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Bottle Rock Power, LLC

Petition to Amend

Bottle Rock Geothermal Power Project (79-AFC-4)

December 2024

Bottle Rock Power, LLC

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December 2024

Prepared for:

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Acronyms and Abbreviations

AC	alternating current
ADA	anthraquinone disulfonic acid
AFC	Application for Certification
AST	aboveground storage tanks
ASTM	American Society for Testing Materials
BAAQMD	Bay Area Air Quality Management District
bls	below land surface
BRP	Bottle Rock Power, LLC
BRPP	Bottle Rock Power Plant
CAAQS	California Ambient Air Quality Standard
CalEEMod	California Emissions Estimator Model
CalFIRE	California Department of Forestry and Fire Protection
CalGEM	California Geologic Energy Management Division
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CBO	Chief Building Official
CBSC	California Building Standards Code
CCR	California Code of Regulations
CEC	California Energy Commission
CH_4	methane
CLVGWSA	Clear Lake Volcanics Groundwater Source Area
CO	carbon monoxide
CO_2	carbon dioxide

CO_2e	CO_2 equivalent
COC	conditions of certification
CPSs	condensate processing systems
CPM	Compliance Project Manager
CUPA	Certified Unified Program Agency Database
CVC	California Vehicle Code
dB	decibels
DTSC	Department of Toxic Substances Controls
DWR	Department of Water Resources
EIR	Environmental Impact Report
ELF	equivalent lateral force
ESA	Environmental Site Assessment
FTA	Federal Transit Administration
GAMP	Geysers Air Monitoring Program
GHGs	greenhouse gases
GMP	Groundwater Management Plan
gpd	gallons per day
GSU	generator step-up
HMBP	Hazardous Materials Business Plan
H_2S	hydrogen sulfide
HFCs	hydrofluorocarbons
IBC	intermediate bulk containers
kV	kilovolt
lbs	pounds
LCAB	Lake County Air Basin
LCAQMD	Lake County Air Quality Management District

L_{eq}	equivalent continuous sound level
LORS	laws, ordinances, regulations, or standards
LOTO	lockout/tagout
LT	long ton
MCC	motor control centers
mg/L	milligrams per liter
mph	miles per hour
MW	megawatt
MWh	megawatt hour
NAAQS	National Ambient Air Quality Standard
NCG	non-condensable gas
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NOP	Notice of Preparation
NOx	nitrogen oxide
OITC	Outdoor/Indoor Transmission Class
OSHA	Occupational Safety and Health Administration
ORC	Organic Rankine cycle
PB	lead
pCi/kg	picocurie/kilogram
PDC	Power Distribution Center
PFCs	perfluorocarbons
PG&E	Pacific Gas & Electric
$PM_{2.5}$	particulate matter fewer than 2.5 microns in diameter
PM_{10}	particulate matter fewer than 10 microns in diameter

PLC	programmable logic controller
ppb	parts per billion
ppm	parts per million
ppv	peak particle velocity
Project	Mayacma Geothermal Project
PTA	Petition to Amend
REC	recognized environmental conditions
ROG	reactive organic gases
SF_6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SGMA	Sustainable Groundwater Management Act
SMBRP	Site Mitigation Brownfields Reuse Program
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control and Countermeasures
SR	State Route
TAC	toxic air contaminant
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UV	ultraviolet
VHFHSZ	very high fire hazard severity zone
VFD	variable frequency drives
W	effective seismic weight

1 Introduction

1.1 Overview of Petition to Amend

Bottle Rock Power, LLC, (BRP) is filing this Petition to Amend (PTA) on behalf of Mayacma Geothermal LLC. Mayacma Geothermal LLC, proposes to construct and operate a 7.5-megawatt (MW) binary geothermal power plant within the approximately 6 -acre Bottle Rock Power Plant (BRPP) site, located at 7385 High Valley Road, Cobb, California. This PTA includes the information required pursuant to California Code of Regulations (CCR) Title 20, section 1769(a)(1).

1.2 Background

The California Energy Commission (CEC) certified the Department of Water Resources (DWR) BRPP Application for Certification (AFC) in 1980 (Order 79-AFC-4). DWR constructed the BRPP and commenced geothermal power production in 1985. DWR ceased operation of the BRPP in 1990 due to reduced steam capacity. In 1993, the CEC approved an amendment to reduce the monitoring and reporting requirements during plant shutdown. In 2001, the CEC approved the transfer of ownership to Bottle Rock Power Corporation. In 2005, the CEC approved an amendment to its decision that extended the environmental monitoring program during suspended operation. In 2006, the CEC approved an amendment to transfer ownership to BRP, restart operations of the BRPP, and complete design changes to the facility. In 2013, the CEC approved an amendment to the decision to change the financial assurance and closure bond requirements. BRPP went into shutdown and non-operational status on April 1, 2015, and has remained non-operational since that time. The history of CEC decisions for the BRPP is summarized in Table 1.2-1.

BRP filed a petition to change operational control of the BRPP to Mayacma Geothermal LLC, on February 14, 2023, to reflect Mayacma Geothermal's operational control over the geothermal resource and BRPP under the terms of the lease agreement and asset purchase agreement between BRP and Mayacma Geothermal LLC. Mayacma Geothermal LLC, would have operational control over the proposed modifications to the BRPP included in this PTA.

The BRPP steam field, including the existing geothermal wells, steam pipelines, and access roads, are operated and maintained under the jurisdiction of Lake County (UP 85-27, UPX 12-02, and MMU 10-01). Lake County published an Environmental Impact Report (EIR) for the Bottle Rock Steam Project in 1980 and a Supplemental EIR in 1985.

Table 1.2-1 Prior CEC Decisions/Orders for the BRPP

Decision/Order	Description
79-AFC-4	CEC decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project (October 1980); approved development of the 55 MW Bottle Rock Geothermal Power Plant
Order No. 93-0426-02	Authorized reduced environmental monitoring during a 5-year suspension of operations at Bottle Rock Geothermal Power Plant (1993)
Order No. 97-1203-1(a)	Approved an extension to reduced environmental monitoring during suspended operations (1997)
Order No. 01-0539-07	Approved transfer of ownership from Department of Water Resources to the Bottle Rock Power Corporation (May 2001)
Order No. 06-1213-12	Approved change of ownership to Bottler Rock Power LLC, restart of operation, after suspension, and 11 facility design changes (2006)
Order No. 13-1211-3	Updated compliance conditions of certification; the bond amount for the project was adjusted as a result of the order (2013)

1.3 Summary of Proposed Modifications

The Mayacma Geothermal Project, or amended BRPP, would include the construction and operation, and decommissioning of a 7.5-MW binary geothermal power plant within the existing BRPP site in Lake County, California. BRP proposes the following modifications to the BRP license:

- Installation of two *organic Rankine cycle* (ORC) binary power generation units with a net power generation capacity of 7.5 MW
- Installation of a sound attenuation enclosure partially covering the ORC units.
- Installation of a low voltage electrical switchgear (480V) and control building.
- Installation of medium voltage switchgear (13.8kV) inside the turbine building, 1st floor.
- Installation of new pipeline segments to connect the steam supply to the new ORC units[1]
- Installation of new pipeline segments to connect the NCG streams from the ORC units to the Stretford H_2S scavenging system (Stretford system) (and optionally to H_2S scavenging system as a backup treatment system if economically beneficial).
- Installation of a new steam vent stack with associated H_2S treatment tank and pumps to be located near the ORC units

[1] The portion of the new steam pipeline located outside of the BRPP fence line would be subject to Lake County jurisdiction and would require separate Lake County authorization.

- New electrical line and switchgear to connect the new power generation to the Bottle Rock Substation.
- Installation of a new condensate pipeline from the ORC units to the injection well on the Coleman Well Pad[2]
- Disconnection of the existing steam supply pipeline at the turbine generator building inlet, steam-stacking system, and rock muffler
- Up to four (4) new groundwater supply wells and water supply pipeline(s) from the new groundwater supply wells to the BRPP[3].

1.4 Necessity of Proposed Modification

Sections 1769 (a)(1)(A), (B), and (C) of the CEC Power Plant Site Certification regulations require a discussion of the necessity for the proposed modification and whether the modification is based on information known by the petitioner during the certification proceeding.

The BRPP ceased operation in 2015 and has been in standby mode since. The amendment includes installation of new technology that has been designed at a capacity that is compatible with the existing steam supply. The new infrastructure would use binary technology to conserve the geothermal reservoir and reinject all condensate to the BRPP steam field.

