DOCKETED	
Docket Number:	23-AFC-03
Project Title:	Black Rock Geothermal Project (BRGP)
TN #:	253668
Document Title:	Black Rock Geothermal Project Report of Waste Discharge and Detection Monitoring Plan Update
Description:	N/A
Filer:	Lindsey Xayachack
Organization:	Jacobs
Submitter Role:	Applicant Consultant
Submission Date:	12/19/2023 12:10:40 PM
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Black Rock Geothermal LLC
4124 NW Urbandale Drive
Urbandale, IA 50322

Jon Trujillo
General Manager, Geothermal Development

December 18, 2023

Colorado River Basin Regional Water Board
Land Disposal Unit
c/o Jose Cortez
73-720 Fred Waring Drive Suite 100
Palm Desert, CA 92260

RE: Report of Waste Discharge and Application for Black Rock Geothermal Project
December 2023 Updated ROWD Application Package

Dear Jose Cortez,

Black Rock Geothermal LLC (Applicant), an indirect, wholly owned subsidiary of BHE Renewables, LLC, submits this Report of Waste Discharge (ROWD) and Form 200 Application for the Black Rock Geothermal Project (BRGP) within the Salton Sea Known Geothermal Resource Area located near Calipatria, Imperial County, California. The BRGP is an 87 megawatt (gross) and 77 megawatt (net) renewable geothermal power plant and related facilities, including generation tie-line, fluid and steam handling facilities, solids handling system, Class II Surface Impoundment, service water pond, stormwater retention basin, and process fluid injection pumps, in addition to geothermal production and injection wells and pipelines that will be permitted by Imperial County.

Changes to BRGP since the last application package submitted to Colorado River Basin RWQCB May 24, 2023, are described in the list below. Additionally, updated ROWDs and Detection Monitoring Plan (DMP) are submitted with redline to emphasize changes.

- Stormwater retention basin relocation and split into two separate basins on the north and south boundaries of the proposed project site. Retention basin capacity is slightly increased as a result.
- Overall project site grading and drainage altered to guide site runoff towards new drainage inlet locations and new stormwater retention basin locations.
- Project site infrastructure general arrangement refinements.

We look forward to working with the Regional Water Quality Control Board staff during the review of these application materials and the issuance of the Waste Discharge Requirements. Please contact Anoop Sukumaran at (760) 348-4275 (email address: Anoop.Sukumaran@calenergy.com) or Joey Velasquez at (503) 929-8989 (email address: joey.velasquez@jacobs.com) if you have any questions or if you need additional information.

Sincerely,

Jon Trujillo
General Manager, Geothermal Development

cc: Zak Owens/CRBRWQCB - Zakary.Owens@waterboards.ca.gov

Attachment A: State of California Regional Water Quality Control Board - Application/Report of Waste Discharge General Information Form 200

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

I. FACILITY INFORMATION

A. Facility:

Name: Black Rock Geothermal Project			
Address: Boyle Road and McKendry Road			
City: Calipatria	County: Imperial	State: CA	Zip Code: 92233
Contact Person: Anoop Sukumaran		Telephone Number: 760-348-4275	

B. Facility Owner:

Name: Black Rock Geothermal LLC			Owner Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☑ Other: LLC
Address: 7030 Gentry Road			
City: Calipatria	State: CA	Zip Code: 92233	
Contact Person: Jon Trujillo		Telephone Number: 760-348-4275	Federal Tax ID: 95-3694478

C. Facility Operator (The agency or business, not the person):

Name: Black Rock Geothermal LLC			Operator Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☑ Other: LLC
Address: 7030 Gentry Road			
City: Calipatria	State: CA	Zip Code: 92233	
Contact Person: Jon Trujillo		Telephone Number: 760-348-4275	

D. Owner of the Land:

Name: Magma Power Company			Owner Type (Check One) 1. ☐ Individual 2. ☐ Corporation 3. ☐ Governmental Agency 4. ☐ Partnership 5. ☑ Other: LLC
Address: 7030 Gentry Road			
City: Calipatria	State: CA	Zip Code: 92233	
Contact Person: Jon Trujillo		Telephone Number: 760-348-4275	

E. Address Where Legal Notice May Be Served:

Address: 7030 Gentry Road		
City: Calipatria	State: CA	Zip Code: 92233
Contact Person: Anoop Sukumaran		Telephone Number: 760-348-4275

F. Billing Address:

Address: 7030 Gentry Road		
City: Calipatria	State: CA	Zip Code: 92233
Contact Person: Anoop Sukumaran		Telephone Number: 760-348-4275

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE
GENERAL INFORMATION FORM FOR
WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

II. TYPE OF DISCHARGE

Check Type of Discharge(s) Described in this Application (A or B):

☑ **A. WASTE DISCHARGE TO LAND** ☐ **B. WASTE DISCHARGE TO SURFACE WATER**

Check all that apply:

- ☐ Domestic/Municipal Wastewater Treatment and Disposal
- ☐ Cooling Water
- ☐ Mining
- ☐ Waste Pile
- ☐ Wastewater Reclamation
- ☐ Other, please describe: _____
- ☐ Animal Waste Solids
- ☐ Land Treatment Unit
- ☐ Dredge Material Disposal
- ☑ Surface Impoundment
- ☐ Industrial Process Wastewater
- ☐ Animal or Aquacultural Wastewater
- ☐ Biosolids/Residual
- ☐ Hazardous Waste (see instructions)
- ☐ Landfill (see instructions)
- ☐ Storm Water

III. LOCATION OF THE FACILITY

Describe the physical location of the facility.

1. Assessor's Parcel Number(s)	2. Latitude	3. Longitude
Facility: 020-110-008	**Facility:** 33.1683062	**Facility:** -115.6253871
Discharge Point: 020-110-008	**Discharge Point:** 33.167128	**Discharge Point:** -115.628753

IV. REASON FOR FILING

- ☑ New Discharge or Facility
- ☐ Changes in Ownership/Operator (see instructions)
- ☐ Change in Design or Operation
- ☐ Waste Discharge Requirements Update or NPDES Permit Reissuance
- ☐ Change in Quantity/Type of Discharge
- ☐ Other: _____

V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: California Energy Commission

Has a public agency determined that the proposed project is exempt from CEQA? ☐ **Yes** ☑ **No**

If Yes, state the basis for the exemption and the name of the agency supplying the exemption on the line below.

Basis for Exemption/Agency: _____

Has a "Notice of Determination" been filed under CEQA? ☐ **Yes** ☑ **No**

If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Negative Declaration. If no, identify the expected type of CEQA document and expected date of completion.

Expected CEQA Documents:

☑ **EIR** ☐ **Negative Declaration**

Expected CEQA Completion Date: 2nd Quarter 2024

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

State of California
Regional Water Quality Control Board

APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT

VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name: Jon Trujillo **Title:** GM, Geothermal Development

Signature: **Date:** December 18, 2023

FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

Attachment B: Other Required Information

Report of Waste Discharge for Black Rock Geothermal Power Project

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1.0 Introduction

Magma Power Company is proposing a new geothermal power facility known as Black Rock Geothermal Power Facility (Black Rock). This power facility is designed for approximately 87 megawatts (MW) of maximum continuous rating and approximately 77 MW of expected net output. Black Rock is located approximately 7 miles northwest of Calipatria and 8 miles southwest of Nilan in Imperial County, California (Figure 1) and (Figure 2). The project site is owned by Magma Power Company and will be operated by Black Rock Geothermal LLC, both wholly owned subsidiaries of BHE Renewables. The project site will be located on approximately 55 acres of a 155-acre parcel (APN: 020-110-008) with average elevation of 232 feet below mean sea level (msl) (Landmark Consultants, Inc., 2022). Identifiable parcel boundaries are Boyle Road to the east and McKendry Road to the North. An approximate 9-foot-high embankment (elevation ~~223.80~~223.50 ft below msl) north of the project site and approximate 6-foot-high embankment (elevation ~~223.80~~223.50 ft below msl) west of the project site separate Black Rock from the Salton Sea.

Black Rock is in the vicinity of existing geothermal power facilities which harness the Salton Sea Known Geothermal Resource Area. Five geothermal production wells are planned on the 155-acre parcel, all geothermal brine will be piped (above ground) to the smaller 55-acre footprint Black Rock facility and processed onsite. Geothermal brine is a mixture of steam and hot water which carries various dissolved minerals due to reactions with reservoir rocks at high temperatures. Geothermal brine has a temperature of 210 – 500 °F and will flash steam when released to atmosphere. Dissolved minerals within geothermal brine consist primarily of chloride, sodium, calcium, and potassium. Other minerals such as zinc, manganese, iron, and silica are also dissolved in geothermal brine. Once above ground, Geothermal brine will be routed to a series of separators each operating at different pressures to divert steam to a turbine and subsequent condenser. Geothermal brine which is not diverted to the turbine, flows to primary and secondary clarifiers. The effluent of these clarifiers is considered spent geothermal brine. Spent geothermal brine has a higher concentration of minerals and relatively lower temperature compared to geothermal brine. Spent geothermal brine will be disposed through underground injection wells regulated by California Department of Conservation, Geologic Energy Management Division (CalGEM). Additional spent geothermal brine management includes a Class II surface impoundment (brine pond) for temporary storage of spent geothermal brine. Power generation infrastructure includes turbine generator, cooling tower, rock muffler, water tanks, pipelines, and power substations. A complete site layout detailing proposed infrastructure and respective locations is included in Figure 3 (General Arrangement Drawing).

2.0 Site Characteristics

The property is primarily flat terrain and is currently used for Bermuda grass crop. The climate in the region is arid with extreme summer temperatures above 100 °F. Rainfall is typically between 2 – 4 inches per year with winter months, December through February, receiving the most precipitation and April through June receiving the least precipitation (Table 1).

Table 1: Average monthly precipitation measured at nearby community Niland, California from 2000 – 2022.

Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average (inches)	0.56	0.54	0.36	0.08	0.04	0.01	0.19	0.33	0.25	0.24	0.25	0.53

Source: (California Water Watch, 2023)

2.1 Geological Setting

The project site is located in the Salton Trough region of the Colorado Desert. The Salton Trough represents the northward extension of the Gulf of California with soils predominantly of tabular silt, sand, and clay. A sub surface investigation was performed in September 2022 by Landmark Consultants Inc. revealing silty clays loams from 0 to 5 feet below ground surface (bgs) and loose to medium dense silty sands, silts, and silty clays from 5 to 35 feet bgs. Below 35 feet, soils consist of loose to dense silty sands interbedded with stiff clays (Landmark Consultants, Inc., 2022). Boring logs down to 76 feet (maximum exploration depth) are included as Appendix B.

2.2 Groundwater

The project site is located in the Imperial Valley Basin groundwater region. The Imperial Valley Basin has two major groundwater aquifers separated by a semi-permeable aquitard with an average thickness of approximately 60 feet and maximum thickness of approximately 280 feet. The upper aquifer is recharged via percolation from irrigation and precipitation with an average thickness of 200 feet and maximum thickness of 450 feet (California Department of Water Resources, 2004). In September 2022, groundwater was encountered 6 feet bgs at the proposed project site (Landmark Consultants, Inc., 2022). Groundwater levels are relatively stable, typically fluctuating 1.0 – 1.5 feet from the average as observed at nearby monitoring wells. The lower aquifer has an average thickness of 380 feet and maximum thickness of 1,500 feet (California Department of Water Resources, 2004). Groundwater beneficial uses in this area are municipal supply for local communities and industrial supply (non-specific). Groundwater quality varies across the Imperial Valley Basin and is likely diluted from freshwater irrigation. Nearby monitoring wells east of the proposed facility have average background with high TDS concentrations (Table 2).

Table 2 Nearby groundwater monitoring well background water quality data.

Parameter	Groundwater Concentrations [1]	Unit
Temperature	23 – 40	°C
pH	6.1 – 7.3	pH unit
Conductivity	5,000 – 68,000	µS/cm
Total Dissolved Solids	4,000 – 56,000	mg/L
Arsenic	1.0 - 55	µg/L
Barium	40 – 770	µg/L
Cadmium	0.05 – 13	µg/L
Lead	0.04 – 36	µg/L
Zinc	1.7 – 210	µg/L

[1] Groundwater concentrations are representative of most recent 5-years of monitoring from existing Region 2 Vulcan and Del Ranch Facility, fluctuations above and below the average are common.

2.3 Surface Water

The Salton Sea is the nearest surface water which currently appears 1,900 feet north of the property and 0.5 miles west of the property at 239 feet below msl. From 2003 to 2023, surface water elevations have decreased from 228 to 239 feet below msl (United States Geological Survey, 2023). Surface water elevations in the Salton Sea are dependent on precipitation, local irrigation runoff and recharge from small regional rivers. An 8-foot berm with maximum elevation ~~223.8~~223.5 feet below msl separates the Salton Sea from the property. Additionally, an irrigation canal on the east side runs adjacent to the property along Boyle Road. The Colorado river is 53 miles east of the property.

3.0 Project Characteristics

Geothermal brine will flow above ground without pumping to the steam handling system (Figure 4). The steam handling system consists of three separators in series, each operating at different pressures to divert steam to the turbine. Geothermal brine which is not diverted to turbine is depressurized and flows to the primary and secondary clarifiers to remove suspended solids that precipitated upstream. Flocculation assists in settling of solid in the clarifiers. Each clarifier is also equipped with an emergency overflow which is routed to the brine pond. Flocculated solids are sent to a filter press for solids to be dewatered prior to offsite disposal at a permitted facility.

3.1 Steam Turbine Generator and Condenser

Approximately 2,600 gallons per minute (gpm) of steam is to be fed to the steam turbine generator and condenser. Additionally, approximately 120,000 gpm of cooling water is continuously circulated between the condenser and the cooling tower. Condenser effluent liquid flows to a hot well pump and is either routed to the cooling tower or joined with the spent geothermal brine. Once combined, the spent geothermal brine is either reinjected into the formation or temporarily stored in the brine pond.

3.2 Air Emission Control

Process and wash water from the abatement device will be routed to the facility conveyance system or injection wells. Air emissions associated with this facility are regulated by the California Air Resources Board and Imperial County Air Pollution Control District.

3.3 Production Wells

Five production wells are planned for this facility on three different well pads which will be located on the north, west, and southwest border of the property (APN: 020-110-008). The guiding principles used for Black Rock production wells are:

- Production wells would be located near known production areas.
- Sufficient spacing between production and injection wells to prevent thermal breakthrough of injection fluid.
- Production wells are located to minimize production impacts to existing geothermal projects.
- Adequate well spacing to support generation for project life.

- Well pads when possible, will support multiple directionally drilled wells to limit impact on surface lands.

3.4 Injection Wells

Seven offsite injection wells are planned for this facility on ~~four~~ three different well pads located approximately one to two miles south on various properties (APNs: 020-110-031, 020-110-043, and 020-110-029). No injection wells will be located on the facility property APN: 020-110-008. The injection wells include five wells for spent geothermal brine, one well for condensate, and one well for aerated fluid. All fluid injections will take place in accordance with CalGEM requirements.

3.5 Site Drainage

The property is to be fully surrounded by a 6 to 9-foot-high embankment with top of berm elevation ~~223.8~~223.5 feet below msl preventing any exterior surface water runoff from entering the project site or any interior runoff from exiting. ~~Eleven~~ Seven drainage inlets are spaced across the interior property for stormwater management. ~~All drainage inlets flow to a 5.79-million-gallon rectangular retention basin for 100-year storm conditions. The project site is relatively level with a slight slope from southeast to northwest and retention basin located on the western most area of the property. The retention basin is an earthen structure with bottom of the pond 5-feet bgs and will be lined with a singular 80-millimeter flexible membrane liner followed by 2-feetof re-worked and re-compacted soil from the trim slope. Complete drawings of the retention basin and drainage system are provided in Appendix C.~~ All drainage inlets flow to either a north or south stormwater retention basin. The combined storage capacity of the two stormwater retention basins is 5.90-million-gallons designed for 100-year storm conditions. The project site is relatively level with a slight slope guiding runoff to drainage collection inlets or stormwater retention basins. The retention basins are unlined earthen structures with bottom of the pond 5-feet bgs. The bottom surface of the ponds will be constructed of 2 feet thick re-worked and re-compacted native soil from the trim slope. Additional retention basin and drainage system details are provided in Appendix A and C. All accumulated stormwaters will evaporate or infiltrate to groundwater. Any potential chemical spills will not flow to stormwater collection. Instead, potential chemical spills will be routed to a diked area to be pumped out, characterized, and properly disposed.

3.6 Brine Pond

A ~~3.92~~4.0-million-gallon brine pond is to be constructed on the west most side of the property. The brine pond will be used for temporary containment of spent geothermal brine prior to injection back into the deep geologic formation. Maximum estimated disposal to the brine pond is 460 gallons per minute with an average annual disposal of 744.6-acre feet per year. Brine pond containment was designed to meet California Code of Regulations Title 27 Class II Surface Impoundment requirements. A triple liner system with leachate collection and removal system (LCRS) between the primary and secondary liner is proposed (Table 3). The LCRS has eight cleanout collection sumps with four located at the outside corners and four at the middle low point of the pond. Cleanout collection sumps are to have a 4-inch perforated pipe drilled per

Caltrans Specification 68-2.02 and surrounded by pea gravel. Collection trenches run parallel with the length of the brine pond and have a total approximate capacity of 3,600 gallons. The LCRS will be operated to prevent liquid accumulation above the secondary liner system. LCRS will be manually pumped as needed and routed to a 300-gallon above ground tank then recirculated into the brine pond. A consistent removal schedule from the LCRS will be established once leakage rates are quantified. In the future, leachate removal may be automated from collection sumps after construction is complete. Six shallow groundwater monitoring wells are proposed around the perimeter of the brine pond. Complete drawings of the brine pond, liner system, cleanout collection, and monitoring well locations are provided in Appendix C. Anticipated geothermal brine water quality is detailed in along with geothermal brine safety data sheet in Appendix D.

Table 3: Proposed Liner and LCRS for brine pond from top to bottom.

Section	Section Material
Spent Geothermal Brine	
1	6-inch fiber reinforced concrete
2	6-inch compacted soil from trim slope
3	80-millimeter flexible membrane liner (primary liner)
4	geogrid leachate collection and removal system (LCRS)
5	80-millimeter flexible membrane liner (secondary liner)
6	geosynthetic clay liner (GCL), (tertiary liner)
7	2-feet soil re-worked and re-compacted from trim slope
Native Undisturbed Soil	

Solids are expected to precipitate out of the spent geothermal brine and accumulate within the brine pond. The rate of accumulation is unknown but is expected to be a few tons per year. Accumulated solids will be removed annually, dewatered in a filter press, and transported to a permitted offsite disposal facility (Table 4). Solids precipitated out of the brine pond are anticipated to be designated hazardous and will be disposed of at a permitted facility.

