type	Reporting Freq.
Total Dissolved Solids	mg/L	Grab	Semi-Annual
Total Petroleum Hydrocarbons (TPH)	mg/kg	Grab	Semi-Annual
Heavy Metals (Cal. Code Regs., tit. 22, § 66261.24 / CAM 17)	mg/kg	Grab	Semi-Annual

Constituents	Units	Sample Type	Reporting Freq.
Volume of Solids/Semi-Solids Discharged to Mud Sump	Cubic Yards	---	Semi-Annual
Description of Sampling Equipment and Methods	Written Description	---	Semi-Annual

¹ Standard Units

2. **Waste Removal Monitoring.** Before removing drilling waste from a mud sump, the waste shall be observed/measured for the following:

Table 2. Waste Removal Monitoring

Requirement	Units	Reporting Freq.
Volume of Solids Disposed of Offsite	Cubic Yards	Semi-Annual
Volume of Liquids Disposed Offsite from Portable Tanks	Gallons	Semi-Annual
Name and Location of Final Disposal Facility	Name and Address	Semi-Annual

3. **Mud Sump Status Monitoring.** The Discharger shall observe the current conditions of each mud sump using the following table:

Table 3. Mud Sump Status Monitoring

Observation Requirement	Reporting Freq.
Well Number	Annual
Status (Open/Closed)	Annual
Landowner	Annual
APN	Annual
Date Mud Sump Was Constructed and/or Closed	Annual

Observation Requirement	Reporting Freq.
Date Mud Sump Last Received Waste	Annual
General Condition (Erosion, Cracking, Plant Growth) ¹	Annual
Construction or Maintenance Done to Mud Sump	Annual

¹ The description of the general condition of the mud sumps shall be of sufficient specificity to be informative. An example narrative is as follows:

“The mud sump associated with PW 11-21 is located on APN 037-130-054, owned by Benson Farms. The sump is currently open, but does not contain any drilling waste. The mud sump was built on **DATE**, and drilling occurred during from **DATE** to **DATE**. The Discharger plans to backfill the sump during the **XX** quarter of **DATE**. The clay liner appears to be intact, does not have plants growing from it, and did not receive any maintenance during this monitoring period.”

C. Reporting Requirements

1. Reporting Schedule
 - a. Semi-Annual Self-Monitoring Reports (SMRs) shall be submitted by **April 15th and October 15th**. Annual SMRs shall be submitted by **April 31st** of the following year.
2. Semi-Annual SMRs shall include, at a minimum, the following:
 - a. **Cover Letter**. A transmittal letter summarizing the essential points in the report.
 - b. **Maps**. Maps depicting the Facility layout and the location of geothermal wells.
 - c. **Summary of Monitoring Data**. Tables of the data collected. The tables shall include all of the data collected to-date for drilling waste discharged to each mud sump, organized in chronological order, with the oldest data in the top row and progressively newer data in rows below the top row. Each row shall be a monitoring event and each column shall be a separate parameter at a single location (or a single average, as appropriate).

- d. **Waste Removal Summary.** Provide a written summary, as specified in Table 6 of Monitoring Requirement B.2.
 - e. **Construction Summary.** A summary of any construction activities relating to well drilling during the reporting period. The summary shall identify whether the proper certifications for permeability of the mud sump liner and thickness of the mud sump liner were obtained. (More frequent reporting of construction activities is required in accordance with Construction Provisions C.2 [7-day advance notice before construction of wells] and C.4 [well certification submissions].)
 - f. **Spill/Leak Summary.** For any and all occurrences of spills/leaks during the reporting period, a summary of each incident detailing the essential points of the cause of the spill/leak shall be transmitted. The summary shall include estimated volumes of liquid or solids that have spilled outside containment, and a description of the management practices addressing each spill or leak occurring during the reporting period. (See Special Provision D.2 for geothermal brine spill requirements.)
 - g. **Compliance Summary.** Identification of any violations found since the last report was submitted, and actions taken or planned for correcting each violation. If the Discharger previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. If no violations have occurred since the last submittal, this shall be stated.
3. Annual SMRs shall include, at a minimum, the following:
- a. **Cover Letter.** A transmittal letter summarizing the essential points in the report.
 - b. **Mud Sump Status Summary.** A table and written summary as specified in Table 7 of Monitoring Requirement B.3.
 - c. **Spill Prevention Summary.** A description of the current Spill Prevention Plan and analysis whether updates to the plan are necessary.
 - d. **Compliance/Spill Summary.** Discussion of any areas of non-compliance and any spills that occurred during the last two semi-annual reporting periods.
4. SMRs shall be certified under penalty of perjury to be true and correct. Each SMR submitted to the Colorado River Basin Water Board shall contain the following completed declaration:

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

Executed on the _____ day of _____ at _____

_____ (Signature)

_____ (Title)"

5. The SMRs and any other information requested by the Colorado River Basin Water Board shall be signed by a principal executive officer or ranking elected official. A duly authorized representative of the Discharger may sign the documents if:
 - a. The authorization is made in writing by the person described above;
 - b. The authorization specified an individual or person having responsibility for the overall operation of the regulated disposal system; and
 - c. The written authorization is submitted to the Colorado River Basin Water Board's Executive Officer.
6. The results of any sampling or analysis performed more frequently than required in this MRP shall be reported to the Colorado River Basin Water Board.
7. As specified in Standard Provision E.13, technical reports shall be prepared by or under the direction of appropriately qualified professional(s). Each technical report submitted shall contain a statement of qualification of the responsible licensed professional(s) as well as the professional's signature and/or stamp of the seal.
8. As specified in Standard Provision E.12, the Discharger shall comply with Electronic Submittal of Information (ESI) requirements by submitting all correspondence and reports required under MRP-2019-0018 and any future revision(s) thereto, including groundwater monitoring data and discharge location data (latitude and longitude), correspondence, and PDF monitoring reports to the State Water Board's Geotracker database. Documents too large to be uploaded into Geotracker should be broken down into smaller electronic files and labelled properly prior to uploading into Geotracker.