The proposed modification to the BRPP facilities is needed to support future geothermal generation at the BRPP in an efficient manner. The reduced steam supply at the BRPP could not have been known by DWR at the time of the BRPP design and licensing in 1980. The facility was designed and licensed based on the expected geothermal capacity at the time of licensing. The change in technology was not known during prior amendments to the BRPP and has become an option due to the recent change in operational control of the facility to Mayacma Geothermal LLC. Mayacma Geothermal LLC has experience constructing and operating binary geothermal facilities with similar capacity and design to those proposed at the BRPP. The existing 55 MW capacity power generation infrastructure will remain within the BRPP to allow for future power generation.

1.5 Summary of Environmental Effects

Section 1769 (a)(1)(E) of the CEC Power Plant Site Certification regulations requires that an analysis be conducted to address impacts a proposed modification may have on the

[2] The portion of the new condensate pipeline outside of the BRPP fence line co-located with the new steam pipeline would be subject to Lake County jurisdiction and would require Lake County approval to construct.

[3] The new groundwater wells and water supply pipeline(s) outside the BRPP fenceline would be subject to Lake County jurisdiction and would require separate Lake County authorization.

environment and proposed measures to mitigate any significant adverse impacts. Section 1769 (a)(1)(F) requires a discussion on whether the proposed modification affects the facility's ability to comply with applicable laws, ordinances, regulations, and standards (LORS).

As evaluated in Section 3 of this PTA, the modification described in this PTA would not result in any new or increased significant effects not addressed in the original AFC proceeding or Lake County EIRs. A summary of the conclusions for each of the environmental technical areas evaluated in the decision and CEC Staff Assessment are presented in Table 1.5-1 below. The amendment would not modify the transmission line system and does not involve any grading. Transmission line safety and nuisance and civil engineering is therefore not discussed further.

Table 1.5-1 Summary of Environmental Effects and Changes to Conditions of Certification (COCs)

Technical area	Summary of environmental effects and changes to COCs
Air quality	Air quality emissions from the amended BRPP would be less than previously evaluated in Order 79-AFC-4. The amended BRPP would comply with the following COCs to address potential air quality impacts: DOC-1 through DOC-23, AC20-1 through AC20-6, AC24-1 through AC24-6, AC25-1 through AC25-6, AC26-1 through AC26-6, 1-3 through 1-8, and 2-2. These COCs are adequate to address impacts from the amended BRPP. The modifications to the operating equipment require modifications to the following COCs applicable to air quality: DOC-2, DOC-3, DOC-6, DOC-7, DOC-10, DOC-14, DOC-20, AC25-2, and 1-3. COC DOC-11 is not applicable to the amended BRPP.
Biological resources	The proposed power generating facilities would be located within the BRPP site and would not affect plant or wildlife habitat. The impact on nesting birds during construction would be temporary, and no biological resource impacts would exceed those of the approved BRPP. The proposed steam and condensate pipelines would be co-located on new steam pipeline supports in disturbed areas and would avoid impacts on habitat including streams and riparian areas. The new groundwater supply wells would be located within grasslands and chaparral areas. The water supply pipeline(s) would mostly be located within developed areas and would also pass through areas containing cismontane woodland and valley oak woodland. The pipeline would not require removal of any trees. COCs 5-1.b. 5-2, 5-3.b, and 5-3.i require modification to update the name of California Department of Fish and Wildlife (from California Department of Fish and Game). COCs 5-3.b. and 5-3.c. require modification to align the sampling location names and timing with the water board permit, and remove groundwater monitoring at locations that are no longer accessible. COC 5-3.d is deleted because years of monitoring data have demonstrated that birds prefer the native habitat to the nest boxes.
Cultural resources	The amended BRPP facilities including the groundwater wells and pipelines outside the BRPP avoid any known cultural resources. The amended BRPP would not result in any new cultural resources impacts. COC 4-3 would be modified to reflect agency changes.
Geologic hazards/structural engineering	The amended BRPP facilities would be located within and immediately adjacent to the previously graded and developed BRPP site. The facilities would be designed to comply with current California Building Standards Code (CBSC). The amended BRPP would not result in any new geologic hazards impacts. COCs 10-5, and 10-6 require modification to reflect current building standards.

Technical area	Summary of environmental effects and changes to COCs
Hazards and hazardous materials	The amended BRPP would not introduce any new hazards or hazardous materials to the BRPP site. The volume of hazardous material required for the amended BRPP would be less than previously evaluated for the BRPP site. COC 11-2 would be modified to incorporate the spent surfactant from the catalyst reactor (if used).
Land use	The amended BRPP is consistent with the existing geothermal use of the site. The amended BRPP would not affect land use. No COCs apply to land use.
Noise and vibration	The amended BRPP would install new ORC units in a sound attenuation enclosure. The amended BRPP equipment is being designed to comply with the noise standards specified in the COCs. The amended BRPP is subject to COCs for noise (16-1 through 16-3). The amended BRPP includes minor technical clarifications to COCs 16-1 and 16-2.
Paleontological resources	The amended BRPP would not disturb any known paleontological resources. The amended BRPP would not result in any new or increased paleontological resource impacts. No COCs pertain to paleontological resources.
Public health	The amended BRPP would result in reduced emissions of pollutants that are a concern to public health. The amended BRPP would therefore result in less impact on public health than the existing BRPP. The amended BRPP is subject to COCs 2-1 through 2-10 (CEC 2013), which address any potential impacts from the amended BRPP.
Socioeconomics and aesthetics	The amended BRPP would not adversely affect socioeconomics or aesthetics. The proposed equipment would be shorter in height than the removed equipment and existing equipment at the site. No COCs for socioeconomics or aesthetics apply to the amended BRPP.
Soil and water resources	The proposed power generating facilities would be located within and immediately adjacent to the BRPP site and would not affect soil and water resources. The amended BRPP would require new groundwater wells and pipelines outside of the BRPP to supply water for cooling. The amended BRPP would not significantly impact groundwater supplies. The amended BRPP would be subject to COCs 6-1 through 6-6 (water resources) and 8-1 and 8-4 (soils), which address any new potential impacts from the amended BRPP. The amended BRPP would not modify any COCs pertaining to soil or water resources.
Traffic and transportation	The amended BRPP would not modify the road network for the BRPP and would not result in any new or increased traffic or transportation impact. No COCs pertain to traffic and transportation.
Waste management	The amended BRPP would generate less waste than the permitted capacity for the BRPP in COCs 11-1 through 11-8 address potential impacts to waste management resulting from the amended BRPP. COC 11-2 requires modifications to address waste from the catalyst reactor.
Worker health and safety	The amended BRPP would not create any new risk to worker health and safety.

1.6 Compliance with Laws, Regulations, Ordinances, and Standards

Section 1769 (a)(1)(F) of the CEC Siting Regulations requires a discussion on whether the proposed modification affects the facility's ability to comply with applicable LORS. The amended BRPP would comply with all LORS applicable to construction, operation, and maintenance of the proposed facilities. The amended BRPP would not affect compliance with applicable LORS.

1.7 Summary of Effects on Public and Nearby Property Owners

Sections 1769(a)(1)(F) and 1769(a)(1)(H) of CEC Power Plant Site Certification regulations require a discussion of the potential effects of the modification on the public and nearby property owners. The potential effects of the amended BRPP on the public and nearby property owners are discussed in subsections 3.1 Air Quality, 3.5 Hazards and Hazardous Materials, 3.9 Public Health, 3.7 Noise and Vibration, and 3.10 Socioeconomics/Aesthetics. The amended BRPP would result in reduced air quality emissions relative to the licensed BRPP and would not result in any new or increased impacts on the public or nearby property owners.

1.8 Property Owners

Section 1769(a)(1)(G) of CEC Power Plant Site Certification regulations requires a list of current assessor's parcel numbers and owners' names and addresses for all parcels within 500 linear feet of any affected project linears and 1,000 feet of the project site. A list of current assessor's parcel numbers and addresses for parcels within 1,000 feet of the project are enclosed in Appendix A.

1.9 Consistency of Modification with License

Section 1769 (a)(1)(D) of the CEC Siting Regulations requires that, should the modification be based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, an explanation of why the change shall be permitted. As presented in this PTA, the amended BRPP does not change or undermine the assumptions, rationale, findings, or other bases of the final decision. The amended BRPP would produce geothermal power consistent with the overall goal of the licensed BRPP and would help meet state goals for mid-term reliability. The amended BRPP would result in impacts that are consistent with those of the licensed BRPP. The amended BRPP is also consistent with applicable LORS and COCs with minor modifications to some COCs to reflect changes in operating equipment, environmental conditions, or regulatory agencies since the initial BRPP licensing.