Table 4 Spent Geothermal brine metal solids concentrations.

Constituent	Test Results [1]	Unit
Antimony	125	mg/kg
Arsenic	376	mg/kg
Beryllium	13.4	mg/kg
Cadmium	9.99	mg/kg
Chromium	3.29	mg/kg
Cobalt	4.19	mg/kg
Copper	231	mg/kg
Lead	268	mg/kg
Molybdenum	ND [2]	mg/kg
Nickel	1.65	mg/kg
Selenium	ND [2]	mg/kg
Silver	22.7	mg/kg

Constituent	Test Results [1]	Unit
Thallium	ND [2]	mg/kg
Vanadium	7.62	mg/kg
Zinc	387	mg/kg
Mercury	ND [2]	mg/kg

[1] Spent geothermal brine solids test results from a nearby facility sampled on 3/23/2020 using EPA 6000/7000 series methods.

[2] ND = Non-Detect

3.7 Water Supply and Fresh Water Pond

The primary water supply (approximately 80%) for the proposed project will be geothermal brine condensate extracted from steam turbine and condenser. Water from this source is used exclusively to supply the cooling tower, process scrubber and seal water for mechanical pump seals. Any additional supply water including source water for a reverse osmosis potable water system will be sourced from the Imperial Irrigation District (IID) canal. On an annual average basis approximately 1,125-acre feet per year of water is to be sourced from the IID canal. Negotiations for the IID canal water supply agreement have not been completed. IID canal water will be diverted to a 7.60-million-gallon freshwater pond. Water Quality data from the IID canal is included in Table 5. The freshwater pond is proposed on the eastern most area of the property and is an earthen structure with the bottom of the pond 5-feet bgs. The liner system consists of an 80-millimeter flexible membrane liner followed by 2-feet of re-worked and re-compacted soil from the trim slope. A complete drawing of the freshwater pond is included in Appendix A.

Table 5: Water quality parameters for IID canal water supply.

Constituent	Concentration [1]	Unit
Fluoride	0.44	mg/L
Nitrate (as NO3-N)	ND (<0.40)	mg/L
Nitrite	ND (<0.40)	mg/L
Aluminum	57	µg/L
Antimony	ND (<6.0)	µg/L
Arsenic	ND (<2.0)	µg/L
Barium	100	µg/L
Beryllium	ND (<1.0)	µg/L
Cadmium	ND (<1.0)	µg/L
Chromium (+6)	ND (<1.0)	µg/L
Chromium (Total Cr)	ND (<10)	µg/L
Iron	ND (<100)	µg/L
Lead	ND (<5.0)	µg/L
Manganese	ND (<20)	µg/L
Mercury	ND (<1.0)	µg/L
Nickel	ND (<10)	µg/L
Selenium	ND (<5.0)	µg/L
Silver	ND (<10)	µg/L
Thallium	ND (<1.0)	µg/L

Constituent	Concentration [1]	Unit
Vanadium	3.1	µg/L
Benzene	ND (<0.50)	µg/L
Ethyl Benzene	ND (<0.50)	µg/L
Toluene	ND (<0.50)	µg/L
Vinyl Chloride	ND (<0.50)	µg/L
Xylenes	ND (<0.50)	µg/L

[1] ND = Non-Detect, followed by reporting limit; Source: (Imperial Irrigation District, 2023).

3.8 Use of Hazardous Materials

Hazardous materials will be kept and used onsite as they are essential for maintaining and cleaning equipment. A complete list of hazardous materials to be kept onsite and their respective use quantity, and storage location is included in Appendix E.

4.0 Waste Generated During Construction

4.1 Sanitary Waste

Sanitary waste generated during construction will be collected in portable self-contained toilets. Self-contained toilets will be pumped out regularly by a licensed contractor and transported to a regulated sanitary wastewater treatment facility.

4.2 Solid Waste

Solid waste generated during construction is primarily expected to be construction debris including scrap wood, scrap metal, concrete, glass, plastic, paper, calcium silicate insulation, and mineral wool insulation. All of this waste will be non-hazardous and will be recycled or disposed of in a Class II or Class III landfill. Small quantities of hazardous waste are also expected to be generated in spent solvents, paints, and adhesives (approximately 10 pounds per month). This spent hazardous waste will be recycled at a permitted treatment storage and disposal facility. Excavated soils generated during construction are to be used in construction of the permitter property berm and aid in construction of freshwater, brine and stormwater pond berms. Excess materials which are not suitable for backfill will be removed from the site and disposed of at a proper facility.

5.0 Byproduct Generation During Operation

5.1 Spent Geothermal Brine

During normal operation, spent geothermal brine will be sent directly to injection wells following the secondary clarifier. During startup or shutdown procedures spent geothermal brine can be directed to the brine pond for temporary containment and subsequently injected back into the formation via injection wells. Spent geothermal brine will only be discharged via injection wells and will not be discharged to the surface. Geothermal brine solids are anticipated to precipitate due to lower ambient temperatures. Precipitated brine solids will be removed, dewatered, and transported off site to a permitted disposal facility as needed.

5.2 Wastewater

All of the following wastewater streams are directed to the Brine Pond and/or to the injection wells for direct injection into the geothermal reservoir:

- Cooling Tower blowdown (liquids)
- Geothermal drilling wastes (solids and liquids)
- Geothermal waste (solids)
- Spent geothermal brine (liquids)
- Geothermal brine precipitates (solids)
- Spills and water from hydro blasting (solids and liquids)
- Wastewater generated from plant cleanups and washdowns, including water collected by plant conveyance system (liquids)
- Vehicle wash station effluent (liquids)
- Process filtrate from brine pond filter press, geotextile solids-dewatering bags used to dewater geothermal solids before final disposal, or other mechanical separator Best Management Practices approved by the Executive Officer (liquids)
- Lime Sump effluent (liquids)
- Effluent from emission abatement equipment (liquids)

5.3 Solid Waste

The primary source of solid waste will be precipitated solids from geothermal brine in the primary and secondary clarifiers. Solids collected at the bottom of clarifiers will be directed to a solid dewatering system. It is likely 95% of filter cake from solid dewatering system will be characterized as non-hazardous and 5% will be characterized as hazardous due to elevated concentrations of heavy metals. Non-hazardous and hazardous solids will be disposed of at a suitable offsite landfill in accordance with applicable regulations. Geothermal brine solids from clarifiers and brine pond precipitates are estimated to be 6,800 tons per year. General refuse and office waste will be removed by the local sanitation service.

5.4 Sanitary Waste

Sanitary waste associated with employees at the proposed facility will be directed to a septic tank and subsequent leach field constructed according to Imperial County building code. The septic tank will be pumped out as necessary.

6.0 References

AECOM. (2009). *Amendment Petition for the Amended Salton Sea Unit 6 Project - Appendix J Construction Drainage, Erosion, and Sediment Control Plan.* CE Obsidian Energy LLC.

California Department of Water Resources. (2004). *Imperial Valley Groundwater Basin Bulletin 118.* Sacramento, CA: California Department of Water Resources.

California Water Watch. (2023, May 16). *Statewide Hydroclimate and Water Supply Conditions*. Retrieved from California Water Watch: https://cww.water.ca.gov/info?address=Niland,%20CA,%20USA

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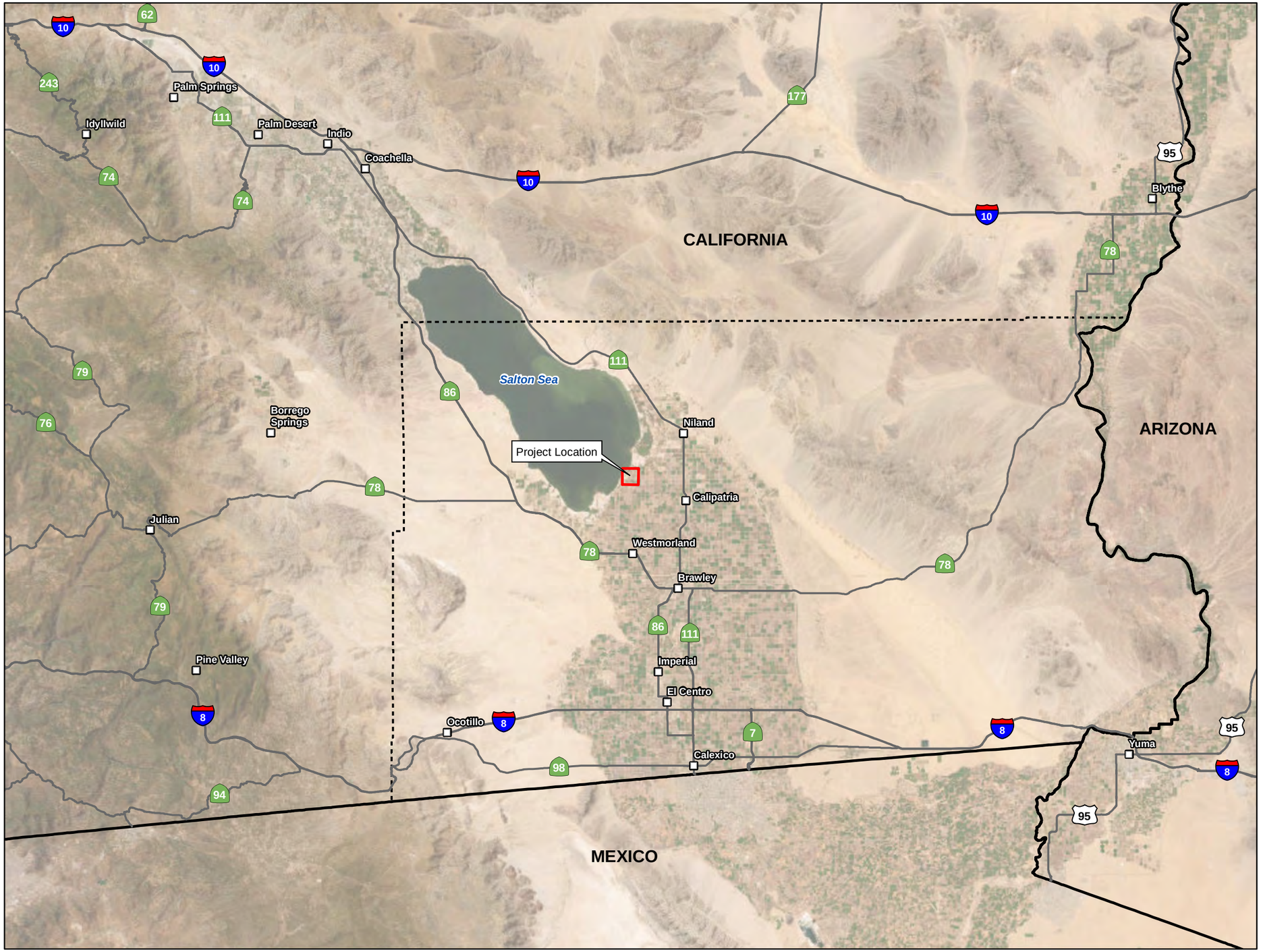
7.0 Figures



Legend

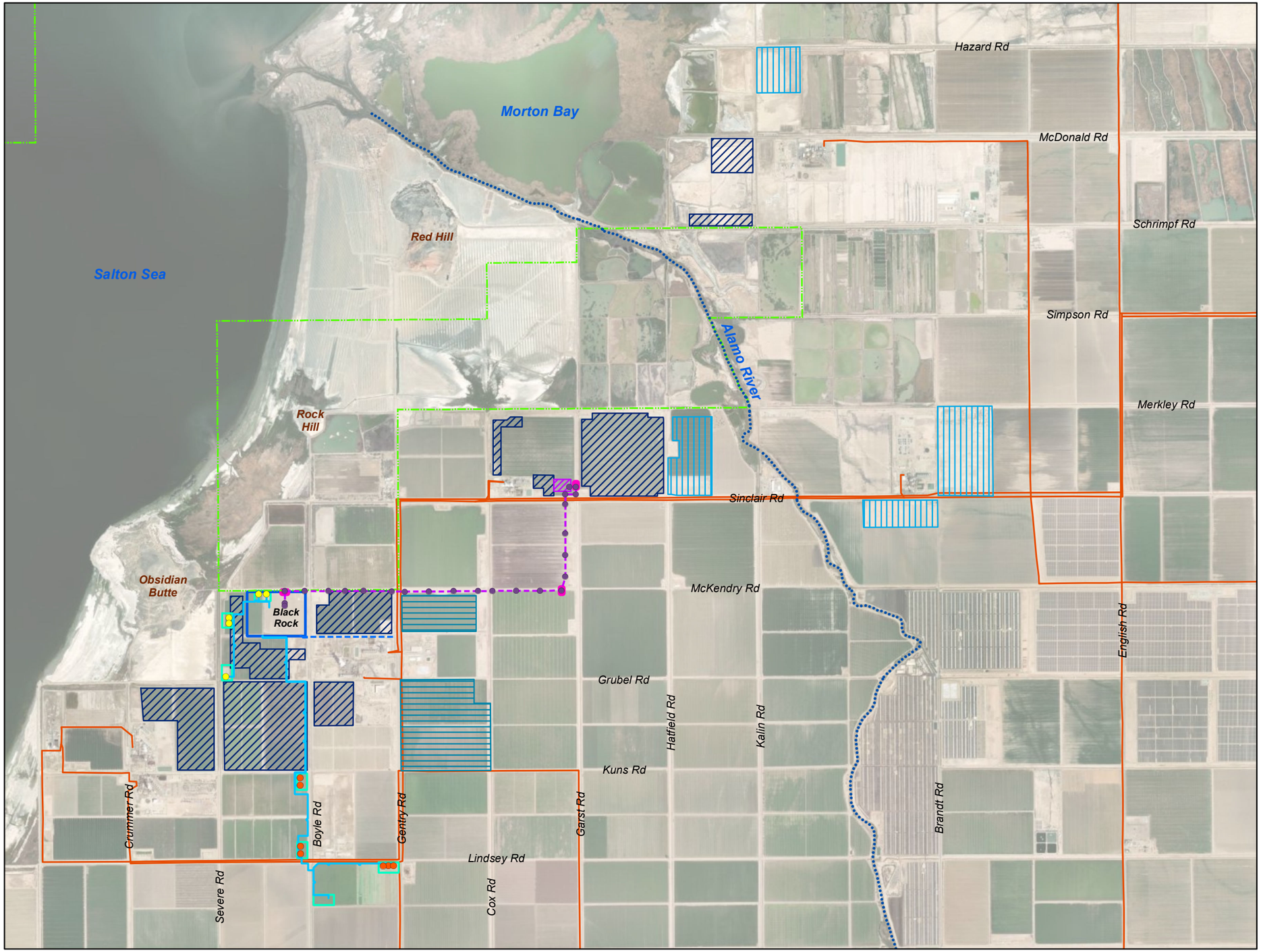
- City or Town
- Major Road
- Imperial County Boundary
- State or National Boundary

N

0 5 10 20
Miles

Figure 1
Project Vicinity
Black Rock Geothermal Project
Imperial County, California

Jacobs



Legend

- Plant
- Well Pad
- Injection Well
- Production Well
- Pipeline
- Water Supply Pipeline
- Gen-Tie Line Pole
- Gen-Tie Line
- Pull Site
- Switching Station
- Borrow Pit
- Construction Camp
- Construction Laydown and Parking Areas
- Existing Transmission/Distribution Power Lines
- Sonny Bono Salton Sea National Wildlife Refuge

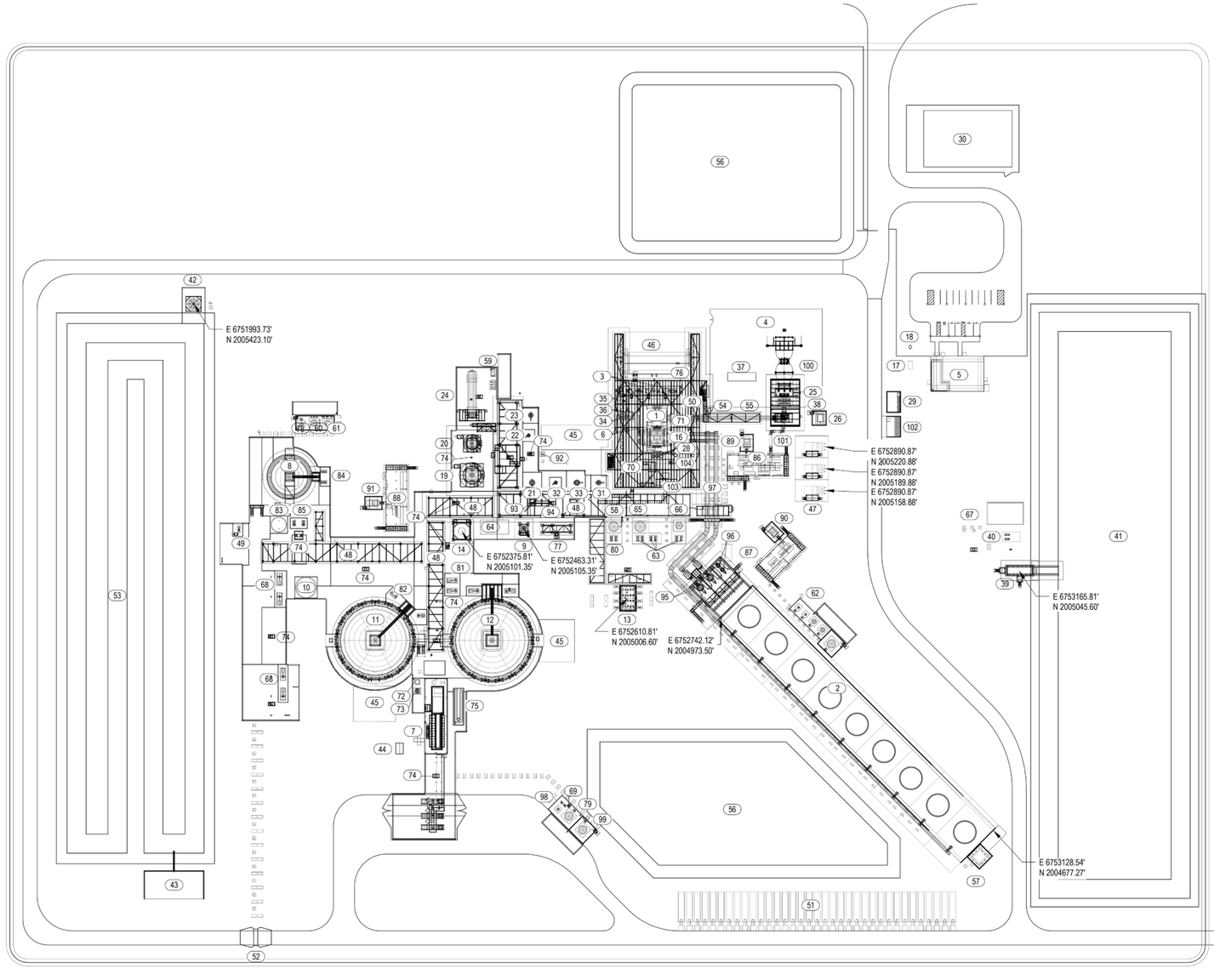
N

0 0.25 0.5 1
Miles

Figure 2
Project Location
Black Rock Geothermal Project
Imperial County, California

Jacobs

\\dc1vs01\gisproj\B\BHE_Renewables\Imperial_Valley\MapFiles\Executive_Summary\BR\Figure_1-4_231114.mxd



BLACK ROCK LOCATION PLAN

TOWNSHIP 11 SOUTH, RANGE 13 E,
SECTION 33, NE 1/4 OF SW 1/4
APPROXIMATELY 50 ACRES

LEGEND:

1. STEAM TURBINE
2. COOLING TOWER
3. VACUUM PUMP SKIDS A/B/C
4. SUBSTATION
5. CONTROL / MAINTENANCE BUILDING
6. EJECTORS A/B/C
7. HORIZONTAL BELT FILTER
8. THICKENER
9. SCRUBBER / DEMISTER DRAIN AFT
10. PROCESS BRINE HEAD TANK
11. SECONDARY CLARIFIER
12. PRIMARY CLARIFIER
13. ROCK MUFFLER
14. PROCESS AFT
15. NOT USED
16. CONDENSER
17. CONTROL / MAINTENANCE BUILDING SEPTIC TANK
18. CONTROL / MAINTENANCE BUILDING SANITARY LIFT STATION
19. LP CRYSTALLIZER
20. SP CRYSTALLIZER
21. LP SCRUBBER
22. SP SCRUBBER
23. HP SCRUBBER
24. HP SEPARATOR
25. GENERATOR STEP-UP TRANSFORMER
26. ALTERNATE FEED TRANSFORMER
27. NOT USED
28. CONDENSATE PUMPS
29. USED OIL STORAGE AREA
30. EVAPOTRANSPIRATION (E-T) BED
31. HP DEMISTER
32. SP DEMISTER
33. LP DEMISTER
34. INSTRUMENT / SERVICE AIR COMPRESSOR
35. INSTRUMENT / SERVICE AIR RECEIVERS
36. AIR COMPRESSOR CHILLER UNIT
37. SUBSTATION CONTROL ENCLOSURE
38. UNIT AUXILIARY TRANSFORMER
39. FIRE WATER PUMP ENCLOSURE
40. SERVICE WATER PUMPS
41. FRESH WATER POND
42. WARM-UP AFT
43. HYDRO BLAST PAD
44. COOLING HUT
45. CRANE ACCESS
46. GANTRY CRANE
47. DIESEL GENERATOR
48. PIPE RACK
49. EMERGENCY BRINE POND PUMPS
50. VT-SURGE CUBICLE
51. TRAILER PARKING
52. CULVERT
53. BRINE POND
54. GENERATOR CIRCUIT BREAKER
55. ISOLATED PHASE BUS DUCT
56. STORM WATER RETENTION BASIN
57. OX BOX
58. BLOWDOWN STORAGE TANK
59. ANTI-FOAM STORAGE AND DOSING SYSTEM
60. NORMS STORAGE AND DOSING SYSTEM
61. FLOCCULANT STORAGE AND DOSING SYSTEM
62. COOLING TOWER CHEMICAL FEED SYSTEM
63. HP/SP/LP CONDENSATE STORAGE PUMPS
64. DILUTION WATER PUMPS (FUTURE)
65. SP/LP CONDENSATE STORAGE TANK
66. HP CONDENSATE STORAGE TANK
67. POTABLE WATER SYSTEM
68. BRINE INJECTION / BOOSTER PUMPS
69. ACID FUME SCRUBBER
70. STG LUBE OIL MODULE
71. NEUTRAL GROUND ENCLOSURE
72. SERVICE WATER HOLDING TANK
73. SERVICE WATER BOOSTER PUMP A/B
74. AREA SUMP / PUMP
75. HORIZONTAL BELT FILTER COOLER
76. SEAL WATER COOLER
77. SCRUBBER AND DEMISTER DRAINS SETTLING TANK
78. ANTI-SCALANT REAGENT
79. HYDROCHLORIC ACID DOSING
80. CONDENSATE INJECTION WELL PUMPS
81. PRIMARY CLARIFIER SEED RECYCLE/TRANSFER PUMPS
82. SECONDARY CLARIFIER SEED RECYCLE/TRANSFER PUMPS
83. AERATED BRINE STORAGE TANK
84. THICKENER SEED RECYCLE/TRANSFER PUMPS
85. AERATED BRINE BOOSTER / INJECTION PUMPS
86. MEDIUM VOLTAGE ELECTRICAL ENCLOSURE
87. COOLING TOWER ELECTRICAL ENCLOSURE
88. BRINE INJECTION ELECTRICAL ENCLOSURE
89. MEDIUM VOLTAGE ELECTRICAL ENCLOSURE SUS TRANSFORMERS
90. COOLING TOWER ELECTRICAL ENCLOSURE SUS TRANSFORMERS
91. BRINE INJECTION ELECTRICAL ENCLOSURE SUS TRANSFORMERS
92. VESSEL DRAIN AFT
93. SCRUBBER DRAIN PUMP
94. DEMISTER DRAIN PUMP
95. COOLING WATER PUMPS
96. AUXILIARY COOLING WATER PUMPS
97. CIRCULATING WATER PIPING
98. 2.5% HCl TANK AND PUMPS
99. LIQUID LIME STORAGE TANK AND PUMPS
100. 230kV BREAKER
101. NON-SEGREGATED PHASE BUS DUCT
102. NEW OIL STORAGE AREA
103. LUBE OIL COOLER
104. OIL PURIFIER

Figure 3
General Arrangement,
Black Rock Geothermal Project
Imperial County, California

Source: Veizades & Associates, Drawing 20046788BR-PP-001.

Jacobs

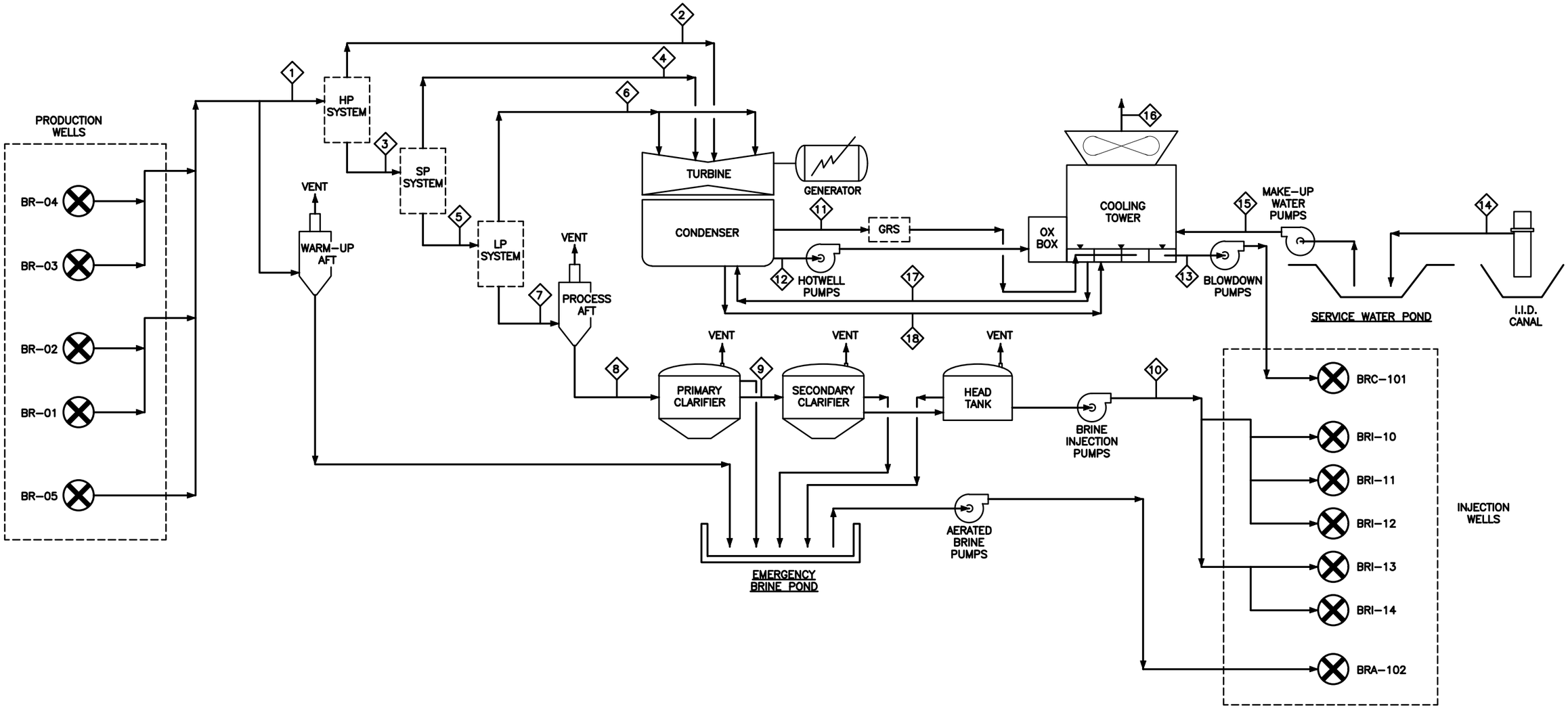


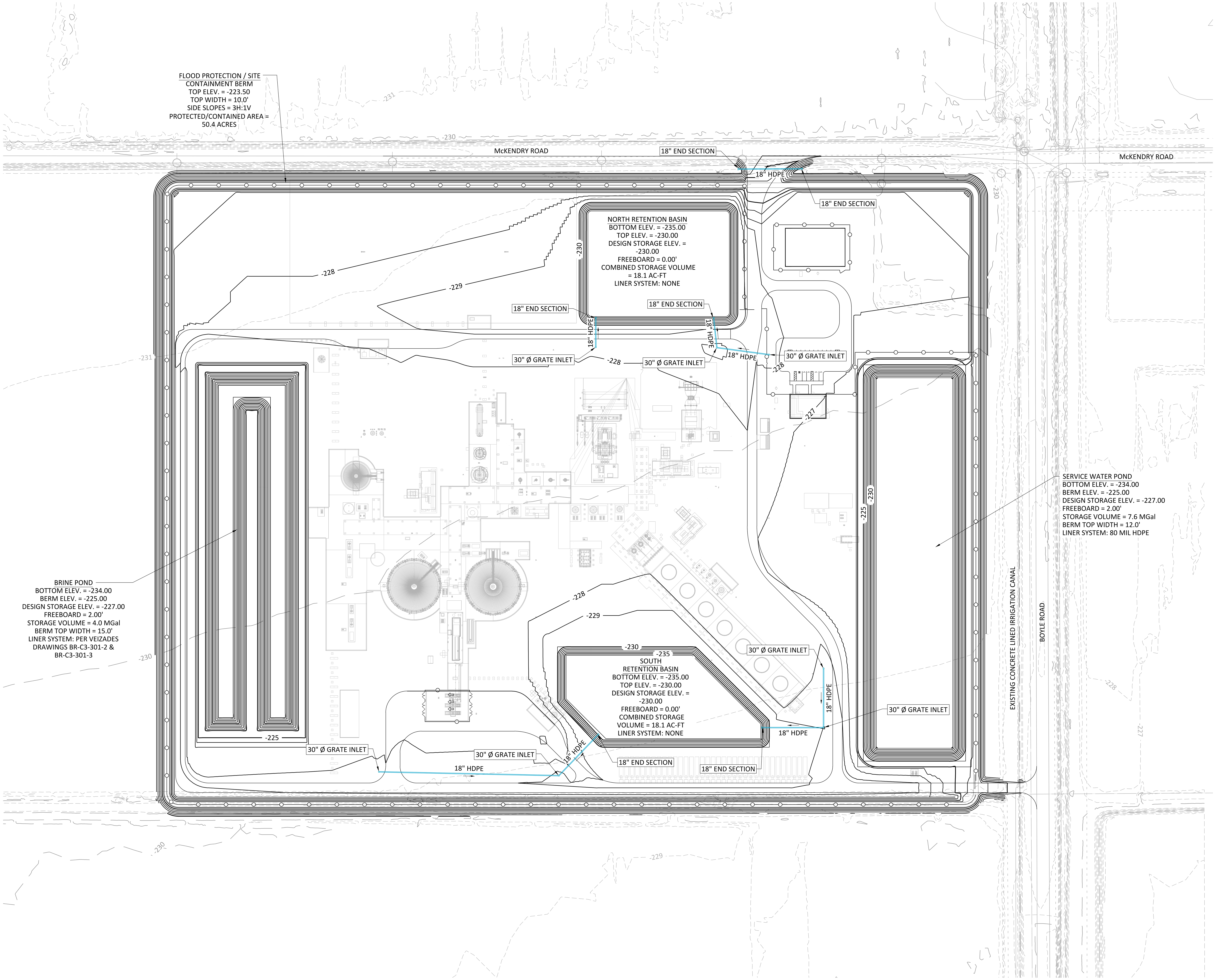
Figure 4
Process Flow Diagram
Black Rock Geothermal Project
Imperial County, California

Source: Veizades & Associates, Drawing BR-M0-200-1F, 4/5/2023.

Jacobs

8.0 Appendices

Appendix A



NOTES:

1. PRELIMINARY EARTHWORK QUANTITIES:
   CUT = 67,746 CY
   FILL = 128,863 CY
2. BALANCE VOLUMES ARE FROM EXISTING GROUND TO FINISHED GRADE.
3. TOP OF CONCRETE IS -227.0 UNLESS SPECIFIED ON THE PLANS.
4. REFER TO PLOT PLAN (PP-001) FOR EQUIPMENT LAYOUT.
5. SEE 20046788BR-CS-001 FOR OVERALL SURFACING PLAN.
6. SITE STORM WATER QUANTITIES:

DESCRIPTION	QTY	UNIT
18" HDPE	1,107	LF
-18" HDPE (<5' DEPTH)	856	LF
-18" HDPE (5'-15' DEPTH)	251	LF
2.5' DIA INLET	7	EA
-2.5' DIA INLET (<5' DEPTH)	7	EA
18" FLARED END SECTION	6	EA

80 0 80 160
SCALE IN FEET
SCALE: 1" = 80'-0"

GENERAL NOTES:

REV	DATE	REVISION INFORMATION	BY	CHK	APP
0	07-27-23	ISSUED FOR APPROVAL	AL	TJ	JB
A	06-08-23	ISSUED FOR REVIEW	AL	TJ	JB

KIEWIT ENGINEERING GROUP, INC. REGISTERED ENGINEERING FIRM:

REFERENCE DRAWINGS

ENGINEER DESIGN ORIGINATOR	AL
LEAD ENGINEER	TJ
ENGINEERING MANAGER	JB
PROJECT MANAGER	AG

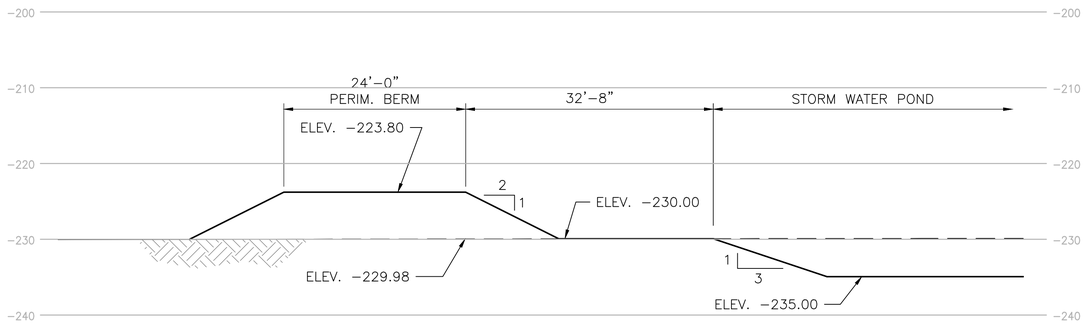
BHE RENEWABLES®

Kiewit

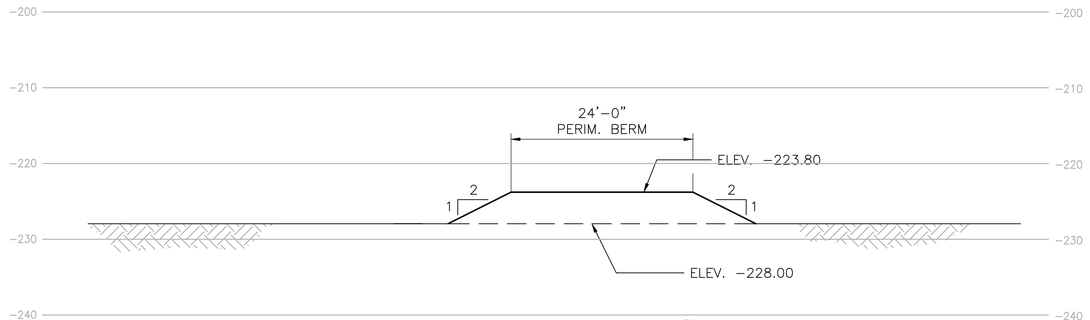
VEIZADES & ASSOCIATES, INC. CONSULTING ENGINEERS

SALTON SEA GEOTHERMAL
BLACK ROCK
SITE GRADING & DRAINAGE PLAN

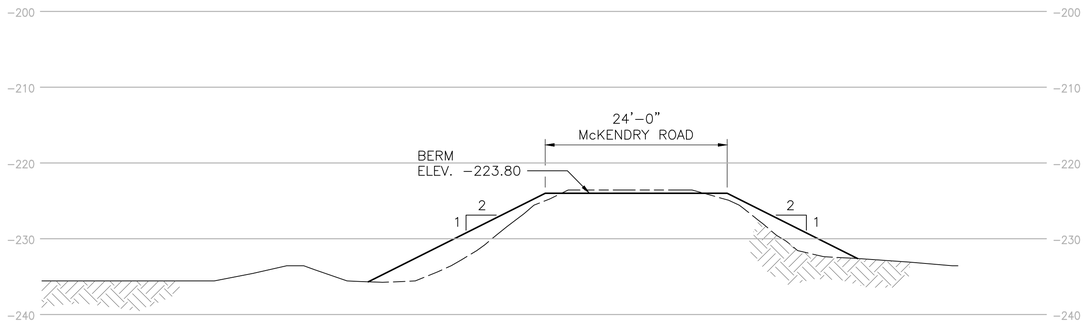
LOCATION: CALIPATRIA, CA
SCALE: 1"=80'
DRAWING NO: 20046788BR-CG-001
REV. A