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2 Project Description

2.1 Overview of Proposed Modification

The BRPP was licensed by the CEC as a 55-MW geothermal turbine-generator power plant in Lake County, California. The BRPP ceased operation in 2015 due to inadequate equipment and geothermal capacity. The geothermal resource at the site is no longer capable of efficiently supporting production of power using the existing 55-MW steam turbine generator. The proposed modification to the BRPP, referred to as the Mayacma Geothermal Project (project or amended BRPP) would be operated by Mayacma Geothermal LLC, under a lease from BRP. The proposed modification includes:

- Installation of two ORC binary power generation units with a net power generation capacity of 7.5 MW
- Installation of a sound attenuation enclosure that would partially cover the ORC units
- Installation of a low voltage electrical switchgear (480V) and control building.
- Installation of medium voltage switchgear (13.8kV) inside the turbine building, 1st floor.
- Installation of new pipelines to connect the steam supply to the new ORC units[4]
- Installation of new pipelines to connect the NCG streams from the ORC units to the Stretford H_2S abatement system (Stretford system) (and optionally to H_2S scavenging system as a backup treatment system if economically beneficial).
- Installation of a new steam vent stack with associated H_2S treatment tank and pumps to be located near the ORCs
- New electrical line and switchgear from the new power generation to the Bottle Rock Substation.
- Installation of a new condensate pipeline from the ORC units to the injection well on the Coleman Well Pad[5]

[4] The portion of the new steam pipeline located outside of the BRPP fence line would be subject to Lake County jurisdiction and would require Lake County approval to construct.

[5] The portion of the new condensate pipeline outside of the BRPP fence line co-located with the new steam pipeline would be subject to Lake County jurisdiction and would require Lake County approval to construct.

- Disconnection of the existing steam supply pipeline at the turbine generator building inlet, steam-stacking system, and rock muffler
- Up to four (4) new groundwater supply wells and pipeline from the new groundwater supply well to the BRPP

Various existing BRPP facilities would also be used, maintained, and tested as part of the project, including the following:

- Stretford system
- Fire protection system
- Domestic water system
- Compressed air system
- Stormwater drainage
- Sanitary system
- Production and injection pipelines
- Geothermal production and injection wells
- Groundwater wells and water supply pipelines
- Storage tanks
- Control room—relocated from the Turbine building to the Stretford building, and to a new separate structure.
- Emergency generator
- Water cooling tower and circulation pumps
- Other ancillary facilities

Although the use of water, stormwater, sanitary sewer, process wastewater, and electrical transmission facilities for the project would be similar to those required for the permitted BRPP, water use would change toward a system that uses primarily steam condensate sourced cooling water to primarily a groundwater sourced system. The system operation will remain largely the same as before, but the new project will employ a greater percentage of groundwater than prior operations. Previously, groundwater was used in limited quantities for initial tower basin charges and lesser makeup water supply. Going forward the project will employ more of a dual-source approach to cooling with the goal of decreasing the quantity of steam mass permanently lost from the reservoir over time by targeting reinjection of near 100% of the steam condensate. This operating scheme will allow increasingly higher rates - to complete return of the steam mass to the reservoir as condensate, contributing to the renewable longevity of the Geysers Steam field. The water for cooling needs would then be made up from groundwater which is readily available from existing BRP-owned, and the four proposed new water supply wells on the property. The overall volume of cooling water makeup would be similar to the permitted facility at ~ 385 gallons per minute (gpm) continual feed.

Groundwater is provided by the landowner under lease agreement to Mayacma Geothermal LLC. A Water Supply Assessment (WSA) was prepared for the amended BRPP (Broadbent Inc, 2024)(See Appendix F). Two shallow groundwater supply wells are located onsite and historically have provided process fluid for the cooling towers and domestic use. The two

existing freshwater wells were previously reported to yield a cumulative capacity of 135 gpm. Based on aquifer tests conducted in 2024 (Appendix F), it was determined that the two wells may be able to sustain a slightly larger yield with adjustments to pump depth in Well 1. To meet project goals, up four (4) additional groundwater wells may be drilled to attain a total of 385 gpm. The groundwater supply wells will be located outside of the BRPP facility and would be subject to Lake County authorization. The new power generation facilities would use the existing interconnection capacity at the Bottle Rock Substation and would not require any modifications to offsite electrical transmission facilities. The project facilities referred to herein as the amended BRPP or project would be operated by Mayacma Geothermal LLC.

2.2 Proposed Facility Description, Design, and Operation

2.2.1 Process Overview

The ORC units are binary-type power production units that use nonflammable refrigerant as the motive or working fluid (R1233zd). Steam from the production wells would be collected in the common steam header and transferred to the ORCs in the same manner and in the same steam gathering system the permitted project previously operated. The project would construct a short segment of new steam piping to connect the ORCs to the existing steam header. The existing vent stack would be disconnected, and a new vent stack would be sized according to the revised steam flow rate and located near the ORCs in order to facilitate startup and shutdown as well as to provide a venting location during short-term upset conditions. The steam being processed through the ORCs would flow through a series of heat exchangers to be cooled and condensed. As the steam is cooled, the heat would be transferred to the motive fluid, which would flash from liquid to vapor. The vapor phase of the motive fluid would flow through an expander, which would convert the thermal energy into electrical energy via a synchronous *alternating current* (AC) generator. At the discharge of the expander, the vapor motive fluid would flow to a water-cooled condenser tank, to be cooled and condensed back into the liquid phase and recycled through the ORC process again via the receiver tank and refrigerant feed pumps. The cooling towers would be supplied by groundwater and condensate with the former provided from two or more on-site water wells. The motive fluid cycle of the ORC would be a closed-loop cycle. On the process side of the heat exchangers, the two discharges are condensed steam (condensate) and NCGs. As a result of cooling the steam and condensing to liquid, there would be an off-gas effect of the naturally occurring NCGs in the steam phase. The NCGs would be transferred to the existing Stretford abatement system. As a backup, or even as a potential replacement to the Stretford abatement system, or if it becomes economically beneficial to the project, a new H_2S scavenging system would be installed at the site. Post-NCG removal, the condensate would be transferred to an existing injection well for reinjection via a new 4-inch condensate pipeline that would be co-located with the new steam pipeline on new pipeline supports. During certain operating conditions, the condensate will be routed to the cooling tower basin; in this case, the condensate may off-gas NCGs that are trapped in the condensate. While operating in this manner the condensate would be treated with iron chelate, hydrogen peroxide, or other H_2S treatment process, if needed, to meet Lake

County Air Quality Management District (LCAQMD) standards as is currently approved in the permitted facility. Under target operating conditions, the condensate would be directly injected rather than introduced to the atmosphere and, therefore, an abatement system would not be required. Condensate routing to the cooling tower will provide additional cooling water makeup when desired, and to help remove scale or biofilm buildup leveraging the lower pH quality of the condensate which may help reduce chemical usage.

2.2.2 Site Arrangement and Layout

Existing Site Conditions and Facilities

The project site contains the existing BRPP, geothermal well pads, geothermal wells, steam pipelines, injection pipeline, and access roads (as shown in Figure 2.2-1). The BRPP, including all production wells and pipelines, is not currently in operation. The existing BRPP facilities are shown in Figure 2.2-2. The Bottle Rock Power Substation is located on the western side of the BRPP. An office and laydown area are located adjacent the Francisco Well Pad. Three existing geothermal wells are present at the Coleman Well Pad, one at the Francisco Well Pad, and three at the West Coleman Well Pad that are connected to the steam-stacking facility via approximately 1.6 miles of cross-country steam pipelines. The injection well is located at the Coleman Well Pad. The injection well is connected to the existing injection pit at the power plant via approximately 0.5 mile of cross-country injection pipeline and to the condensate collection system from the gathering system. The power plant facility was licensed by the CEC under Order 79-AFC-4. The geothermal wells, steam pipelines, and access roads are permitted by Lake County use permits and the California Geologic Energy Management Division (CalGEM).