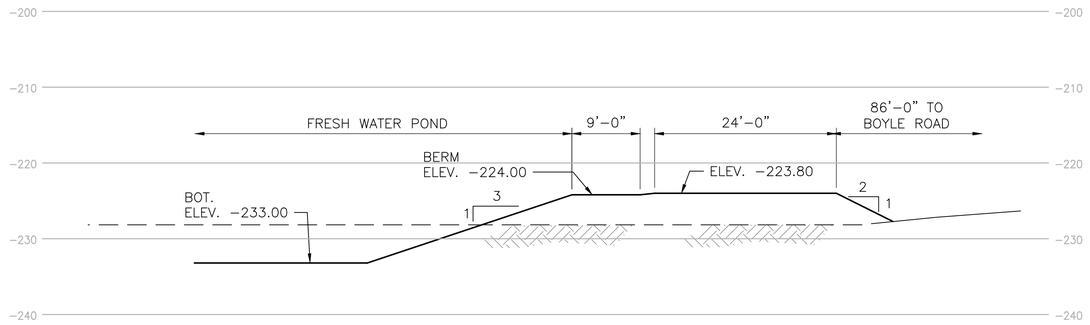
WEST BERM SECTION D
1"=10'



SOUTH BERM SECTION C
1"=10'



NORTH BERM SECTION A
1"=10'



EAST BERM SECTION B
1"=10'

NO.	REVISIONS	BY	APPR.	DATE
A	ISSUED FOR REVIEW	MA	HGV	20/JAN/23

WARNING
IF BAR BELOW DOES NOT MEASURE 1 INCH THEN DRAWING IS NOT TO SCALE
0 1
1 INCH

VEIZADES & ASSOCIATES, INC.
CONSULTING ENGINEERS
5 THIRD STREET • SUITE 400 • SAN FRANCISCO • CA 94103
TEL: 415. 394.8855 FAX: 415. 394.8866

DESIGNED BY	MA
CHECKED BY	BAP
DRAFTED BY	NP
APPROVED BY	HGV
DATE	01/06/23
SCALE	1"=10'

BHE RENEWABLES

NEW GENERATION
BLACK ROCK PROJECT

BERM DETAILS

PROJECT NO.	242-067
CONTRACT NO.	
CADFILE NO.	
SHEET NO.	BR-C3-201-1
REV. NO.	A

Appendix B

LOG OF BORING NO. B-1

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
			2		SILTY CLAY/CLAYEY SILT (CL-ML): Brown, very moist, soft, low to medium plasticity		32.0	LL=26% PI=6%
5			5		SANDY SILT/SILTY SAND (ML-SM): Light brown, wet, loose, with very fine grained sand ▼	105.5	26.9	
			5		Saturated		30.6	
10			4			101.2	24.9	c=0.25 tsf Φ=26°
15			21		Medium dense			% passing #200 = 58.1%
20			13					
25			4	0.25	SILTY CLAY/CLAYEY SILT (CL-ML): Gray-brown, very moist/ saturated, soft, medium plasticity, some very fine grained sand			
30					Groundwater was measured at 6 feet at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			

DATE DRILLED: 9/27/22 TOTAL DEPTH: 26.5 Feet DEPTH TO WATER: 6.0 ft.

LOGGED BY: A. Gomez TYPE OF BIT: Hollow Stem Auger DIAMETER: 8 in.

SURFACE ELEVATION: Approximately -225' HAMMER WT.: 140 lbs. DROP: 30 in.

PROJECT No. LE22199

LANDMARK Geo-Engineers and Geologists

PLATE B-1

LOG OF BORING NO. B-2

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
			7		SILTY CLAY/CLAYEY SILT (CL-ML): Brown, very moist, soft, medium plasticity	106.6	24.8	LL=30% PI=12% c=0.21 tsf
5			1		SILT/SANDY SILT (ML): Light brown, wet, very loose		29.8	% passing #200 = 97.4% <2μ = 11.7%
			7		Saturated, loose, some very fine grained sand	98.7	27.2	% passing #200 = 86.5%
10			7		SILTY SAND (SM): Light brown, saturated, loose, with very fine grained sand		26.4	
15			12		CLAYEY SILT (ML): Light brown, very moist/saturated, firm, low plasticity, some very fine grained sand			LL=27% PI=6% % passing #200 = 92.6% <2μ = 12.4%
20			8		SILTY SAND (SM): Light brown, saturated, loose, with very fine grained sand			% passing #200 = 40.9%
25			4		CLAYEY SILT (ML): Gray-brown, very moist/saturated, very soft, low plasticity			% passing #200 = 95.7% <2μ = 18.0%
30					Groundwater was measured at 16 feet at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			

DATE DRILLED: 9/27/22 TOTAL DEPTH: 26.5 Feet DEPTH TO WATER: 6.0 ft.

LOGGED BY: A. Gomez TYPE OF BIT: Hollow Stem Auger DIAMETER: 8 in.

SURFACE ELEVATION: Approximately -225' HAMMER WT.: 140 lbs. DROP: 30 in.

PROJECT No. LE22199

LANDMARK Geo-Engineers and Geologists

PLATE B-2

LOG OF BORING No. B-3

SHEET 1 OF 1

DEPTH	SAMPLE	USCS CLASS.	BLOW COUNT	POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	DRY DENSITY (pcf)	MOISTURE CONTENT (% dry wt.)	OTHER TESTS
					SILTY CLAY/CLAYEY SILT (CL-ML): Brown, very moist, soft, low to medium plasticity			
			2		SANDY SILT (ML): Light brown, wet, very loose, with very fine grained sand		28.3	Passing #200 = 60.6%
5			18		SILTY SAND (SM): Light brown, wet, medium dense, fine grained sand ▼	99.8	24.2	Passing #200 = 24.4%
			1		SANDY SILT/SILTY SAND (ML-SM): Light brown, saturated, very loose, with very fine to fine grained sand		30.7	Passing #200 = 57.4%
10			33		Medium dense	103.9	23.6	Passing #200 = 49.7%
15			5		SILT/CLAYEY SILT (ML): Brown, very moist, firm, low plasticity		30.6	Passing #200 = 94.9%
20			6		SAND/SILTY SAND (SP-SM): Brown, saturated, loose, fine grained sand	96.2	22.0	Passing #200 = 39.7% c=0.04 tsf Φ=35°
25			21		Medium dense		22.8	Passing #200 = 10.9%
30			4		FAT CLAY (CH): Dark brown, very moist, soft, high plasticity			LL=62% PI=43% % passing #200 = 99% <2μ = 54.6%
35			6		SILTY SAND (SM): Light brown, saturated, loose, fine grained sand		28.9	Passing #200 = 82.2%
40			50/6"		SAND/SILTY SAND (SP-SM): Brown, saturated, very dense, fine grained sand	105.6	20.4	c=0.02 tsf Φ=39°
45			21		Medium dense		25.7	Passing #200 = 9.5%
50			88		Very dense			
55			12	2.5	CLAYEY SILT/SILTY CLAY (ML): Brown, very moist, stiff, low to medium plasticity		26.2	LL=23% PI=5%
60					SILTY SAND (SM): Brown, saturated, very dense, fine grained sand			

DATE DRILLED: 9/28/22 | TOTAL DEPTH: 76.5 Feet | DEPTH TO WATER: 6.0 ft.

LOGGED BY: A. Gomez | TYPE OF BIT: Hollow Stem Auger | DIAMETER: 8 in.

SURFACE ELEVATION: Approximately -225' | HAMMER WT.: 140 lbs. | DROP: 30 in.

PROJECT No.: LE22199

LANDMARK Geo-Engineers and Geologists

PLATE B-3a

LOG OF BORING No. B-3

SHEET 1 OF 1

DEPTH	FIELD: SAMPLE	FIELD: USCS CLASS.	FIELD: BLOW COUNT	FIELD: POCKET PEN. (tsf)	DESCRIPTION OF MATERIAL	LABORATORY: DRY DENSITY (pcf)	LABORATORY: MOISTURE CONTENT (% dry wt.)	LABORATORY: OTHER TESTS
			50/6"		SILTY SAND (SM): Brown, saturated, very dense, fine graded sand	107.2	20.1	% passing #200 = 30.4% <2μ = 7.7%
65			12	2.5	SILTY CLAY (CL): Brown, very moist, stiff, medium plasticity	94.6	30.4	c=0.87 tsf
70			15	1.5				LL=30% PI=16%
75			5	1.5		103.5	23.1	c=0.31 tsf
80					Groundwater was measured at 14 feet at time of drilling. This is not considered the stabilized groundwater depth as groundwater may rise to a level higher than that measured in borehole.			
85								
90								
95								
100								
105								
110								
115								
120								

DATE DRILLED: 9/28/22 | TOTAL DEPTH: 76.5 Feet | DEPTH TO WATER: 6.0 ft.

LOGGED BY: A. Gomez | TYPE OF BIT: Hollow Stem Auger | DIAMETER: 8 in.

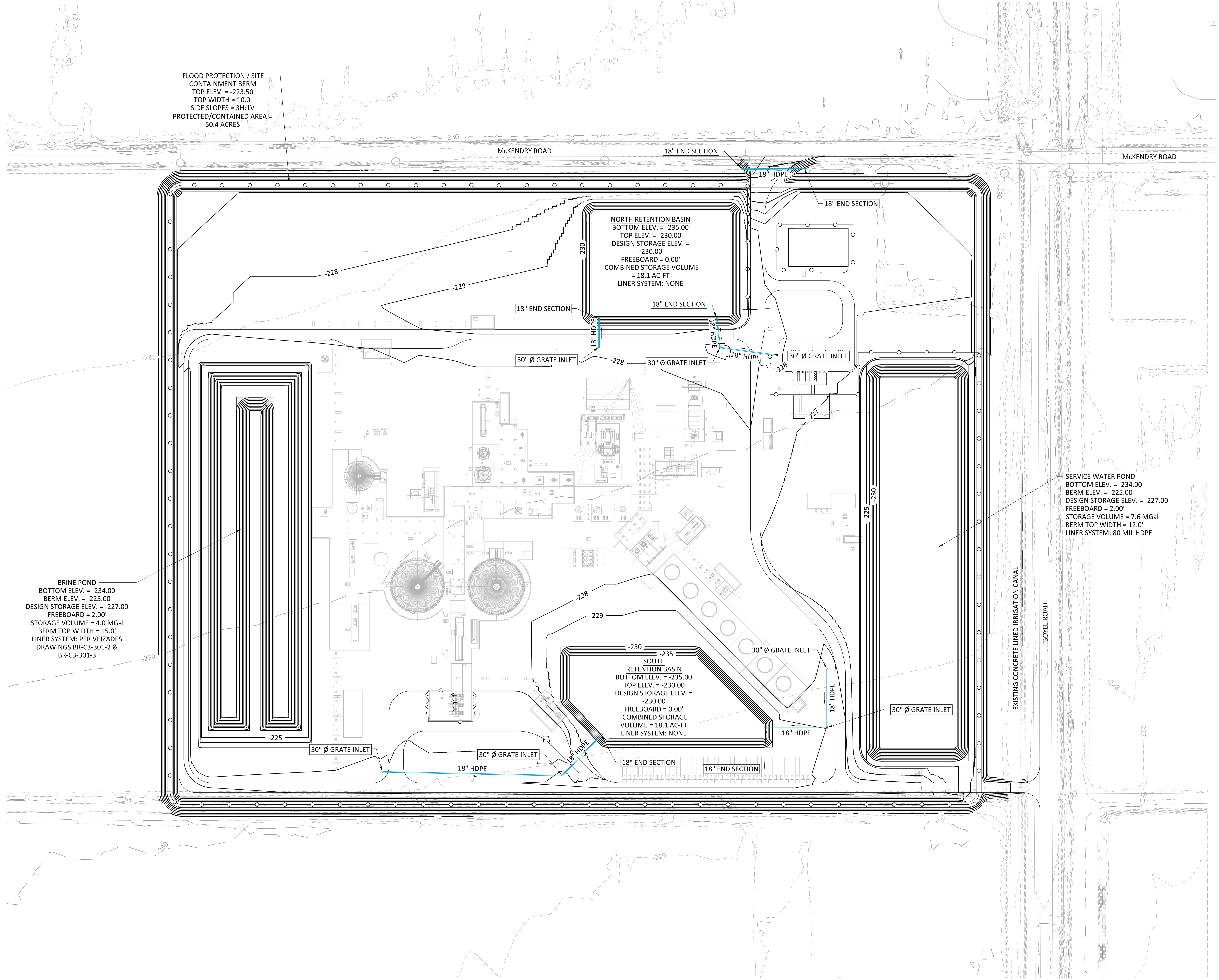
SURFACE ELEVATION: Approximately -225' | HAMMER WT.: 140 lbs. | DROP: 30 in.

PROJECT No.: LE22199

LANDMARK Geo-Engineers and Geologists

PLATE B-3b

Appendix C



NOTES:

1. PRELIMINARY EARTHWORK QUANTITIES:
   CUT = 67,746 CY
   FILL = 128,863 CY
2. BALANCE VOLUMES ARE FROM EXISTING GROUND TO FINISHED GRADE.
3. TOP OF CONCRETE IS -227.0 UNLESS SPECIFIED ON THE PLANS.
4. REFER TO PLOT PLAN (PP-001) FOR EQUIPMENT LAYOUT.
5. SEE 20046788BR-CS-001 FOR OVERALL SURFACING PLAN.
6. SITE STORM WATER QUANTITIES:

DESCRIPTION	QTY	UNIT
18" HDPE	1,107	LF
-18" HDPE (<5' DEPTH)	856	LF
-18" HDPE (5'-15' DEPTH)	251	LF
2.5' DIA INLET	7	EA
-2.5' DIA INLET (<5' DEPTH)	7	EA
18" FLARED END SECTION	6	EA

GENERAL NOTES:

REFERENCE DRAWINGS

REV	DATE	REVISION INFORMATION	BY	CHK	APP
0	07-27-23	ISSUED FOR APPROVAL	AL	TJ	JB
A	06-08-23	ISSUED FOR REVIEW	AL	TJ	JB

KIEWIT ENGINEERING GROUP, INC. REGISTERED ENGINEERING FIRM:

ENGINEER DESIGN ORIGINATOR	AL
LEAD ENGINEER	TJ
ENGINEERING MANAGER	JB
PROJECT MANAGER	AG

BHE RENEWABLES®

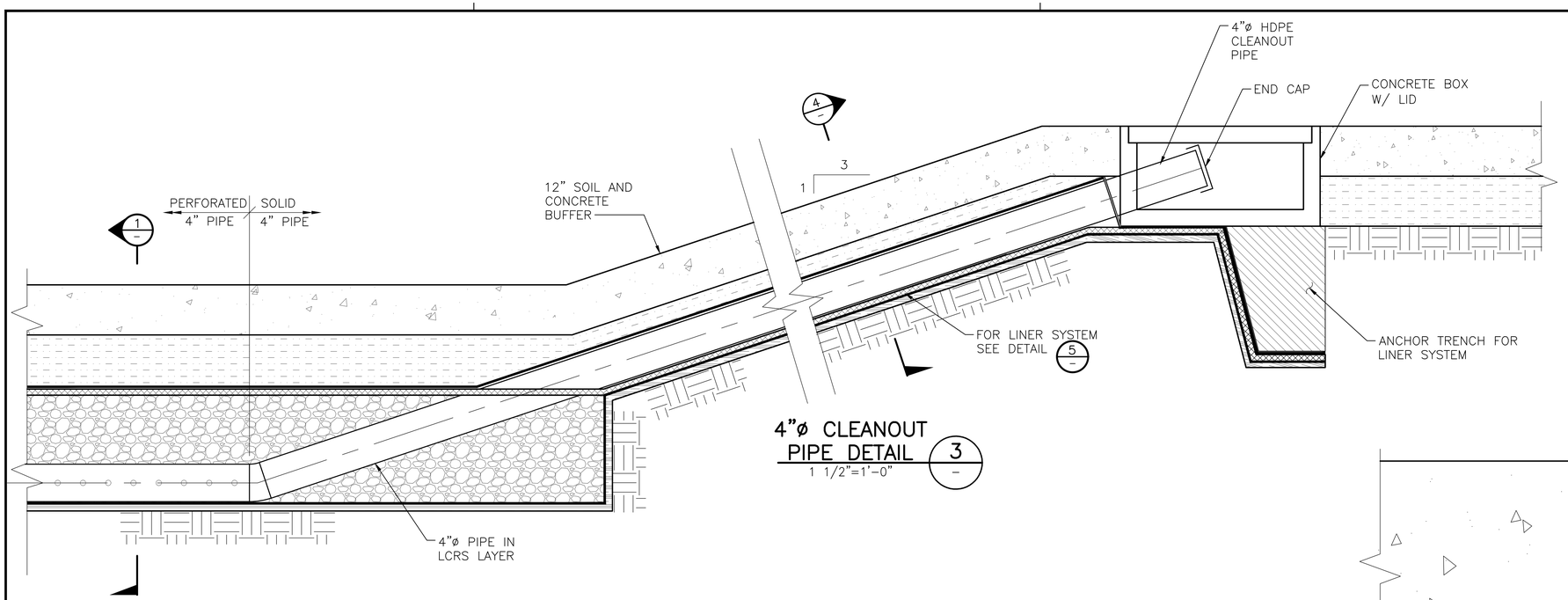
Kiewit

VEIZADES & ASSOCIATES, INC. CONSULTING ENGINEERS

SALTON SEA GEOTHERMAL
BLACK ROCK
SITE GRADING & DRAINAGE PLAN

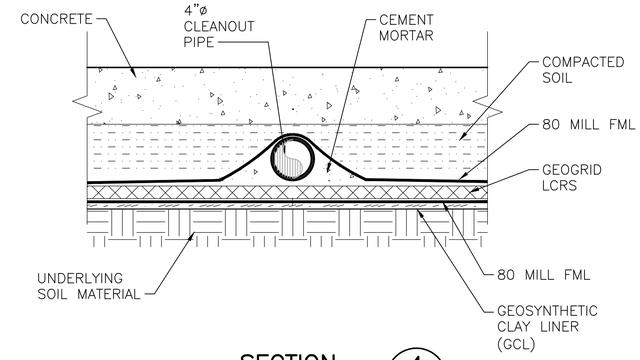
LOCATION: CALIPATRIA, CA — SCALE: 1"=80'

DRAWING NO: 20046788BR-CG-001 — REV. A



4"ø CLEANOUT PIPE DETAIL 3

1 1/2"=1'-0"



SECTION 4

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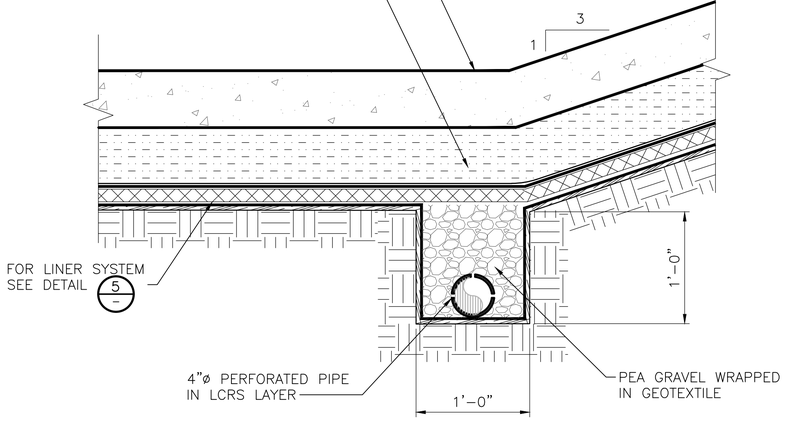
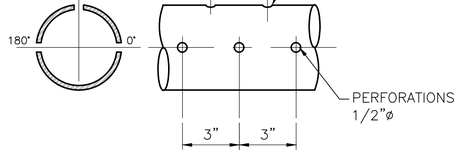


4"ø CLEANOUT PIPE SECTION 1

1 1/2"=1'-0"



PERFORTED PIPE

NOTES:

1. LEAK DETECTION PIPE SHALL BE DIAMETER SHOWN ON PLANS AND NOT LESS THAN SCHEDULE 80 OR EQUIVALENT STRENGTH AND MADE OF HDPE.
2. THE PIPE SHALL BE DRILLED PER CALTRANS SPECIFICATION 68-2.02
3. THE JOINTS SHALL BE FUSION BUTT WELDED.
4. RAP GEOTEXTILE AROUND THE ENTIRE LENGTH OF PERFORATED PIPE.