General Arrangement

Access to the amended BRPP facilities would be provided via the existing access road and entrance gate. The proposed modifications would be constructed on paved and graveled areas within the existing BRPP fence line and the steam pipeline and condensate pipeline would be located immediately adjacent to the fence in areas that have been cleared of vegetation for defensible space. The surrounding uses are predominately undeveloped open space, existing geothermal facilities, and rural residential. The nearest residential structure is approximately 1,500 feet northeast of the fence line at the BRPP site, and the nearest property line is approximately 200 feet east of the BRPP site fence line. The general arrangement of the proposed facilities is shown in Figure 2.2-3.

The project would connect to the same geothermal wells and steam pipelines at the permitted BRPP. The domestic water supply, septic system, and emergency generator would be tested, and maintenance would be performed to ensure proper operation, but no major modifications to these systems are proposed. The existing transmission line would not be modified. The existing water supply wells and underground lines to the cooling towers would be maintained or updated if necessary to accommodate the required flows to the power plant. Up to two additional water supply wells would be drilled, and new water piping installed to supplement the existing transfer system.

2.2.3 Proposed Mayacma Project Facilities

Organic Rankine Cycle Binary Power Generation Units

Two new ORC units capable of producing an approximate total of 9.58MW gross and 7.5 MW net of geothermal power would be installed within a graveled portion of the site that is currently used for equipment storage. Each ORC unit would be approximately 134 feet long by 50 feet wide and up to 27 feet in height, and wholly contained within two new sound-attenuation enclosures in the southeast area of the existing facility footprint and would not be visible from any public vantage point.

Major components of the ORC equipment includes the expander, generator, heat exchangers (i.e., evaporator, preheater, condensate subcooler, and condensate tank), refrigerant receiver, expander lube oil system and separator, and refrigerant-feed pump. The ORC units would be housed within two insulated sound-attenuating structures that are approximately 88.5 feet long by 59.1 feet wide, and up to 36.1 feet high. The walls would use noise-insulating materials to control noise emissions from the ORC units and comply with Lake County and CEC conditions for noise control at the property line.

Because under target conditions the water-cooled process design does not use the steam condensate for cooling, this new process would conserve mass within the geothermal reservoir through a more complete reinjection of the condensate than traditional Geysers operations, which would support long-term sustainability of the geothermal resource for BRPP and nearby Operators.

Switchgear Installation

The low voltage (480V) switchgear would be housed in a separate new control building. The building would be located west of the emergency generator building and south of the two sound attenuation enclosures, and would be approximately 17 feet wide by 43 feet long, and approximately 14 feet tall on a concrete pier foundation. The control building would house the following equipment:

- 480 V switchgear
- 480 V *motor control centers* (MCCs) with *variable frequency drives* (VFDs)
- ORC generator control and exciter cabinets
- *Programmable logic controller* (PLC) panel(s)
- 480 V power distribution boards
- 480 V/120 V distribution transformers
- 120 V panelboards

The medium voltage (13.8kV) switchgear will be housed within the existing Turbine Building (1st floor), in an area with existing cable trenches and access to the main Step Up Transformer. The high voltage equipment will be augmented, refurbished, and/or updated to accommodate the new ORC units. The switchgear will be placed in a set of cabinets in a room currently used for storage.

Figure 2.2-1 Project Location and Existing Facilities

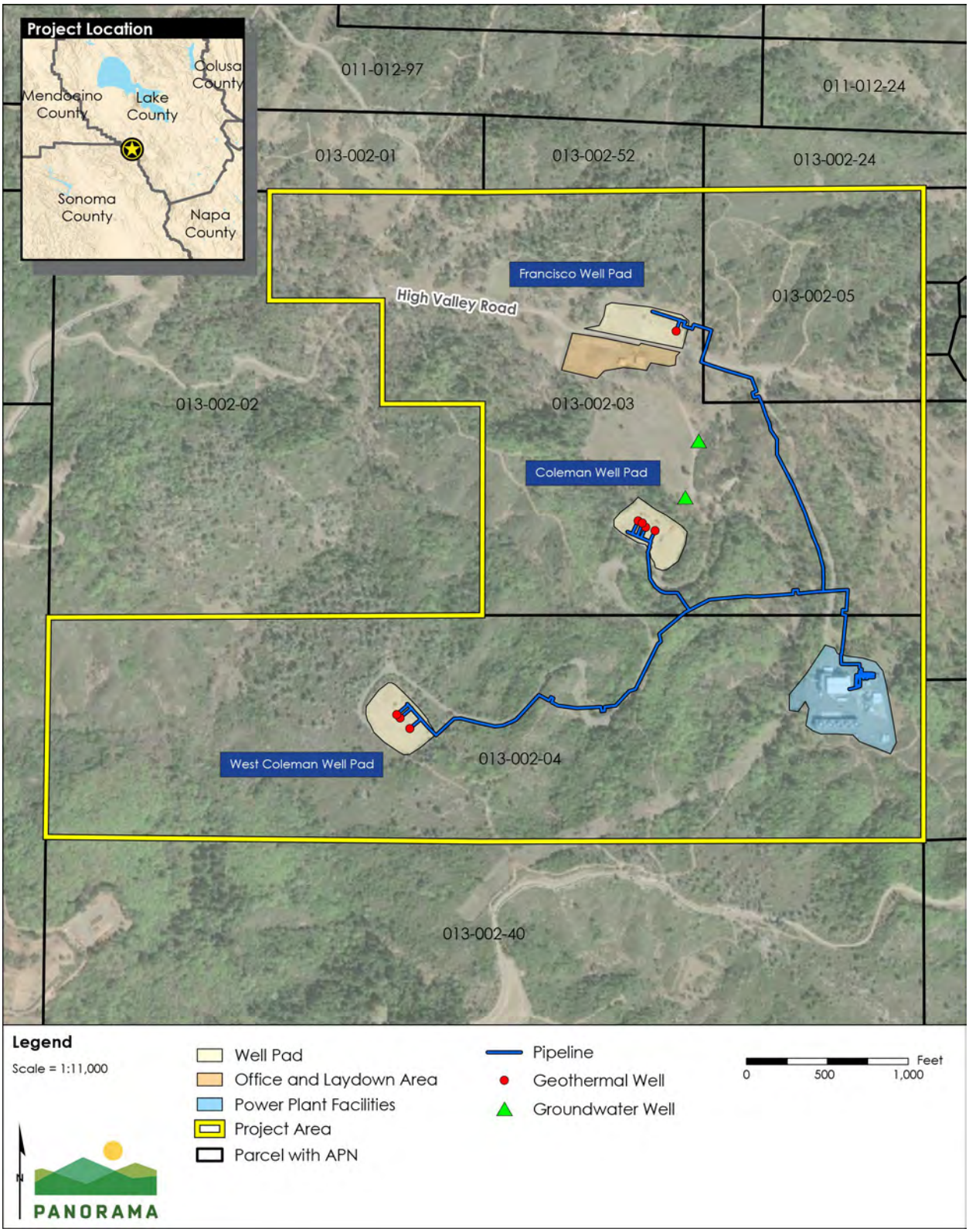
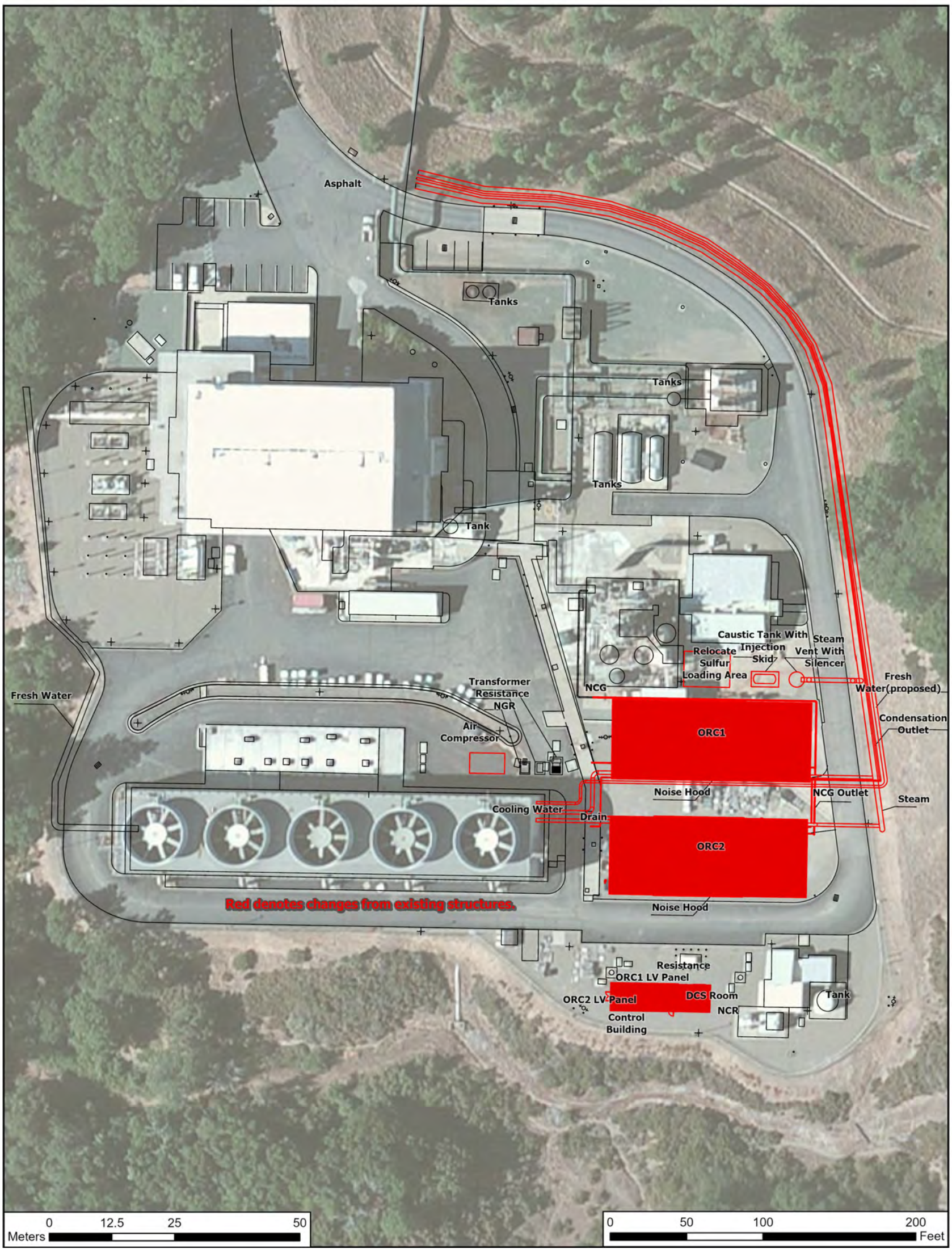


Figure 2.2-2 Existing Bottle Rock Power Plant Facilities

Figure 2.2-3 Amended BRPP Facilities



Cooling Tower

The project would use the existing water-cooling tower on the BRPP site. The project does not propose expansion of the cooling tower. The existing cooling water system is comprised of a five-cell Hamon counter flow cooling tower with 150 horsepower (HP) electric driven fans in each cell. Cooling water from the cooling tower basin is supplied to the surface condenser by redundant 1,000 HP electric driven pumps. The cooling system was designed for nominal 55MW (~ 7X current design); therefore, no additional equipment would be required to operate the cooling system with the proposed power generation, but pumps may be updated to match design requirements. Use of the existing cooling tower would not alter the site drainage.

Groundwater Supply Wells and Pipelines

Non-potable water for the BRPP is supplied by two existing industrial groundwater supply wells and is pumped (existing 7.5 and 14 HP motors) through buried water supply piping throughout the project, including to the water cooling towers, a treatment facility and to various control buildings and tanks. Those existing systems will be maintained and updated as-needed to accommodate the amended project's needs. Existing wells may undergo standard maintenance activities, such as wellbore clean-out, or have pumps, drives and controls systems updated, replaced or repaired. Piping may also be repaired or updated as-needed.

If necessary, up to four additional water supply wells will be drilled to provide as backup, replacement or supplemental supply wells. The wells would be outfitted with submersible pumps, variable speed drives, electronic control, data acquisition and telemetry systems and associated piping and control valves. Electrical connections will be made from the nearest overhead power supply line (PG&E), or installed underground to the well control shed. It is anticipated that maximum pump motor sizes would be approximately 50 HP, with an average HP across all the wells to be less than approximately 70 HP, with a maximum of 80 HP from all pumps combined. The new well locations have not yet been determined, but will be located within previously disturbed areas. Constructed well pads are not necessary for drilling, and no new ground disturbance will occur during the drilling process. Water wells will be drilled by licensed contractor under permit from Lake County, and adhere to CVRWQB regulations. New wells, if drilled would necessitate some new pipelines to tie into the existing systems. New pipelines (e.g., HDPE or PVC) would generally be constructed in or along previously disturbed areas, and likely trenched underground or insulated in most places to prevent incidental damage, and to protect against freezing. New pipelines may connect directly between the new wells and the power plant, as well as have connections to the existing infrastructure (tank house, water treatment facility, and control buildings). The locations of the new water supply wells and pipelines are shown on Figure 2.2-4.

Water from the groundwater supply wells would be supplied to the BRPP from the private landowner under a lease agreement, and as allowed for under the existing water rights held by the landowner. Mayacma will retain records and report ongoing water use, including water levels, and water quantities used for the project.

Figure 2.2-4 Proposed Groundwater Supply Wells and Pipelines

Tie-In to Existing Steam Pipelines

The project includes construction of a new pipeline and vent stack to extend the steam line directly to the ORC unit from the steam line at the entrance to the facility. As shown in Figure 2.2-3, the majority of the new steam pipeline would be located directly adjacent to and just outside the existing BRPP fence.[6] The vent stack would be constructed and operated to meet LCAQMD requirements A new H_2S treatment tank and chemical application equipment would be installed adjacent to the vent stack to treat any vented steam and corresponding NCG. The H_2S treatment tank would be used during plant shutdowns, startups and upset conditions when applicable.

Hydrogen Sulfide Abatement

The project would require modification and refurbishing of the Stretford H_2S abatement system to accommodate current resource conditions and for the proposed process changes with the ORC binary-power generation rather than existing turbine generators. As an optional component of the project, BRP may also in the future install, operate, and maintain a catalyst reactor as a backup, or alternative H_2S scavenging system process if it is economically beneficial. The catalyst reactor would improve facility reliability and allow for the facility to continue to operate when the refurbished Stretford H_2S scavenging system is down for maintenance.

Refurbished Stretford

The following actions would be required to refurbish the Stretford system for use with the proposed ORC units:

- Recoating of all Stretford tanks and vessels
- Removing the feed gas blowers from service
- Replacing the activated carbon mercury vessels
- Replacing piping and related piping components as necessary (i.e., where damaged)
- Restoring or replacing all instrumentation and electrical wiring
- Restoring the laboratory in the Stretford building
- Replacing damaged vacuum skids including vacuum pump, separator, cooler and receiver
- Reinstalling scavenged piping and related equipment
- Installation of a spare air compressor
- Refurbishment of the evaporator
- Installation of new pressure protection system upstream of the Stretford on the incoming NCG stream from the ORCs
- Installation of a spare pre-scrubber

[6] The portion of the proposed steam pipeline outside of the BRPP fence line would be subject to Lake County permit requirements.

- Replacement of existing perforated plate trays in the polishing tower to a system type less susceptible to fouling
- Installation of a wash-water collection pan to rotary drum filter to allow better segregation of wash water from Stretford liquor

Catalyst Reactor

If chosen to be implemented, the catalyst reactor would consist of large pressure vessels that are 10 feet in diameter by 30 feet tall. Each ORC would be connected to two vessels in a lead-lag arrangement to provide 100-percent redundancy during operation. Once the catalyst in the first vessel becomes saturated with sulfur, the NCG stream would be automatically routed to the second vessel. The spent catalyst would then be removed and hauled to a non-hazardous waste disposal facility/landfill. The new catalyst would be loaded into the vessel and put into lag mode. An activated carbon mercury removal vessel would be installed upstream of the catalyst reactor to provide capture for mercury. The mercury removal vessel would be serviced routinely. The spent activated carbon containing mercury would be removed and replaced by an authorized waste hauler and sent to a landfill authorized to accept hazardous waste.

Condensate Collection

Steam condensate within the power plant will be collected in a receiver tank, and then distributed to the injection well or to the cooling tower. Under reinjection conditions the condensate will remain under slight pressure, not exposed to atmospheric conditions or pressures. The remnant minor fraction of NCG gases contained in the condensate liquid will be reinjected to the reservoir on the Coleman pad. Steam condensate that is routed to the cooling tower for use will undergo H2S scavenging before it is discharged into the basin.