PERFORATED PIPE 2

NO SCALE

LINER SYSTEM 5

NO SCALE

NO.	REVISIONS	BY	APPR.	DATE
B	RE-ISSUED FOR REVIEW	BAP	HGV	02/22/23
A	ISSUED FOR REVIEW	BAP	HGV	01/13/23

WARNING

IF BAR BELOW DOES NOT MEASURE 1 INCH THEN DRAWING IS NOT TO SCALE

0 1

1 INCH

VEIZADES & ASSOCIATES, INC.
CONSULTING ENGINEERS
5 THIRD STREET • SUITE 400 • SAN FRANCISCO • CA 94103
TEL: 415. 394.8855 FAX: 415. 394.8866

DESIGNED BY	BAP
CHECKED BY	HGV
DRAFTED BY	DA
APPROVED BY	HGV
DATE	12/06/22
SCALE	1 1/2"=1'-0"

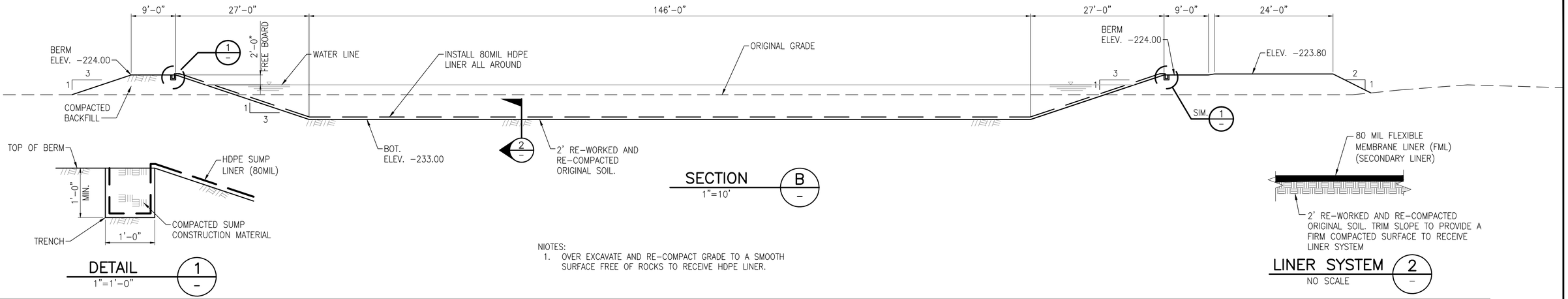
BHE RENEWABLES

NEW GENERATION
BLACK ROCK PROJECT

BRINE POND CIVIL DETAILS – 1

PROJECT NO.	242-067
CONTRACT NO.	
CADFILE NO.	
SHEET NO.	BR-C3-301-2
REV. NO.	B

Plot Date: 22 Feb 2023, - 10:44:03; Drawing file: S:\CAD Folder\CADFILES\242\067\Civil drawings\ BR-C3-301-2,3.dwg

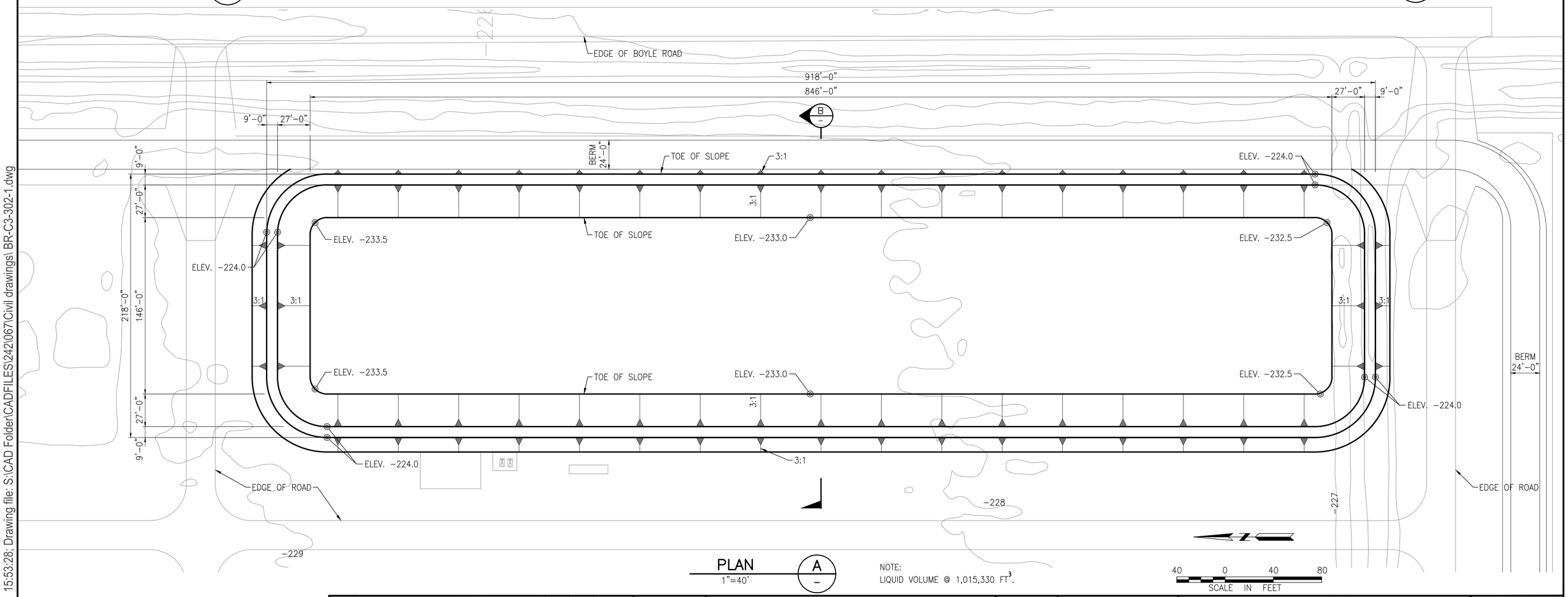


DETAIL 1
1"=1'-0"

SECTION B
1"=10'

LINER SYSTEM 2
NO SCALE

NIOTES:
1. OVER EXCAVATE AND RE-COMPACT GRADE TO A SMOOTH SURFACE FREE OF ROCKS TO RECEIVE HDPE LINER.



PLAN A
1"=40'

NOTE:
LIQUID VOLUME @ 1,015,330 FT^3.

NO.	REVISIONS	BY	APPR.	DATE
A	ISSUED FOR REVIEW	BAP	HGV	20/JAN/23

WARNING
IF BAR BELOW DOES NOT MEASURE 1 INCH THEN DRAWING IS NOT TO SCALE
0 1
1 INCH

VEIZADES & ASSOCIATES, INC.
CONSULTING ENGINEERS
5 THIRD STREET • SUITE 400 • SAN FRANCISCO • CA 94103
TEL: 415. 394.8855 FAX: 415. 394.8866

DESIGNED BY	BAP
CHECKED BY	HGV
DRAFTED BY	DA
APPROVED BY	HGV
DATE	01/17/23
SCALE	1"=30'

BHE RENEWABLES

NEW GENERATION
BLACK ROCK PROJECT

FRESH WATER POND CIVIL PLAN

PROJECT NO.	242-067
CONTRACT NO.	
CADFILE NO.	
SHEET NO.	BR-C3-302-1
REV. NO.	A

Plot Date: 20 Jan 2023, - 15:53:28; Drawing file: S:\CAD Folder\CADFILES\242067\Civil drawings\ BR-C3-302-1.dwg

Appendix D

Constituent	Test Results	Unit
Antimony	125	mg/kg
Arsenic	376	mg/kg
Barium	733	mg/kg
Beryllium	13.4	mg/kg
Cadmium	9.99	mg/kg
Chromium	3.29	mg/kg
Cobalt	4.19	mg/kg
Copper	231	mg/kg
Lead	268	mg/kg
Molybendum	ND	mg/kg
Nickel	1.65	mg/kg
Selenium	ND	mg/kg
Silver	22.7	mg/kg
Thalium	ND	mg/kg
Vanadium	7.62	mg/kg
Zinc	387	mg/kg
Mercury	ND	mg/kg

Geothermal Brine Solids test resutls are from a nearby facility and were sampled on 03/23/2020 using EPA 6000/7000 Series Methods.

Safety Data Sheet

Section 1: Identification

Product identifier

Product Name • **Geothermal Brine**

Synonyms • Brine

Product Description • Light brown liquid with fine precipitate. It is a saline solution with traces of other substances. It will have a Hydrogen Sulfide/Ammonia odor. Under normal conditions, it has a temperature of 210-500F, and will flash steam when released to the atmosphere.

Relevant identified uses of the substance or mixture and uses advised against

Recommended use • Brine is released out from the ground (pressurized) and is flashed to obtain steam to run turbines

Details of the supplier of the safety data sheet

Manufacturer • CalEnergy Operating Corp

7030 Gentry Road
Calipatria, CA 92233
United States
www.calenergy.com

Telephone (Technical) • 760-348-4275 - EHS Telephone No.

Emergency telephone number

Manufacturer • 760-348-4271

Section 2: Hazard Identification

United States (US)

According to OSHA 29 CFR 1910.1200 HCS

Classification of the substance or mixture

OSHA HCS 2012 • Eye Irritation 2 - H319

Label elements

OSHA HCS 2012

WARNING

Hazard statements • Causes serious eye irritation - H319

Precautionary statements

Prevention • Wash thoroughly after handling. - P264
Wear eye/face protection , . - P280

Response • IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. - P305+P351+P338

If eye irritation persists: Get medical advice/attention. - P337+P313

Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Other information

- This product contains trace quantities of naturally occurring radioactive material (NORM)

Section 3 - Composition/Information on Ingredients

Substances

- Material does not meet the criteria of a substance.

Mixtures

Composition				
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Comments**
Sodium chloride	**CAS:**7647-14-5	18.5%	Ingestion/Oral-Rat LD50 • 3000 mg/kg	NDA
Calcium chloride	**CAS:**10043-52-4	3%	Ingestion/Oral-Rat LD50 • 1 g/kg	NDA
Potassium chloride	**CAS:**7447-40-7	1.5%	Ingestion/Oral-Rat LD50 • 2600 mg/kg	NDA
Carbon dioxide	**CAS:**124-38-9	2000ppm	Inhalation-Rat LC50 • 470000 ppm 30 Minute(s)	NDA
Manganese	**CAS:**7439-96-5	930ppm	Ingestion/Oral-Rat LD50 • 9 g/kg	NDA
Ammonia	**CAS:**7664-41-7	420ppm	Inhalation-Rat LC50 • 2000 ppm 4 Hour(s)	NDA
Silicon	**CAS:**7440-21-3	250ppm	Ingestion/Oral-Rat LD50 • 3160 mg/kg	NDA
Barium	**CAS:**7440-39-3	130ppm	NDA	NDA
Lead	**CAS:**7439-92-1	100ppm	NDA	NDA
Magnesium	**CAS:**7439-95-4	40ppm	NDA	NDA
Arsenic	**CAS:**7440-38-2	15ppm	Ingestion/Oral-Rat LD50 • 763 mg/kg	NDA
Cesium	**CAS:**7440-46-2	10ppm	NDA	NDA
Hydrogen sulfide	**CAS:**7783-06-4	7ppm	Inhalation-Rat LC50 • 700 mg/m³ 4 Hour(s)	NDA
Copper	**CAS:**7440-50-8	5ppm	NDA	NDA
Methane	**CAS:**74-82-8	3ppm	NDA	NDA
Cadmium	**CAS:**7440-43-9	1.2ppm	Ingestion/Oral-Rat LD50 • 2330 mg/kg Inhalation-Rat LC50 • 25 mg/m³ 30 Minute(s)	NDA
Antimony	**CAS:**7440-36-0	0.9ppm	Ingestion/Oral-Rat LD50 • 100 mg/kg	NDA
Aluminum	**CAS:**7429-90-5	0.7ppm	NDA	NDA
Silver	**CAS:**7440-22-4	0.4ppm	NDA	NDA
Tin	**CAS:**7440-31-5	0.2ppm	NDA	NDA
Selenium	**CAS:**7782-49-2	0.2ppm	Ingestion/Oral-Rat LD50 • 6700 mg/kg	NDA
Nickel	**CAS:**7440-02-0	0.2ppm	NDA	NDA
Chromium	**CAS:**7440-47-3	0.2ppm	NDA	NDA
Beryllium	**CAS:**7440-41-7	0.02ppm	NDA	NDA

Section 4: First-Aid Measures

Description of first aid measures

Inhalation
- Move victim to fresh air. Administer oxygen if breathing is difficult. Give artificial respiration if victim is not breathing. If signs/symptoms continue, get medical attention.

Skin
- In case of contact with substance, immediately flush skin with running water for at least 20 minutes. Take off contaminated clothing and wash before reuse. If irritation develops and persists, get medical attention.

Eye
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. If eye irritation persists: Get medical advice/attention.

Ingestion
- Do not use mouth-to-mouth method if victim ingested the substance. Get medical attention.

Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Notes to Physician
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5: Fire-Fighting Measures

Extinguishing media

Suitable Extinguishing Media
- LARGE FIRE: Water spray, fog or regular foam.
  SMALL FIRES: Dry chemical, CO_2, water spray or regular foam.

Unsuitable Extinguishing Media
- No data available.

Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- No hazard due to fire or explosion expected.

Hazardous Combustion Products
- No data available

Advice for firefighters

- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
  Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
  Wear positive pressure self-contained breathing apparatus (SCBA).

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures

Personal Precautions
- Ventilate enclosed areas. Do not walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Wear appropriate personal protective equipment, avoid direct contact.

Emergency Procedures
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stay upwind. Keep out of low areas. Keep unauthorized personnel away. Ventilate closed spaces before entering.

Environmental precautions

- Avoid run off to waterways and sewers.

Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Stop leak if you can do it without risk.
SMALL SPILLS: Take up with sand or other non-combustible absorbent material and place into containers for later disposal.
LARGE SPILLS: Dike far ahead of spill for later disposal.

Section 7 - Handling and Storage

Precautions for safe handling

Handling

- Use only with adequate ventilation. Use good safety and industrial hygiene practices. Wear appropriate personal protective equipment, avoid direct contact. Avoid breathing mist, vapors, spray. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

Conditions for safe storage, including any incompatibilities

Storage

- Store in a well-ventilated place. Keep container tightly closed.

Section 8 - Exposure Controls/Personal Protection

Control parameters

Exposure Limits/Guidelines				
	Result	**ACGIH**	**NIOSH**	**OSHA**
Beryllium as Beryllium compounds	Ceilings	Not established	0.0005 mg/m3 Ceiling	5 µg/m3 Ceiling
	TWAs	0.00005 mg/m3 TWA (inhalable fraction)	Not established	2 µg/m3 TWA
Chromium (7440-47-3)	TWAs	0.5 mg/m3 TWA	0.5 mg/m3 TWA	1 mg/m3 TWA
Selenium as Selenium compounds	TWAs	0.2 mg/m3 TWA	0.2 mg/m3 TWA	0.2 mg/m3 TWA (as Se) *as Selenium compounds*
Nickel (7440-02-0)	TWAs	1.5 mg/m3 TWA (inhalable fraction)	0.015 mg/m3 TWA	1 mg/m3 TWA
Tin (7440-31-5)	TWAs	2 mg/m3 TWA	2 mg/m3 TWA	Not established
Silver (7440-22-4)	TWAs	0.1 mg/m3 TWA (dust and fume)	0.01 mg/m3 TWA (dust)	0.01 mg/m3 TWA
Aluminum (7429-90-5)	TWAs	1 mg/m3 TWA (respirable fraction)	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Antimony as Antimony compounds	TWAs	0.5 mg/m3 TWA	0.5 mg/m3 TWA	0.5 mg/m3 TWA
Cadmium (7440-43-9)	Ceilings	Not established	Not established	0.3 mg/m3 Ceiling (applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect, fume); 0.6 mg/m3 Ceiling (applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect, dust)
				0.1 mg/m3 TWA (fume, applies to any operations or sectors for which the Cadmium standard is stayed or

	TWAs	0.01 mg/m3 TWA; 0.002 mg/m3 TWA (respirable fraction)	Not established	otherwise not in effect); 0.2 mg/m3 TWA (dust, applies to any operations or sectors for which the Cadmium standard is stayed or otherwise not in effect); 5 µg/m3 TWA
Methane (74-82-8)	TWAs	1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)	Not established	Not established
Copper (7440-50-8)	TWAs	0.2 mg/m3 TWA (fume)	1 mg/m3 TWA (dust and mist); 0.1 mg/m3 TWA (fume)	0.1 mg/m3 TWA (fume); 1 mg/m3 TWA (dust and mist)
Hydrogen sulfide (7783-06-4)	Ceilings	Not established	10 ppm Ceiling (10 min); 15 mg/m3 Ceiling (10 min)	20 ppm Ceiling
	STELs	5 ppm STEL	Not established	Not established
	TWAs	1 ppm TWA	Not established	Not established
Arsenic (7440-38-2)	TWAs	0.01 mg/m3 TWA	Not established	Not established
	Ceilings	Not established	0.002 mg/m3 Ceiling (15 min)	Not established
Lead as Lead, inorganic compounds	TWAs	0.05 mg/m3 TWA	0.050 mg/m3 TWA	50 µg/m3 TWA
Barium (7440-39-3)	TWAs	0.5 mg/m3 TWA	Not established	Not established
Silicon (7440-21-3)	TWAs	Not established	10 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable dust)	15 mg/m3 TWA (total dust); 5 mg/m3 TWA (respirable fraction)
Ammonia (7664-41-7)	TWAs	25 ppm TWA	25 ppm TWA; 18 mg/m3 TWA	50 ppm TWA; 35 mg/m3 TWA
	STELs	35 ppm STEL	35 ppm STEL; 27 mg/m3 STEL	Not established
Manganese as Manganese compounds	Ceilings	Not established	Not established	5 mg/m3 Ceiling (fume)
	TWAs	0.02 mg/m3 TWA (respirable fraction); 0.1 mg/m3 TWA (inhalable fraction)	1 mg/m3 TWA (fume)	Not established
	STELs	Not established	3 mg/m3 STEL	Not established
Carbon dioxide (124-38-9)	TWAs	5000 ppm TWA	5000 ppm TWA; 9000 mg/m3 TWA	5000 ppm TWA; 9000 mg/m3 TWA
	STELs	30000 ppm STEL	30000 ppm STEL; 54000 mg/m3 STEL	Not established

Exposure controls

Engineering Measures/Controls
- Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values.