Along the steam line there is a condensate collection system that collects condensate from the steam header/gathering system at various points as a result of pressure drop and pipe-wall cooling. The existing condensate collection system would be reused. Within the plant area, a new pipeline segment would connect the new portion of the condensate collection on the extended steam line to the existing condensate collection system at the power plant site. The existing condensate collection system would remain in service and is capable of discharges to the injection pit at the power plant site in addition to the injection well at the Coleman pad. The wellfield condensate collection system on the well pads and gathering system pipelines will be rehabilitated with no major modifications, and reused. This system collects condensate from numerous “knockout pots”, and gravity-flows to the respective well pads where the condensate can be treated in a small local well pad abatement facility (separator stack with caustic treatment). Abated wellfield condensate is subsequently pumped or flowed to the injection well and reinjected to the reservoir. The injection pit gravity-flows to the injection well located on the

Coleman Well Pad. A new 4-inch pipeline co-located on the new steam pipeline would carry the condensate from the ORC condensate tanks to the injection well for reinjection.[7]

Electrical Modifications

Power produced from the project would interconnect at the existing Bottle Rock Power Substation. An existing storage room on the south side of the existing turbine generator building would be used to house the new medium voltage switchgear for the project modification. The new switchgear would consist of five 13.8-kilovolt (kV) breakers, one main circuit breaker/bus (1), one for each ORC unit (2), one for power distribution center (1), and one for the equipped space (1). Each breaker would be approximately 36 inches wide, and breakers would be located within a rack with a height of approximately 95 inches. The low voltage switchgear (480V) and ORC units would be housed in separate new buildings in the southeast portion of the facility.

2.3 Construction

Waste Management and Removal

Nonhazardous Solid Waste

Solid waste from construction activities may include lumber, excess concrete, metal, glass scrap, empty nonhazardous containers, and waste generated by workers. Management of these wastes would be the responsibility of the construction contractor(s). Typical management practices required for nonhazardous waste management would include recycling when possible, proper storage of waste and debris to prevent wind dispersion, and weekly pickup and disposal of wastes at local Class III landfills.

Hazardous Waste

All hazardous wastes generated during construction would be handled and disposed in accordance with applicable laws, ordinances, regulations, and standards. Hazardous wastes would be recycled or managed and disposed properly in a licensed Class I waste disposal facility that is authorized to accept the waste. The Kettleman Hills Hazardous Waste Facility is the nearest Class I facility that could accept hazardous waste generated from the project.

Construction Phases, Schedule, and Traffic

Construction of the project would occur over approximately 8 months and is planned to begin in May 2025. Construction is anticipated to occur between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. No work would occur on Sundays or holidays. Table 2.3-1 presents the construction schedule by phase.

[7] Similar to the portion of the new steam pipeline located outside the BRPP fence line, this portion of the new condensate pipeline would be subject to Lake County permit requirements.

Excavation and Soil Disturbance

Project construction would require excavation of approximately 500 cubic yards of material and placement of approximately 1,200 cubic yards of concrete for new foundations. The depth of excavation for the project would be 5 feet if spread footings are used. Micro pile foundations may be used to avoid underground interferences, if necessary, depending on the results of geotechnical investigations.

Table 2.3-1 Construction Schedule

Construction phase	Start	End	Duration (working days)
Well plug removal and cleanout	05/01/2025	07/01/2025	30
Well testing	08/15/2025	09/30/2025	45
Staging and mobilization	05/01/2025	05/05/2025	5
Foundation construction	05/09/2025	06/26/2025	42
Process installation	07/07/2025	11/24/2025	120
Commissioning	11/12/2025	11/21/2025	35
Commercial in-service	04/01/2026	04/02/2026	1

Table 2.3-2 provides the average daily worker, vendor, and haul-truck trips for project construction. A total of approximately 1,248 one-way haul truck trips and approximately 354 vendor truck trips are expected to occur throughout project construction.

Table 2.3-2 Average Daily Construction Vehicle Trips by Phase (One-Way Trips)

Construction phase	Worker trips	Vendor trips	Haul-truck trips
Well pad cleanout	30	10	3
Well testing	10	10	1
Staging and mobilization	8	0	4
Foundation construction	20	2	4
Process installation	50	2	13
Water well construction	2	2	1

Access and Staging

Work crews would access the project site via Bottle Rock Road and High Valley Road. Staging and storage of equipment and materials for construction would occur within existing paved or graveled areas at the BRPP site. The primary staging area would be located at the existing

storage yard adjacent the Francisco Well Pad, with a smaller staging area located at the southeast corner of the BRPP.

Equipment and Personnel

Anticipated equipment for construction of the project is provided in Table 2.3-3. An average of 15 workers would be on site daily during construction, with a maximum of up to 30 workers per day during peak construction.

Table 2.3-3 Equipment Table

Construction phase	Equipment	Quantity	Daily usage (hours)
Well Plug Removal and Clean Out	Drill rig diesel engine	2	24
	Forklift	1	12
	Generator	1	24
	Light tower	2	12
	Water truck	1	4
Foundation construction	Pier Drilling Rig	1	4
	Concrete Pump Truck	1	8
	Skidsteer	1	4
Process installation construction equipment and pipeline	Manlifts	2	4
	Crane	2	4
	Forklift	1	4
	Telehandler	1	4
	Loader	1	4
	Welders	2	4
Water well drilling	Drilling Rig	1	8
	Support truck	1	8

Construction Water Use

Water use for the project construction would be limited to water required for dust control, concrete mixing, compaction, and worker drinking water and sanitation. Water for the project site, with the exception of drinking water, would be sourced from the existing groundwater wells at the site shown in Figure 2.2-1 (Well #1 and Well #2). The two existing freshwater wells were previously reported to yield a cumulative capacity of 135 gpm, which would exceed the water demand for construction.

Construction would require both potable and non-potable water. Approximately 225 gallons per day (gpd) of potable water (approximately 39,100 total annual gallons) and 460 gpd of non-potable water (approximately 80,000 total annual gallons) would be required during construction. The total water use during construction would be approximately 119,100 gallons or 0.37-acre foot.

Traffic Control

The project access roads and vehicle traffic would be maintained in compliance with the Traffic Control and Road Maintenance Plan (MMU 10-01). Appropriate traffic control devices would be installed along access roads to control vehicle speed and traffic during construction. Traffic controls would also follow the recommendations in the California Temporary Traffic Control Handbook regarding basic standards for the safe movement of traffic on highways and streets in accordance with section 21400 of the California Vehicle Code.

2.4 Operations and Maintenance

Startup

Prior to starting the ORCs, the auxiliary systems of the facility including the electrical, fire water and compressed air system would be in service and fully functional. The two ORCs located at this facility would be started up one at a time.

For startup of the first ORC, the well field production system would be operating at half the steam flow rate (sufficient for one ORC unit) with steam venting through the vent system and abated at the vent station. The production system would be at a steady operating state. The startup of the ORC would largely be automatic through the control system of the ORC. Once the operator has determined that the production system and all auxiliary systems are operating in steady state, the start command would be given to the first ORC. The ORC startup sequence would commence by starting the expander lubricating oil system, then stopping the generator space heater and starting the generator cooling system. Once the control system confirms that the oil system and cooling system is within pressure and temperature range, the system would allow for preheating.

At this point, the Stretford scavenging system would be started based on the equipment's startup procedures and would be ready to accept NCGs. During the preheating phase, the motive fluid circulating pump would start to fill the preheaters, condensate tank and evaporator with motive fluid until the operational set point is reached, then the steam inlet control valve would start to modulate open to introduce steam or heat to the ORC system. The expander bypass valve would remain open and the expander inlet valve would remain closed bypassing the motive fluid to the receiver tank. The system would begin heating up at a minimum flow level until the pressure set points in the gas-liquid separator portion of the evaporate is reached. Cooling water circulation would begin as the system starts heating, and the fans would engage when the cooling water temperature increases to the determined set point. Once the system is in stable operation with pressure and level set points reached in the evaporator, condensate tank and receiver, the expander startup phase would commence. The inlet valve to the expander would begin to modulate open and the bypass valve would throttle closed and then the system would begin to take more steam (heat) by modulating open the steam inlet valve. As the steam inlet valve is opened the motive fluid pump controls would react by motive fluid level to increase the speed of the pump and the flow of motive fluid. With the increased motive fluid the expander bypass valve would modulate to control pressure in the

gas-liquid separator section of the evaporator. The expander would start to accelerate and reach synchronization speed.

In cooperation with PG&E, once synchronization speed is reached, the synchronization system would be energized along with the generator exciter. The auto synchronization system would be enabled and the generator breaker would close, connecting the generator to the grid. The ORC system would ramp up to increase generation to normal operation by steadily admitting steam (heat) to the ORC system. The motive fluid circulating pump and expander bypass valve would work concurrently with the expander inlet control valve to transfer the motive fluid vapor from the bypass system to the expander. As the system ramps up it would take more steam transferring the steam to the ORC from the venting system until venting has stopped. Once rated output is reached the bypass valve would be in the closed position and all motive fluid would be processed through the expander. When the first ORC is in normal, stable operation, the second ORC can be started.

In order to start the second ORC, the well field production system would be increased to the full steam flow rate. This portion of increased steam flow would be processed through the vent system and if required, abated at the vent station. Once the steam system is in stable operation the second ORC would be started in the same manner as the first ORC.

Shutdown Procedure

The general procedure for shutdown of the project has been sequenced to reduce the well field production flow rate during the shutdown process in order to comply with the Lake County Air Quality Management District Rule 421.2 for the allowable rate of H_2S emissions during scheduled and unscheduled outages.

The first step in shutting down the facility would be to reduce the production well flow rates to match the steam flow required for minimum output of both ORCs. Once the system is stable at minimum flow, one ORC would be shut down. Shut down would be conducted by closing the steam inlet control valve to the first ORC; the pressure in the evaporator would decrease along with the power output until the generator output reaches the minimum level. The evaporator inlet valve would close as the evaporator bypass valve opens to maintain system pressure; then the generator breaker would disconnect from the grid and the expander speed would decrease to a full stop. The motive fluid circulating pumps would stop and the ORC and the cooling tower would stop based on a preprogrammed schedule. The well field production would decrease to minimize venting from the vent system.

Once the first ORC is shut in and no steam is venting from the vent system, the second ORC would be stopped in the same manner as the first ORC. Once the second ORC is shut down, the production well field would be shut in and the Stretford, scavenging system and all other auxiliary systems would be shutdown per the equipment's normal shutdown sequence.

Workforce

The proposed facility would have an operational life of 30 years, with an option to extend. Operation of the facility would require two to four employees on site daily. The existing

geothermal wells and pipelines would be operated and maintained in compliance with all existing permit conditions. Operation and maintenance of the proposed facility would include routine inspections and maintenance of the facility to ensure proper operating conditions and maintain defensible space around the facility in compliance with California Department of Forestry and Fire Protection requirements. Facility maintenance would also be conducted as needed to repair any damaged or malfunctioning equipment. The facility is expected to operate 95 percent of the time, with 5 percent downtime for facility maintenance.

Water Use

Operations would require both potable and non-potable water. Approximately 60 gpd of potable water (approximately 21,900 total annual gallons) and 576,000 gpd of non-potable water (approximately 199,728,000 total annual gallons) would be required during operations. Non-potable water estimates are based on demand of 400 gpm and assumes 95 percent operational time with 5 percent downtime for facility maintenance. The total annual water use during operations would be approximately 199,749,900 gallons equivalent to 620 acre feet/year.

Water requirements for the facility would be primarily for the ORC water-cooled condensing process. Other uses include fire water and general plant washdown water, Stretford system operation and cleanout (once every 2 years), employee and domestic use. Operational water would be sourced from steam condensate, on-site groundwater wells (two existing groundwater wells and up to 4 new groundwater wells), and cooling tower blowdown[8]. The amended BRPP would require fresh, soft water for the following uses:

- Cooling tower makeup (approximately 385 gpm/ 620 acre feet/year), continually at assumed summer maximum requirements. Wintertime usage would be approximately50% of summer maximum. Cooling tower makeup water would be supplied from a combination of steam condensate and groundwater.
- Refill of Stretford tanks every two years (67,000 gallons)
- Stretford filter wash water (680 gpd)
- Stretford liquid ring vacuum pump (80 gpd)
- Water for pump seal flushes (<1 gpd)
- Mist eliminator cleaning spray lance on top of the polishing tower that operates six times a day for 30 seconds at a time
- Worker and domestic use (15 gpd per worker)

[8] Cooling tower blowdown (drain from cooling tower) is approximately 64 gpm, continually at summer maximum requirements. Drained cooling water is normally sent to the reinjection well but may also be used for water supply.

Wastewater

Blowdown from the Stretford pumps would produce 80 gpd of wastewater. The 67,000 gallons of Stretford solution would become wastewater when the Stretford solution is refilled every 2 years.

An existing septic system would be utilized at the project site to handle sanitary waste. The septic system would require the installation of two new motors and control panels prior to operation.

Lighting

New lighting on steel posts (up to 30 feet tall) would be located around the perimeter of the new ORC units. Lighting would be on motion sensors, downcast, and dark-sky compliant to avoid impacts on the night sky. Where it is feasible to use shorter light posts due to focused work areas on the ground, lights would be mounted at a height of 10 to 16 feet to reduce light scatter. Lighting would comply with outdoor lighting standards in California Energy Code Title 24 part 6.

Facility Security

The existing security fence and site access controls would be maintained. Site access to the facility is restricted by locked chain-linked fencing, locked gates, and locked buildings. An automated gate located on High Valley Road provides traffic control and minimal security to the site. Locked gates located on the entrance roads to the power plant and well pads are used to provide secondary security. There is no other access to the facility when these gates are closed. Only authorized personnel are allowed access to the facility.

Fire Protection

The existing fire protecting system would be re-used to the extent possible. The system may undergo repairs to ensure critical functionality which may include updates, repairs or replacements to the pumps, motors and electrical control equipment. The project would utilize the two existing fire hydrants on the north side of the cooling tower. The new transformers within the turbine building have a capacity of less than 500 gallons of oil and therefore do not require a deluge system. The oil system for the expanders would have a fire sprinkler system if the oil capacity were to exceed 500 gallons.

Emissions Control Equipment

Stretford System

The existing Stretford system would be utilized for the expected one-percent flow of NCGs from the current steam supply. Testing and maintenance of the existing Stretford system would occur prior to operation.

Materials used to operate the Stretford system would include 67,000 gallons of solution in the process vessels and lines. The solution would consist of vanadium, *anthraquinone disulfonic acid* (ADA), alkalinity, and sulfur byproduct salts. Table 2.4-1 provides the estimates for makeup chemicals added to the Stretford system process and stored on site. The Stretford process will produce approximately 4,700 pounds (lbs) of sulfur daily at design conditions, which would be

loaded into roll-off bins and transported off site for commercial use or for disposal. The area for the roll-off bins would be realigned if needed to the east to allow for installation of the ORC units and required noise mitigation. Sulfur produced from the Stretford system would be tested to ensure it meets standards for reuse. Sulfur materials containing vanadium in excess of the standards for reuse would be handled as hazardous waste and sent to a facility that is licensed to accept hazardous waste (see discussion in "Hazardous Waste," below).

Table 2.4-1 Stretford System Chemicals

Chemicals	Quantity
Assumed days of storage on site	120 days
Assumed total sulfur throughput during time period	101 long ton (LT)
Assumed vanadium use rate	3.2 lbs/LT
Vanadium stored on site	320 lbs
Vanadium content of liquid Vanadium solution	8 percent weight (wt%)
Liquid vanadium solution stored on site	4,000 lbs
Assumed ADA use rate	12 lbs/LT
ADA stored on site	1,200 lbs
ADA content of liquid ADA solution	20 wt%
Liquid ADA stored on site	6,000 lbs
Assumed caustic use rate	300 lbs/LT
Caustic stored on site	30,000 lbs
Caustic concentration	25 wt%
Liquid caustic stored on site	120,000 lbs

Catalyst Reactor (Optional Implementation)

The absorbent used in the catalyst reactor process is iron-oxide based and non-regenerative. The absorbent is a non-hazardous granular material that absorbs H_2S as the NCG passes through the containment vessel. Over time, as the sulfur concentration builds, the absorbent would eventually need to be replaced (as described in Section 2.2.3 above). The spent absorbent would be non-hazardous and would be transported to an approved disposal facility/landfill. The absorbent would be supplied in ultraviolet-coated polypropylene bulk bags, which require dry storage.