Personal Protective Equipment

Respiratory
- In case of insufficient ventilation, wear suitable respiratory equipment.

Eye/Face
- Wear chemical splash safety goggles.

Skin/Body
- Wear appropriate gloves. Wear protective clothing

Environmental Exposure Controls
- Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene
NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
STEL = Short Term Exposure Limits are based on 15-minute exposures
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

Information on Physical and Chemical Properties

Material Description			
Physical Form	Liquid	Appearance/Description	Light brown liquid with fine precipitate with a hydrogen sulfide/ammonia odor.
Color	Light brown.	Odor	Hydrogen sulfide/Ammonia.
Odor Threshold	No data available		
General Properties			
Boiling Point	No data available	Melting Point	No data available
Decomposition Temperature	No data available	pH	No data available
Specific Gravity/Relative Density	No data available	Density	10 lbs/gal
Water Solubility	No data available	Viscosity	No data available
Explosive Properties	No data available	Oxidizing Properties:	No data available
Volatility			
Vapor Pressure	No data available	Vapor Density	No data available
Evaporation Rate	No data available		
Flammability			
Flash Point	No data available	UEL	No data available
LEL	No data available	Autoignition	No data available
Flammability (solid, gas)	Not relevant.		
Environmental			
Octanol/Water Partition coefficient	No data available		

Section 10: Stability and Reactivity

Reactivity

- No dangerous reaction known under conditions of normal use.

Chemical stability

- Stable under normal temperatures and pressures.

Possibility of hazardous reactions

- Hazardous polymerization will not occur.

Conditions to avoid

- No data available.

Incompatible materials

- Mixing of brine with cooling tower water will result in nitrites and may cause emissions of nitrogen dioxide. In addition, contact of brine with zinc metal may cause emission of arsine.

Hazardous decomposition products

- None expected under ordinary circumstances.

Section 11 - Toxicological Information

Information on toxicological effects

Component Name	CAS	Data
Sodium chloride (18.5%)	7647-14-5	**Acute Toxicity:** orl-rat LD50:3000 mg/kg; **Irritation:** eye-rbt 10 mg MOD; skn-rbt 500 mg/24H MLD
Calcium chloride (3%)	10043-52-4	**Acute Toxicity:** orl-rat LD50:1 gm/kg
Potassium chloride (1.5%)	7447-40-7	**Acute Toxicity:** orl-rat LD50:2600 mg/kg; **Irritation:** eye-rbt 500 mg/24H MLD
Iron (1000ppm)	7439-89-6	**Multi-dose Toxicity:** ihl-rat TCLo:250 mg/m3/6H/4W-I

GHS Properties	Classification
Acute toxicity	**OSHA HCS 2012** • Data lacking
Aspiration Hazard	**OSHA HCS 2012** • Data lacking
Carcinogenicity	**OSHA HCS 2012** • Data lacking
Germ Cell Mutagenicity	**OSHA HCS 2012** • Data lacking
Skin corrosion/Irritation	**OSHA HCS 2012** • Data lacking
Skin sensitization	**OSHA HCS 2012** • Data lacking
STOT-RE	**OSHA HCS 2012** • Data lacking
STOT-SE	**OSHA HCS 2012** • Data lacking
Toxicity for Reproduction	**OSHA HCS 2012** • Data lacking
Respiratory sensitization	**OSHA HCS 2012** • Data lacking
Serious eye damage/Irritation	**OSHA HCS 2012** • Eye Irritation 2

Potential Health Effects

Inhalation

Acute (Immediate)
- May cause irritation.

Chronic (Delayed)
- No data available.

Skin

Acute (Immediate)
- May cause irritation.

Chronic (Delayed)
- No data available.

Eye

Acute (Immediate)
- Causes serious eye irritation.

Chronic (Delayed)
- No data available.

Ingestion

Acute (Immediate)
- May cause irritation if swallowed.

Chronic (Delayed)
- No data available.

Carcinogenic Effects
- This material does contain components that may cause cancer, however, based on regulatory criteria this material is not classified as a carcinogen.

Carcinogenic Effects				
	CAS	OSHA	IARC	NTP
Lead 210	14255-04-0	Not Listed	Group 1-Carcinogenic	Not Listed
Radium 226	13982-63-3	Not Listed	Group 1-Carcinogenic	Not Listed
Radium 228	15262-20-1	Not Listed	Group 1-Carcinogenic	Not Listed
Radon 222	14859-67-7	Not Listed	Group 1-Carcinogenic	Not Listed
Beryllium	7440-41-7	Not Listed	Group 1-Carcinogenic	Known Human Carcinogen
Beryllium as Beryllium Compounds	NDA	Not Listed	Group 1-Carcinogenic	Known Human Carcinogen

Nickel	7440-02-0	Not Listed	Group 2B-Possible Carcinogen	Reasonably Anticipated to be Human Carcinogen
Nickel as Nickel Compounds	NDA	Not Listed	Group 1-Carcinogenic	Known Human Carcinogen
Cadmium	7440-43-9	Specifically Regulated Carcinogen	Group 1-Carcinogenic	Known Human Carcinogen
Lead	7439-92-1	Not Listed	Group 2A-Probable Carcinogen	Reasonably Anticipated to be Human Carcinogen
Arsenic	7440-38-2	Not Listed	Group 1-Carcinogenic	Known Human Carcinogen

Key to abbreviations

LD = Lethal Dose
MLD = Mild
MOD = Moderate
TC = Toxic Concentration

Section 12 - Ecological Information

Toxicity

- No data available at this time.

Persistence and degradability

- No data available at this time.

Bioaccumulative potential

- No data available at this time.

Mobility in Soil

- No data available at this time.

Other adverse effects

- No data available at this time.

Section 13 - Disposal Considerations

Waste treatment methods

Product waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	UN number	UN proper shipping name	Transport hazard class(es)	Packing group	Environmental hazards
DOT	UN3257	Elevated Temperature, Liquid, N.O.S., (Geothermal Brine)	9	III	NDA

Special precautions for user
- 10x Organic/HEPA Respirators, Splash Proof eye wear, and Slicker Suit required when handling. 24 hour emergency phone, 1-800-424-9300.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- Transported by using a vacuum truck or tanker.

Section 15 - Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications

- Acute

Inventory						
Component	**CAS**	**Canada DSL**	**Canada NDSL**	**EU EINECS**	**EU ELNICS**	**TSCA**
Aluminum	7429-90-5	Yes	No	Yes	No	Yes
Ammonia	7664-41-7	Yes	No	Yes	No	Yes
Antimony	7440-36-0	Yes	No	Yes	No	Yes
Arsenic	7440-38-2	Yes	No	Yes	No	Yes
Barium	7440-39-3	Yes	No	Yes	No	Yes
Beryllium	7440-41-7	Yes	No	Yes	No	Yes
Bismuth	7440-69-9	Yes	No	Yes	No	Yes
Boron	7440-42-8	Yes	No	Yes	No	Yes
Cadmium	7440-43-9	Yes	No	Yes	No	Yes
Calcium chloride	10043-52-4	Yes	No	Yes	No	Yes
Carbon dioxide	124-38-9	Yes	No	Yes	No	Yes
Cesium	7440-46-2	No	Yes	Yes	No	Yes
Chromium	7440-47-3	Yes	No	Yes	No	Yes
Copper	7440-50-8	Yes	No	Yes	No	Yes
Hydrogen sulfide	7783-06-4	Yes	No	Yes	No	Yes
Iron	7439-89-6	Yes	No	Yes	No	Yes
Lead	7439-92-1	Yes	No	Yes	No	Yes
Lead 210	14255-04-0	No	No	No	No	No
Lithium	7439-93-2	Yes	No	Yes	No	Yes
Magnesium	7439-95-4	Yes	No	Yes	No	Yes
Manganese	7439-96-5	Yes	No	Yes	No	Yes
Methane	74-82-8	Yes	No	Yes	No	Yes
Nickel	7440-02-0	Yes	No	Yes	No	Yes
Potassium chloride	7447-40-7	Yes	No	Yes	No	Yes
Radium 226	13982-63-3	No	No	No	No	No
Radium 228	15262-20-1	No	No	No	No	No
Radon 222	14859-67-7	No	No	No	No	No
Rubidium	7440-17-7	No	Yes	Yes	No	Yes
Selenium	7782-49-2	Yes	No	Yes	No	Yes
Silicon	7440-21-3	Yes	No	Yes	No	Yes
Silver	7440-22-4	Yes	No	Yes	No	Yes
Sodium chloride	7647-14-5	Yes	No	Yes	No	Yes
Strontium	7440-24-6	Yes	No	Yes	No	Yes
Thorium 228	14274-82-9	No	No	No	No	No

Tin	7440-31-5	Yes	No	Yes	No	Yes
Zinc	7440-66-6	Yes	No	Yes	No	Yes

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Hydrogen sulfide	7783-06-4	A, B1, D1A, D2B
• Lithium	7439-93-2	B6, E
• Calcium chloride	10043-52-4	D2B
• Barium	7440-39-3	B6, D2B; B4, B6, D2B (pyrophoric powder)
• Copper	7440-50-8	Uncontrolled product according to WHMIS classification criteria
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	A, B1, D1A, E; E (Ammonia solution, in water - 10-35% Ammonia, 35-50% Ammonia, >50% Ammonia)
• Potassium chloride	7447-40-7	Uncontrolled product according to WHMIS classification criteria (including 23.8%)
• Cadmium	7440-43-9	D1A, D2A
• Carbon dioxide	124-38-9	A; Uncontrolled product according to WHMIS classification criteria (solid)
• Chromium	7440-47-3	Uncontrolled product according to WHMIS classification criteria
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	D2A
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	D2A (including powder)
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Uncontrolled product according to WHMIS classification criteria (including amorphous and crystalline)
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Uncontrolled product according to WHMIS classification criteria
• Tin	7440-31-5	Uncontrolled product according to WHMIS classification criteria
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Uncontrolled product according to WHMIS classification criteria; D1B (powder)
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed

• Arsenic	7440-38-2	D1A, D2A
• Beryllium	7440-41-7	D2A, D2B; B4, D1A, D2A, D2B (powder)
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	B6 (powder); Uncontrolled product according to WHMIS classification criteria
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	D2A, D2B; B6, D2A (Raney)
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	B4
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Uncontrolled product according to WHMIS classification criteria
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Uncontrolled product according to WHMIS classification criteria
• Magnesium	7439-95-4	B4, B6
• Bismuth	7440-69-9	Uncontrolled product according to WHMIS classification criteria
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	A, B1
• Cesium	7440-46-2	B4, B6, E
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

Canada - WHMIS - Ingredient Disclosure List

• Hydrogen sulfide	7783-06-4	1 %
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	1 %
• Copper as Copper compounds		1 %
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	1 %
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	0.1 %
• Carbon dioxide	124-38-9	1 %
• Chromium	7440-47-3	0.1 %
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	0.1 %
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		1 %
• Manganese	7439-96-5	1 %
• Manganese as Manganese compounds		1 %
• Selenium	7782-49-2	0.1 %
• Selenium as Selenium compounds		1 %

• Silver	7440-22-4	1 %
• Tin	7440-31-5	1 %
• Tin as Tin compounds		1 %
• Antimony	7440-36-0	1 %
• Antimony as Antimony compounds		1 %
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	0.1 %
• Beryllium	7440-41-7	0.1 %
• Beryllium as Beryllium compounds		0.1 %
• Aluminum	7429-90-5	1 %
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	0.1 %
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

Environment

Canada - CEPA - Priority Substances List

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Priority Substance List 2 (substance considered toxic, in the aquatic environment)
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	Not Listed
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed

• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Hydrogen sulfide	7783-06-4	1500 lb TQ
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	10000 lb TQ (anhydrous); 15000 lb TQ (solution, >44% Ammonia by weight)
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	Not Listed
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed

• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	5 µg/m3 TWA (See 29 CFR 1910.1027); 2.5 µg/m3 Action Level
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	30 µg/m3 Action Level (See 29 CFR 1910.1025); 50 µg/m3 TWA (See 29 CFR 1910.1025)

• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		30 µg/m3 Action Level (See 29 CFR 1910.1025, as Pb); 50 µg/m3 TWA (See 29 CFR 1910.1025, as Pb)
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed

• Chromium as Chromium compounds		(including any unique chemical substance that contains Chromium as part of its infrastructure)
• Lead	7439-92-1	Not Listed
• Lead as Lead compounds		(including any unique chemical substance that contains Lead as part of its infrastructure)
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		(including any unique chemical substance that contains Manganese as part of its infrastructure)
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		(including any unique chemical substance that contains Selenium as part of its infrastructure)
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		(including any unique chemical substance that contains Antimony as part of its infrastructure)
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		(including any unique chemical substance that contains Beryllium as part of its infrastructure)
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		(including any unique chemical substance that contains Nickel as part of its infrastructure)
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed

• Thorium 228	14274-82-9	Not Listed
U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities		
• Hydrogen sulfide	7783-06-4	100 lb final RQ; 45.4 kg final RQ
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	100 lb final RQ; 45.4 kg final RQ
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	10 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 4.54 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	10 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 4.54 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)

• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 45.4 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	1000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	5000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 2270 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	1 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 0.454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Beryllium	7440-41-7	10 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 4.54 kg final RQ (no

		reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	100 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 45.4 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	454 kg final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm); 1000 lb final RQ (no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm)
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed
U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities		
• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed

• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	Not Listed
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	0.1 curie final RQ; 0.0037 TBq final RQ
• Radium 226	13982-63-3	0.1 curie final RQ (notification requirements for releases of mixtures or solutions of Radionuclides can be found in 40 CFR 302.6[b]); 0.0037 TBq final RQ (notification requirements for releases of mixtures or solutions of Radionuclides can be found in 40 CFR 302.6[b])
• Lead 210	14255-04-0	0.01 curie final RQ; 0.00037 TBq final RQ
• Radium 228	15262-20-1	0.1 curie final RQ; 0.0037 TBq final RQ
• Thorium 228	14274-82-9	0.01 curie final RQ; 0.00037 TBq final RQ

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

• Hydrogen sulfide	7783-06-4	100 lb EPCRA RQ
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	100 lb EPCRA RQ
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	Not Listed
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

• Hydrogen sulfide	7783-06-4	500 lb TPQ
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	500 lb TPQ
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	Not Listed
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

• Hydrogen sulfide	7783-06-4	1.0 % de minimis concentration

• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	1.0 % de minimis concentration
• Copper	7440-50-8	1.0 % de minimis concentration
• Copper as Copper compounds		1.0 % de minimis concentration (This category does not include CAS numbers 147-14-8, 1328-53-6, or 14302-13-7, or copper phthalocyanine compounds that are substituted with only hydrogen and/or chlorine and/or bromine.)
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	1.0 % de minimis concentration (includes anhydrous Ammonia and aqueous Ammonia from water dissociable Ammonium salts and other sources, 10% of total aqueous Ammonia is reportable under this listing)
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	0.1 % de minimis concentration
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	1.0 % de minimis concentration
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	0.1 % Supplier notification limit; 0.1 % de minimis concentration (when contained in stainless steel, brass, or bronze)
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		0.1 % Supplier notification limit (Chemical Category N420)
• Manganese	7439-96-5	1.0 % de minimis concentration
• Manganese as Manganese compounds		1.0 % de minimis concentration (Chemical Category N450)
• Selenium	7782-49-2	1.0 % de minimis concentration
• Selenium as Selenium compounds		1.0 % de minimis concentration (Chemical Category N725)
• Silver	7440-22-4	1.0 % de minimis concentration
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	1.0 % de minimis concentration
• Antimony as Antimony compounds		1.0 % de minimis concentration (Chemical Category N010)

• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	0.1 % de minimis concentration
• Beryllium	7440-41-7	0.1 % de minimis concentration
• Beryllium as Beryllium compounds		0.1 % de minimis concentration (Chemical Category N050)
• Aluminum	7429-90-5	1.0 % de minimis concentration (dust or fume only)
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	0.1 % de minimis concentration
• Nickel as Nickel compounds		0.1 % de minimis concentration (Chemical Category N495)
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	1.0 % de minimis concentration (dust or fume only)
• Zinc as Zinc compounds		1.0 % de minimis concentration (Chemical Category N982)
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	100 lb RT (this lower threshold does not apply to lead when it is contained in stainless steel,

		brass or bronze alloy)
• Lead as Lead compounds		100 lb RT
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	carcinogen, initial date 10/1/87
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed

• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	carcinogen, initial date 10/1/92
• Lead as Lead compounds		carcinogen, initial date 10/1/92
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	carcinogen, initial date 10/1/87
• Beryllium as Beryllium compounds		carcinogen, initial date 10/1/87
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	carcinogen, initial date 10/1/89 (metallic)
• Nickel as Nickel compounds		carcinogen, initial date 5/7/04
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	developmental toxicity, initial date 5/1/97
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed

• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	developmental toxicity, initial date 2/27/87
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		developmental toxicity, initial date 2/27/87
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	4.1 µg/day MADL (oral)
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed

• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	0.5 µg/day MADL
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	0.05 µg/day NSRL (inhalation)
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed
• Lead	7439-92-1	15 µg/day NSRL (oral)

• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	0.06 µg/day NSRL (inhalation); 10 µg/day NSRL (except inhalation)
• Beryllium	7440-41-7	0.1 µg/day NSRL
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	Not Listed
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed

• Lead	7439-92-1	female reproductive toxicity, initial date 2/27/87
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Hydrogen sulfide	7783-06-4	Not Listed
• Lithium	7439-93-2	Not Listed
• Calcium chloride	10043-52-4	Not Listed
• Barium	7440-39-3	Not Listed
• Copper	7440-50-8	Not Listed
• Copper as Copper compounds		Not Listed
• Strontium	7440-24-6	Not Listed
• Ammonia	7664-41-7	Not Listed
• Potassium chloride	7447-40-7	Not Listed
• Cadmium	7440-43-9	male reproductive toxicity, initial date 5/1/97
• Carbon dioxide	124-38-9	Not Listed
• Chromium	7440-47-3	Not Listed
• Chromium as Chromium compounds		Not Listed

• Lead	7439-92-1	male reproductive toxicity, initial date 2/27/87
• Lead as Lead compounds		Not Listed
• Lead as Lead, inorganic compounds		Not Listed
• Manganese	7439-96-5	Not Listed
• Manganese as Manganese compounds		Not Listed
• Selenium	7782-49-2	Not Listed
• Selenium as Selenium compounds		Not Listed
• Silver	7440-22-4	Not Listed
• Tin	7440-31-5	Not Listed
• Tin as Tin compounds		Not Listed
• Antimony	7440-36-0	Not Listed
• Antimony as Antimony compounds		Not Listed
• Antimony as Antimony oxides		Not Listed
• Arsenic	7440-38-2	Not Listed
• Beryllium	7440-41-7	Not Listed
• Beryllium as Beryllium compounds		Not Listed
• Aluminum	7429-90-5	Not Listed
• Aluminum as Aluminum insoluble compounds		Not Listed
• Nickel	7440-02-0	Not Listed
• Nickel as Nickel compounds		Not Listed
• Silicon	7440-21-3	Not Listed
• Zinc	7440-66-6	Not Listed
• Zinc as Zinc compounds		Not Listed
• Iron	7439-89-6	Not Listed
• Iron as Iron Salts		Not Listed
• Sodium chloride	7647-14-5	Not Listed
• Magnesium	7439-95-4	Not Listed
• Bismuth	7440-69-9	Not Listed
• Boron	7440-42-8	Not Listed
• Methane	74-82-8	Not Listed
• Cesium	7440-46-2	Not Listed
• Rubidium	7440-17-7	Not Listed
• Radon 222	14859-67-7	Not Listed
• Radium 226	13982-63-3	Not Listed
• Lead 210	14255-04-0	Not Listed
• Radium 228	15262-20-1	Not Listed
• Thorium 228	14274-82-9	Not Listed

Other Information

- WARNING: This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

Section 16 - Other Information

Last Revision Date
- 15/May/2014

Preparation Date
- 16/September/2003

Disclaimer/Statement of Liability
- This product is only used onsite and is not transported/dispersed to any other location except for CalEnergy Operating Corporation (Imperial Valley).

Key to abbreviations

NDA = No Data Available

Appendix E

Appendix E - Use and Location of Hazardous Materials

Chemical[a]	Use	Maximum Quantity Onsite (gallons, lbs, tons)	Annual Quantity (gallons, lbs, tons)	Storage Location (General Arrangement Location Code)	State	Type of Storage
Chemical Treatment CL41	Oxidizing Biocide	1,000 gallons	3,250 gallons	Cooling Tower (62)	Liquid	Continuously onsite
ChemTreat CL456	Biodetergent	250 gallons	750 gallons	Cooling Tower (62)	Liquid	Continuously onsite
ChemTreat CL5428	Dispersant	250 gallons	750 gallons	Cooling Tower (62)	Liquid	Continuously onsite
ChemTreat CT775	Corrosion Inhibitor	250 gallons	750 gallons	Cooling Tower (62)	Liquid	Continuously onsite
ChemTreat CL2065	Nonoxidizing Biocide	500 gallons	1,500 gallons	Cooling Tower (62)	Liquid	Continuously onsite
HASA 12.5% Sodium Hypochlorite Solution	Oxidizing Biocide	3,000 gallons	18,000 gallons	Cooling Tower (62)	Liquid	Continuously onsite
ChemTreat C2187T	Oxidizing Biocide – H_2S Abatement	2,000 lbs	75,000 lbs	Cooling Tower (62)	Solid	Continuously onsite
ChemTreat C2184G	Oxidizing Biocide – H_2S Abatement	500 lbs	1,100 lbs	Cooling Tower (62)	Solid	Continuously onsite
NALCO GEO901	Norms Inhibitor	6,000 gallons	73,000 gallons	NORMS (60)	Liquid	Continuously onsite
NALCO N7471 Antifoam	Antifoaming Agent	900 gallons	6,570 gallons	HP Separator Area (59)	Liquid	Continuously onsite
NALCO 1720	Oxygen Scavenger	500 gallons	4,500 gallons	Clarifier (61)	Liquid	Continuously onsite
GEO912	Scale Inhibitor	3,000 gallons	14,600 gallons	HP Separator (25)	Liquid	Continuously onsite
NALCO N9907	Polymer/Flocculant	4,000 lbs	47,450 lbs	Clarifier (61)	Solid	Continuously onsite
Battery Electrolyte	UPS and Emergency Shutdown Battery Array	1,200 gallons	1,200 gallons	Battery Rooms (37)	Liquid	Continuously onsite
Diesel No. 2	Fuel for Onsite Equipment	1,000 gallons	21,000 gallons	Fire Water Pump AST (39)	Liquid	Continuously onsite

Chemical[a]	Use	Maximum Quantity Onsite (gallons, lbs, tons)	Annual Quantity (gallons, lbs, tons)	Storage Location (General Arrangement Location Code)	State	Type of Storage
Hydrochloric Acid <37%	Filter Press Wash	10,000 gallons	420,500 gallons	Filter Press (79)	Liquid	Continuously onsite
Hydrochloric Acid <2.5%	Filter Press Wash	300 gallons	5,800,000 gallons	Filter Press (98)	Liquid	Continuously onsite
Liquid Lime	Filter Press Wash	10,300 gallons	158,604 gallons	Filter Press (99)	Liquid	Continuously onsite
Sulfur Hexafluoride	Circuit Breakers/TET Test	300 lbs	300 lbs	Switchyards/Resources Test Unit (4, 54)	Gas	Continuously onsite
Anti-Freeze and Coolant	Portable Equipment in Shop	1,000 gallons	1,000 gallons	Maintenance Building (6)	Liquid	Continuously onsite
Naphtha	Portable Equipment in Shop	250 gallons	250 gallons	Maintenance Building (6)	Liquid	Continuously onsite
Hydraulic fluid	Portable Equipment in Shop/Shop/Equipment	2,000 gallons	2,000 gallons	Maintenance Building/Filter Press (6)	Liquid	Continuously onsite
Laboratory reagents	Geothermal Fluids/Filter Cake Laboratory Filter Cake Laboratory Analysis	5 gallons	5 gallons	Laboratory/chemical storage cabinets (5)	Liquid and Granular Solid	Continuously onsite
Turbine Lubrication Oil	Lubricate Rotating Equipment (e.g., steam turbine bearings, valves)	12,000 gallons	12,000 gallons	Lubricating oil reservoirs adjacent to the steam turbine and drum storage in lubricant storage shed/warehouse (63)	Liquid	Continuously onsite
Mineral Insulating Oil	Transformers	22,000 gallons	15,000 gallons	Transformers and drum storage in lubricant storage shed (38, 44, 6)	Liquid	Continuously onsite
Acetylene	Welding Gas	500 cubic feet	500 cubic feet	Maintenance building (6)	Gas	Continuously onsite

Chemical[a]	Use	Maximum Quantity Onsite (gallons, lbs, tons)	Annual Quantity (gallons, lbs, tons)	Storage Location (General Arrangement Location Code)	State	Type of Storage
Oxygen	Welding Gas	500 cubic feet	500 cubic feet	Maintenance building (6)	Gas	Continuously onsite
Propane	Torch Gas	500 cubic feet	500 cubic feet	Maintenance building (6)	Gas	Continuously onsite
Alloy Mix Gas	Welding Gas	500 cubic feet	500 cubic feet	Maintenance building (6)	Gas	Continuously onsite
Lab Gas (Helium, Argon, Nitrogen, Air)	Laboratory	500 cubic feet	500 cubic feet	Laboratory (5)	Gas	Continuously onsite
Liquid Argon	Laboratory	300 gallons	300 gallons	Laboratory (5)	Liquid	Continuously onsite
Cleaning Chemicals	Cleaning	Varies (< 25 gallons of fluids or 100 lbs of solid for each chemical)	Varies (< 25 gallons of fluids or 100 lbs of solids for each chemical)	Control Room (5)	Liquid or Solid	Continuously onsite
Paint	Touch-up of Painted Surfaces	Varies (< 25 gallons of fluids or 100 lbs of solid for each chemical)	Varies (< 25 gallons of fluids or 100 lbs of solids for each chemical)	Control Room (5)	Liquid	Continuously onsite

Notes:

[a] Chemical vendor may be subject to change; however, chemical class will remain the same or similar.

AST = aboveground storage tank
H_2S = hydrogen sulfide
HP = high pressure
lbs = pound(s)
UPS = uninterruptible power supply

[a] Chemical vendor may be subject to change; however, chemical class will remain the same or similar.

Jacobs

Proposal for Background Groundwater Monitoring Well Network – Consisting of the Detection Monitoring Plan and Well Installation Work Plan

Black Rock Geothermal Power Project

December 2023

Submitted as an attachment to the ROWD for Black Rock Geothermal Power Project

Black Rock Geothermal Power Project ROWD Submitted in May 2023

Submitted by

Black Rock Geothermal LLC

BHE RENEWABLES

Prepared under the supervision of

Thomas A. Lae, P.G.
Professional Geologist

Date: December 11, 2023

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Introduction

This report details a detection monitoring plan (DMP) using a groundwater monitoring network for the Black Rock Geothermal Project (BRGP). The DMP is an attachment to the Report of Waste Discharge submitted to the RWQCB on May 24, 2023. The DMP is prepared pursuant to CCR Title 27 § 20420. The monitoring network consists of three proposed background monitoring wells in the vicinity of the proposed BRGP. At least 4 quarters of sampling will occur at each proposed groundwater monitoring well prior to start-up and operation of the BRGP. Background data are to be established for each individual well with at least 4 quarters of samples. Once BRGP operation commencement occurs, groundwater monitoring results will be evaluated to establish Constituent of Concern (COC) reporting level as well as to establish pertinent statistical methods, further the data will be assessed to determine basis behind intra or inter well monitoring once the Waste Discharge Requirement become effective.

Background

BRGP is the vicinity of existing geothermal power facilities which harness the Salton Sea Known geothermal Resource Area. This power facility is designed for approximately 87 megawatts (MW) of maximum continuous rating and approximately 77 MW of expected net output. BRGP is located approximately 7 miles northwest of Calipatria and 8 miles southwest of Nilan in Imperial County, California (Figure 1). The project site will be located on approximately 55 acres of a 155-acre parcel (APN: 020-110-008) with average elevation of 232 feet below mean sea level (msl) (Landmark Consultants, Inc., 2022). Identifiable parcel boundaries are Boyle Road to the east and McKendry Road to the North.

Monitoring Well Locations

Locations for the new proposed groundwater monitoring wells are based on the following principles:

- Yield representative groundwater from the uppermost aquifer to allow for earliest possible detection of a release from the brine pond.
- Adequate spacing to understand localized groundwater movement underneath and around the project site.
- Minimize impact on construction and operational activities at the project site to avoid potential well damage.
- Avoid areas to be excavated and used as soil borrow/stockpiles during construction.

Proposed groundwater monitoring well locations are directly northwest (downgradient), west (downgradient) and southeast (upgradient) of the brine pond (Figure 2) (Table 2). This figure also shows the excavation area and soil borrow areas to be avoided as a potential site for monitoring well installation. The proposed groundwater monitoring well locations are positioned in the most likely downgradient groundwater flow directions from the proposed brine pond.

Table 2: *Proposed groundwater monitoring well latitude and longitude coordinates.*

Proposed Monitoring Well	Latitude [1]	Longitude [1]
BRMW-1	~~33.165418~~ 33.165251	~~-115.628081~~ -115.627437
BRMW-2	~~33.167131~~ 33.166952	~~-115.629676~~ -115.629137
BRMW-3	~~33.169037~~ 33.169140	~~-115.628715~~ -115.629105

[1] Latitude and longitude coordinates for proposed monitoring wells are approximate and are subject to change depending on field conditions.

Monitoring Well Construction

Groundwater monitoring well samples will provide at least one year of groundwater quality data results prior to BRGP operation in accordance with Title 27 § 20415 (e)(6). Following the one-year of background monitoring, the groundwater monitoring wells will subsequently serve as compliance wells (if undamaged) until decommissioned. Based on data from nearby monitoring wells groundwater is expected to be first encountered approximately 5-feet below ground surface (bgs). Well construction will be as specified by California Department of Water Resources Bulletin 74-81 and 74-90 well construction requirements. Following construction, all monitoring wells will be surveyed by a California-licensed Professional Land Surveyor and developed in accordance with California Department of Water Resources Bulletin 74-81 and 74-90. Details on groundwater monitoring well construction and drilling activities is detailed in Attachment 1 (Well Installation Plan).

Groundwater Sampling Frequency

Prior to beginning operation at BRGP, all monitoring wells shall be sampled four times per year (once per quarter) following the immediate first year after installation pursuant to Title 27 § 20415 (e)(6). Quarterly sampling frequency shall take place during the months of January, April (anticipated highest groundwater elevation), July, and October (anticipated lowest groundwater elevation). If BRGP operation does not commence immediately after 1-year, background data collection will continue with the same quarterly frequency until operation begins increasing the background data sample size. Following operation commencement at BRGP, sampling frequency shall decrease to semi-annually.

Groundwater Sampling Constituents

The proposed monitoring wells will be purged prior to each sampling event. Purging will ensue until equilibrium/stabilization is achieved prior to sampling Water quality parameters (Table 3). Groundwater samples will be collected from the proposed monitoring wells directly after purging and sent to an ELAP certified laboratory for analysis. Constituents proposed for analysis mirror current groundwater monitoring parameters in WDR R7-2022-0011 for R2 Vulcan and Del Ranch Power facilities.

Proposed Monitoring Constituents:

- Total Dissolved Solids *(Method: SM 2540 C)*
- Arsenic *(Method: EPA 200.8)*
- Barium *(Method: EPA 200.8)*
- Cadmium *(Method: EPA 200.8)*

- Lead *(Method: EPA 200.8)*
- Zinc *(Method: EPA 200.8)*
- Oil & Grease *(Method: EPA 1664A)*

Table 3: *Physical and water quality parameters measured during well purging.*

Parameter	Unit
pH	pH Units
Depth to Groundwater	Feet below elevation datum (top of well casing)
Depth to Bottom of Well	Feet below elevation datum (top of well casing)
Groundwater Elevation [1]	Feet above sea level (USGS Datum)
Specific Conductance	Micromhos per centimeter
Temperature	Degrees Fahrenheit
Turbidity	Nephelometric Turbidity Units (NTU)
Dissolved oxygen	Milligrams per liter (mg/L)
Oxidation Reduction Potential	Millivolts (mV)

[1] Calculated based on depth to groundwater from elevation datum.

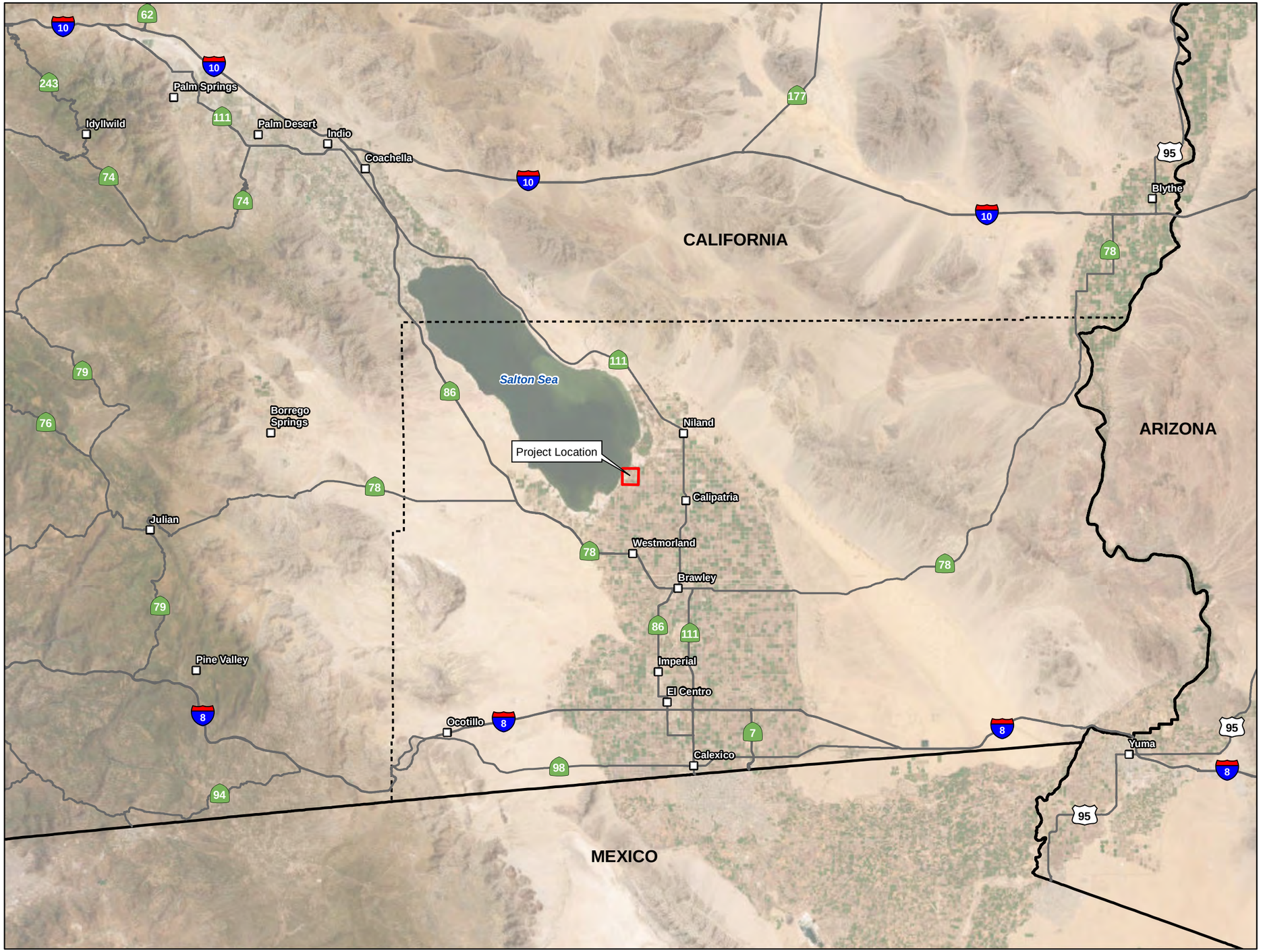
Establishing Background Data

A minimum of four quarters (1-year) of samples will be collected from each monitoring well prior to operation commencement. If more samples are collected prior to operation commencement, these results will be added to the background data set. In the future these data may be used to determine appropriate monitoring method (intra/inter well monitoring) and to define the reporting limits for the constituents of concern (COC) which are subject to applicable statistical and non-statistical tests.

References

Landmark Consultants, Inc. (2022). *Preliminary Geotechnical Investigation Black Rock Geothermal Power Plant.* El Centro, CA: Landmark Consultants, Inc.

Figures



Legend

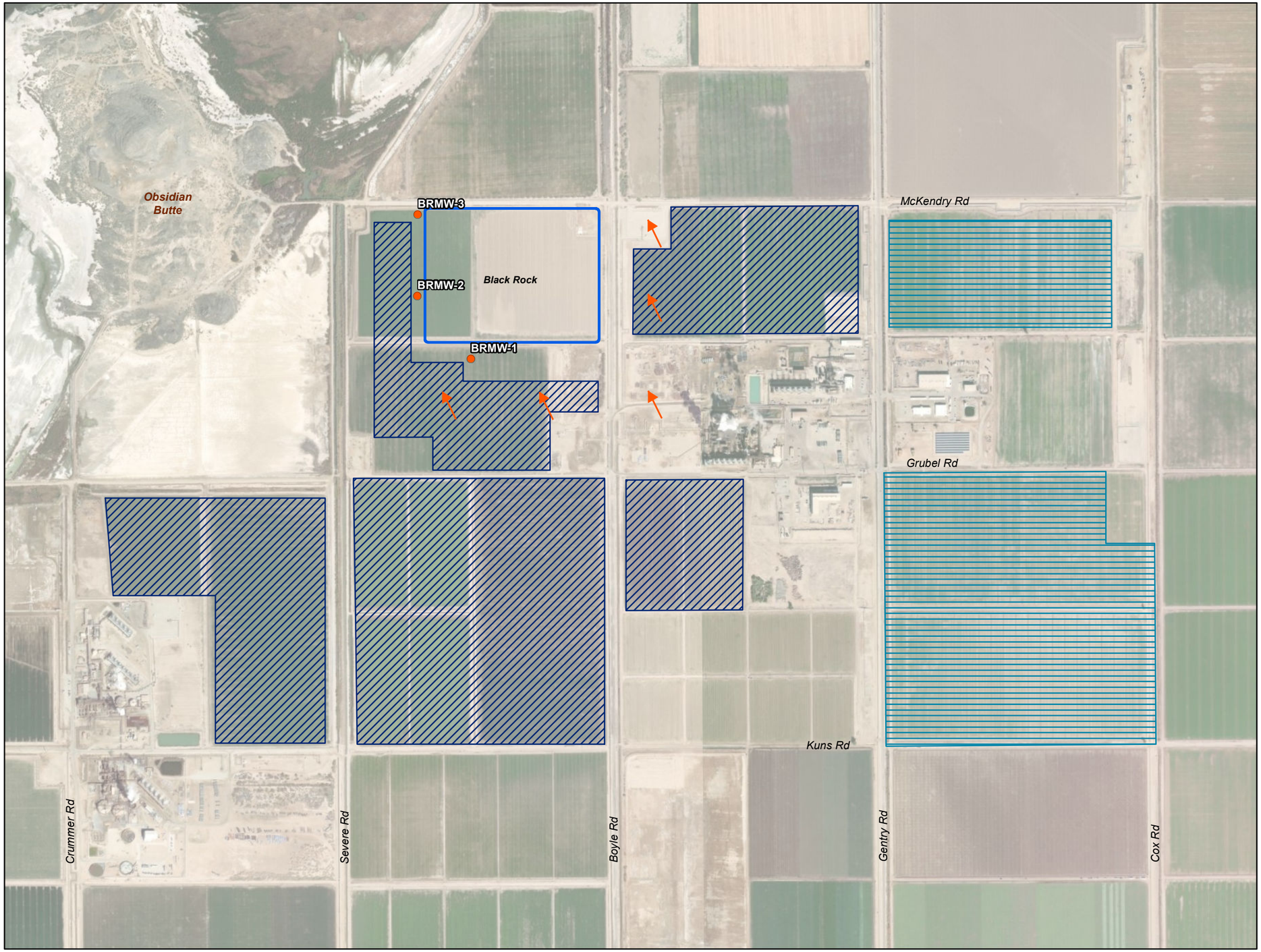
- City or Town
- Major Road
- Imperial County Boundary
- State or National Boundary

N

0 5 10 20
Miles

Figure 1
Project Vicinity
Black Rock Geothermal Project
Imperial County, California

Jacobs



Legend

- Plant
- Construction Camp
- Construction Laydown and Parking Areas
- Proposed Monitoring Well
- Historical Groundwater Direction Indicator

N

0 500 1,000 2,000
Feet

Figure 2
Proposed Monitoring Well Locations
Black Rock Geothermal Project
Imperial County, California

Jacobs

\\dc1vs01\gisproj\B\BHE_Renewables\Imperial_Valley\MapFiles\Wells\BR\Figure_2_231129.mxd

Attachments

Groundwater Monitoring Well Installation Work Plan – Black Rock Geothermal Power Project

Introduction

This report details a Groundwater Monitoring Well Installation Work Plan (Well Installation Work Plan) for the Black Rock Geothermal Project (BRGP). The Well Installation Work Plan is an attachment to the Report of Waste Discharge submitted to the RWQCB on May 24, 2023. The Well Installation Work Plan is prepared pursuant to California Department of Water Resources Monitoring Well Standards Bulletin 74-90. The monitoring network consists of three proposed background monitoring wells in the vicinity of the proposed BRGP. At least 4 quarters of sampling will occur at each proposed groundwater monitoring well prior to start-up and operation of the BRGP. Background data are to be established for each individual well with at least 4 quarters of samples. Once BRGP operation commencement occurs, groundwater monitoring results will be evaluated to establish Constituent of Concern (COC) reporting level as well as to establish pertinent statistical methods, further the data will be assessed to determine basis behind intra or inter well monitoring once the Waste Discharge Requirement become effective.

Drilling Activities

A total of three soil borings will be drilled at the proposed project site. During drilling, bulk samples will be collected from drill cuttings and drive samples will be collected approximately every 5 feet for logging purposes. The soil borings will be logged under the direction of a Professional Geologist registered in the State of California, in accordance with American Society for Testing & Materials (ASTM) International Test Standard D 5434. Boring logs detailing a description of the subsurface conditions, relative densities of the subsurface materials, sample intervals/depths, and groundwater levels will be prepared and provided in a well installation report submitted to the RWQCB after well installation is complete.

Drill rods and core barrels with a minimum 6-inch inside diameter (ID) will be used to drill monitoring well boreholes. Continuous core soil samples (4- inches outside diameter) will be collected for lithologic classification. Override casings, core barrels, and other downhole drilling tools will be decontaminated prior to the initiation of drilling activities and between each borehole location. Core barrels and other downhole soil sampling equipment will also be decontaminated before and after each use.

Soil and water generated during well construction will be disposed of on site. Groundwater generated during development will be evenly spread across the site. Well construction and sampling equipment will be decontaminated I agreement with best management practices.

Monitoring Well Construction

Personnel expected to be onsite for field exploration and well installation will complete required CalEnergy Safety training. Based on data from nearby monitoring wells groundwater is expected to be first encountered approximately 5-feet below ground surface (bgs). Monitoring wells will

be constructed inside the override casing(s), once the borehole has been advanced to the desired depth. Following setting the well screen, riser, filter pack, and bentonite seal, the well will be grouted as the temporary casing is withdrawn, preventing cross contamination. If the borehole has been drilled to a depth greater than that at which the well is to be set, the borehole will be backfilled with bentonite pellets or a bentonite-cement slurry to a depth approximately 2 feet below the intended well depth. Approximately 2 feet of clean sand will be placed on top of the bentonite to return the borehole to the proper depth for well installation. The appropriate lengths of well screen, nominally 10 feet (with bottom cap), and casing will be joined watertight and lowered inside the temporary casing to the bottom of the borehole. Centering guides, if used, will be placed at the bottom of the screen and above the interval in which the bentonite seal is placed. A primary sand pack consisting of clean Morie No. 00 (or DSI No.1) silica sand for 0.010-inch slotted screen will be placed around the well screen. The sand will be placed into the borehole at a uniform rate, in a manner that will allow even placement of the sand pack. The inner-most override casing will be raised gradually during sand pack installation to avoid caving of the borehole wall; at no time will the innermost override casing be raised higher than the top of the sand pack during installation. During placement of the sand, the position of the top of the sand will be continuously sounded. The primary sand pack will extend from the bottom of the borehole to a minimum of 1 foot above the top of the well screen.

Groundwater monitoring wells will be constructed using 2-inch diameter schedule 80 PVC well casing with approximately 10-feet of 0.010 factory slotted well screen. The top of the 10-foot screen interval shall be installed approximately 1 to 2 feet above the static water level. The final drilling depth will be determined by soil data collected at the time of drilling and will be dependent on where static water level is observed. It is anticipated the total boring depth will be 15 to 20 feet below ground surface (Figure 1). A bentonite seal at least 2 feet thick will be placed above the sand pack. The seal will be placed into the borehole in a manner that will prevent bridging. The position of the top of the bentonite seal will be verified using a weighted tape measure. If all or a portion of the bentonite seal is above the water table, clean water will be added to hydrate the bentonite. A hydration period of at least 30 minutes will be required following installation of the bentonite seal. Above the bentonite seal, an annular seal of cement-bentonite grout will be placed. The cement-bentonite grout will be installed continuously in one operation from the bottom of the space to be grouted to the ground surface through a tremie pipe. The tremie pipe must be plugged at the bottom and have small openings along the sides of the bottom 1-foot length of pipe. This will allow the grout to discharge laterally into the borehole and not disturb the bentonite pellet seal. A continuation of hydrated bentonite to surface is also adequate in lieu of cement-bentonite grout.

In agreement with applicable design and installation guidelines, All monitoring wells will be completed above-grade, installed with a locking protective well box, in a concrete pad protected by guard posts

Each well will be properly labeled on the exterior of the locking cap or protective casing with a metal stamp indicating the permanent well number. The specified well construction detailed above meets California Department of Water Resources Bulletin 74-81 and 74-90 well

construction requirements. Following construction, all monitoring wells will be surveyed by a California-licensed Professional Land Surveyor and developed in accordance with California Department of Water Resources Bulletin 74-81 and 74-90 to facilitate equilibrium with surrounding groundwater.

Monitoring Well Development

Well development will be accomplished using a combination of surging throughout the well screen and pumping, until the physical and chemical parameters of the discharge water that are measured in the field have stabilized and the turbidity of the discharge water is substantially reduced. Fine-grained materials in the surficial aquifer at the site may not allow low turbidity results to be achieved. The surging apparatus will include a tight-fitting surge block. Well development will begin by surging the well screen, starting at the bottom of the screen and proceeding upwards, throughout the screened zone. Following surging, the well will be pumped to remove the fine materials that have been drawn into the well. During pumping, measurements of pH, temperature, turbidity and specific conductance will be recorded. Development will continue by alternately surging and pumping until the discharge water is free from sand and silt, the turbidity is substantially reduced, and the pH, temperature, and specific conductance have stabilized at regional background levels, based on historical data. Development will continue for a minimum of one hour until the water removed from the well is as clear of turbidity as practicable. Well development equipment will be decontaminated prior to initial use and after the development of each well.

Figures

JACOBS	PROJECT NAME **Black Rock Geothermal Project**	WELL NUMBER SHEET 1 OF 1

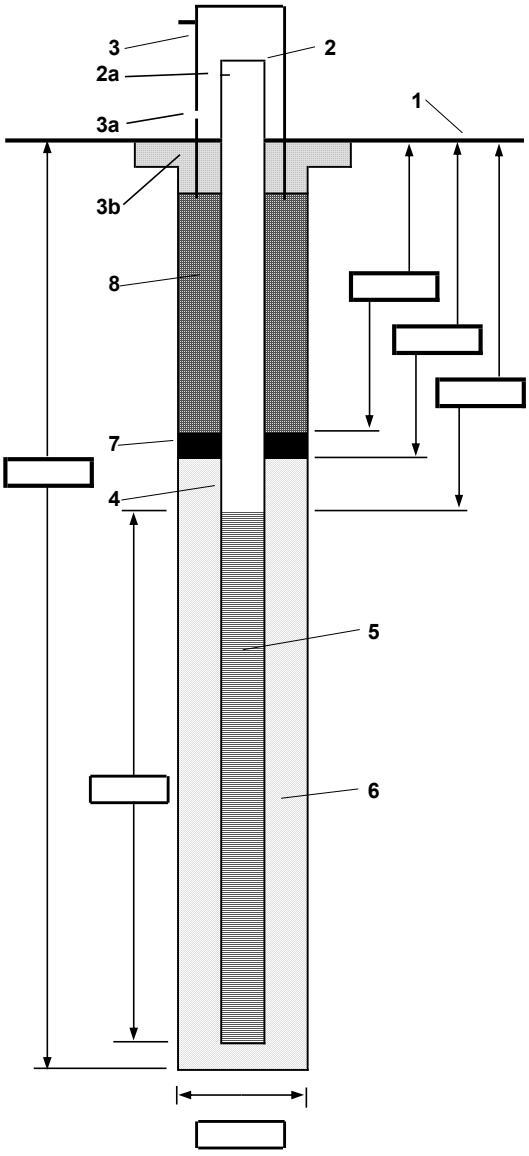
WELL COMPLETION DIAGRAM

PROJECT : **Black Rock Geothermal Project** LOCATION : **Black Rock Geothermal Facility**

DRILLING CONTRACTOR : **TBD**

DRILLING METHOD AND EQUIPMENT USED : **Sonication or Direct Push**

WATER LEVELS : **TBD** START : **TBD** END : **TBD** LOGGER : **TBD**



1-	Ground elevation at well	TBD
2-	Top of casing elevation	TBD
	a) vent hole?	TBD
3-	Wellhead protection cover type	TBD
	a) weep hole?	
	b) concrete pad dimensions	
4-	Dia./type of well casing	TBD
5-	Type/slot size of screen	Factory slotted PVC 0.01 inch well screen
6-	Type screen filter	Morie No. 00 or DSI No. 01
	a) Quantity used	
7-	Type of seal	Hydrated bentonite
	a) Quantity used	
8-	Grout	
	a) Grout mix used	Hydrated bentonite or bentonite/cement slurry
	b) Method of placement	
	c) Vol. of well casing grout	
	Development method	Alternating surging and pumping till stability
	Development time	TBD
	Estimated purge volume	TBD

Comments

*As built construction diagrams will be submitted to the RWQCB as part the well completion report.

JACOBS

PROJECT NAME	WELL NUMBER
	SHEET 1 OF 1

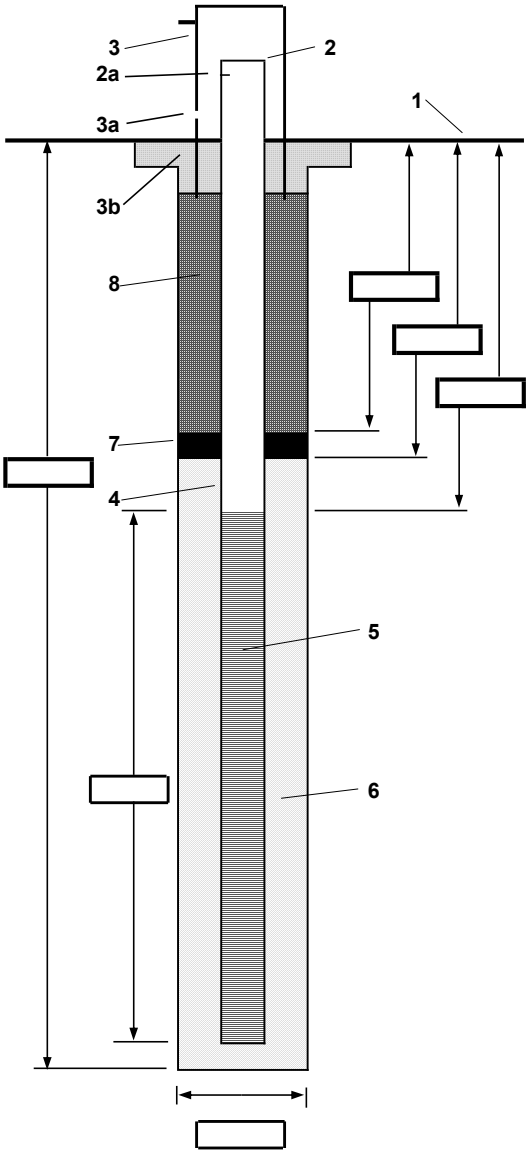
WELL COMPLETION DIAGRAM

PROJECT : LOCATION :

DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT USED :

WATER LEVELS : START : END : LOGGER :



1- Ground elevation at well _____

2- Top of casing elevation _____
a) vent hole? _____

3- Wellhead protection cover type _____
a) weep hole? _____
b) concrete pad dimensions _____

4- Dia./type of well casing _____
_____

5- Type/slot size of screen _____
_____

6- Type screen filter _____
a) Quantity used _____

7- Type of seal _____
a) Quantity used _____

8- Grout
a) Grout mix used _____
b) Method of placement _____
c) Vol. of well casing grout _____

Development method _____

Development time _____

Estimated purge volume _____

Comments _____