Hazardous Materials and Waste

Hazardous Material Storage

Hazardous materials would be stored in the existing hazardous material storage room between the generator building and the BRPP or in the chemical storage area within the Stretford control building. The hazardous materials storage room has secondary containment and complies with

all standards for storage of hazardous materials. Two 500-gallon *aboveground storage tanks* (ASTs) and one 1,000-gallon AST located at the BRPP would also continue to be used for storage of diesel fuel for operation of the emergency generator. Both ASTs would continue to be monitored to ensure that there are no leaks of diesel fuel.

Hazardous Wastes

The Stretford system has historically produced sulfur cake that is primarily commercial grade; however, about 12 percent of the sulfur cake contained vanadium at a high enough level that required disposal as hazardous waste. Assuming the sulfur cake from the project would have a similar make up as that from the prior Bottle Rock Project, the project would produce approximately 200,000 lbs of wet sulfur cake annually that would be classified as hazardous waste. The mercury-laden activated carbon would be classified as hazardous waste.

All hazardous wastes generated during facility operation would be handled and disposed in accordance with applicable laws, ordinances, regulations, and standards. Hazardous wastes would be recycled or managed and disposed properly in a licensed Class I waste disposal facility, such as the Kettleman Hills Hazardous Waste Facility.

Nonhazardous Solid Waste

The primary source of solid waste during operation would be office waste and other waste generated by workers. Non-hazardous waste would be collected in appropriate on-site storage receptacles designated for waste and recycling. Recyclable materials would be brought to a recycling center, and non-recyclable waste would be removed and taken to a Class III landfill.

2.5 Facility Availability and Reliability

2.5.1 Facility Availability and Reliability

The facility has been designed for 95-percent availability after initial startup and commissioning. The facility would need to be taken offline every two years for planned maintenance activities.

2.5.2 Efficiency

The power-generating equipment, ORC and existing cooling tower will operate year-round. The actual level of power generation will be partially dependent on daily and seasonal atmospheric conditions that affect the efficiency of the refrigerant condensing process via the cooling tower. Output will be highest in the cooler spring and winter months, and lower during the hotter summer and fall months.

2.5.3 Safety

The facility design incorporates as many engineering controls as possible. System descriptions, control narratives, and standard operating procedures would be used to train the operators and serve as the daily operating basis. Alarm systems would be incorporated into potentially

hazardous areas that may contain H_2S, mercury, vanadium, or other hazardous chemicals. An Occupational Safety and Health Administration (OSHA) compliant lockout/tagout (LOTO) process would be used to conduct planned and unplanned maintenance activities. Operators would be trained on and follow company policies for confined space entry, equipment operation, H_2S, and fall protection. Records would be maintained for all training and instruction.

2.6 Decommissioning and Closure

The project would be decommissioned at the end of the project's useful life. Decommissioning activities would involve removal of all infrastructure within the power plant site, including the ORC units, steam pipelines, water cooling tower, Stretford system, pipelines, ASTs, generator, water storage tanks, paving, and other infrastructure associated with the power plant operation. All aboveground geothermal steam pipelines and injection pipelines would be removed, and the geothermal wells would be capped and abandoned in accordance with CalGEM requirements. Any materials that could be recycled would be recycled, and all waste would be managed in accordance with state and federal regulations. BRP would submit a final closure plan to the CEC in compliance with COC COM—15 prior to closure of the facility.

2.7 Applicant Proposed Measures

APM BIO-1. Northern Spotted Owl Avoidance. If project construction commences during nesting/breeding season of northern spotted owl (February 1 to July 31), protocol surveys for noise disturbance projects shall be conducted by a qualified biologist, following USFWS's 2011 Northern Spotted Owl survey protocol. This protocol requires six visits between March 15 and May 31, and the goal would be to determine if spotted owls are nesting in the immediate vicinity of the project area. The surveys shall cover all spotted owl habitat within 0.25-mile of the project site. If no nests are documented, the surveys are effective until the beginning of the following nesting season (February 1). If northern spotted owl nests are documented in the immediate project area no construction activities may commence within 0.25 mile of any active nest and the United States Fish and Wildlife Service (USFWS) shall be consulted to define appropriate nest buffers or other mitigation measures.

APM BIO-2. Nesting Bird and Raptor Avoidance. Project construction shall be timed to avoid bird nesting season (February 15 – August 15) to the extent feasible. If construction activities start during the nesting season, a pre-construction survey for nesting birds shall be conducted by a qualified biologist within one week prior to initiation of construction activities. If construction ceases for a period of 72 hours or more or if construction activities move into areas that have not been subject to routine construction noise disturbance then new avian surveys shall be conducted for nesting birds. If active nests are observed in proximity to the construction, the following standard no-disturbance buffers shall be implemented: 50-foot buffer for passerine (songbird) nests, 200-foot buffer for raptor nests, and 500-foot buffer for purple martin nests. The no disturbance buffer may be adjusted by the biologist based on site

specific conditions. The no disturbance buffer shall be maintained until the young have fledged and left the nest, as determined by a qualified biologist.

APM Water-1. Groundwater Monitoring. The Project operator shall prepare and implement a groundwater monitoring program. The groundwater supply monitoring program shall include continuous monitoring of groundwater elevations within each of the groundwater supply wells. If the groundwater elevations reach an elevation that could not sustain continued operation of the Project water cooling towers, the Project shall switch to cooling using condensate for up to 100 percent of cooling water demand until aquifer levels have rebounded. The groundwater monitoring program shall be prepared by a qualified hydrologist/hydrogeologist and shall include specific action levels when water cooling shall switch to condensate to sustain project operations.

3 Environmental Information

The Environmental Information section presents the environmental, public health and safety, and local impact assessment technical areas for which the California Energy Commission's (CEC's) Power Plant Site Certification regulations require information in a Petition to Amend (20 CCR §§ 1769). Each technical area subsection follows a standardized format with discussions under the following headings:

- Affected Environment
- Environmental Analysis
- Compliance with Laws, Ordinances, Regulations, and Standards
- Conditions of Certification
- References

Each "Affected Environment" discussion describes the existing environmental conditions in the proposed modification area and any relevant changes to those conditions since certification. CEQA requires an evaluation of a project's environmental impacts against conditions existing without the project. Historically this was interpreted to mean the specific, static conditions that existed at the moment in time that the environmental review was commenced[9]; however, court rulings[10] have held that it is appropriate to evaluate a proposed project's operational impacts relative to a substitute baseline rather than against existing conditions at the time of the environmental review. The court cases have found that substituting a baseline consisting of conditions that reflect historic use or occupancy, granted the baseline conditions are supported by substantial evidence available to the Lead Agency and provide a realistic baseline for analyzing impacts. Therefore, this analysis evaluates the operational impacts of the amended BRPP against the conditions assuming operation and occupancy of the BRPP in accordance with the activities that have historically occurred on the BRPP site as allowable under the existing CEC permit. The BRPP site and buildings have been historically occupied and operation of the power plant and associated facilities could occur at any time in accordance with the CEC permit conditions.

[9] The PTA process is a CEQA-equivalent process.

[10] Neighbors for Smart Rail v. Exposition Metro Line Construction Authority, et al (8/5/13) 57 Cal.4th 439,453.; Communities for a Better Environment v. South Coast Air Quality Management Dist. (2010) 48 Cal.4th 310; North County Advocates v. City of Carlsbad (4th Dist. 2015) 241 Cal.App.4th 94.

Each "Environmental Analysis" discussion analyzes the potential environmental consequences of the construction and operation of the modification. The environmental analysis discusses whether the modification will result in any new or increased environmental impacts when compared to the licensed BRPP.

Each "Compliance with Laws, Ordinances, Regulations, and Standards" discussion describes changes to laws, ordinances, regulations, or standards (LORS) that pertain to the modification for a given technical area.

Each "Conditions of Certification" discussion briefly describes the conditions of approval for the licensed Bottle Rock Power Plant that are applicable to the proposed modification and any changes to those conditions that are needed for the modification.

3.1 Air Quality

This subsection includes an evaluation of the amended BRPP effects on air quality and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts to air quality that were not previously analyzed in Order 79-AFC-4. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

Supplemental information on the environmental and regulatory setting, methodology, and emissions modeling results for the amended BRPP are provided in Appendix B.

3.1.1 Affected Environment

Lake County Air Basin

The project site is in the southern portion of Lake County, California, which is located within the Lake County Air Basin (LCAB) and the jurisdictional boundaries of the Lake County Air Quality Management District (LCAQMD). The LCAB is a federally and state recognized geographic area that follows the county boundary.

Mountains surround the LCAB, which is why it is rarely influenced by outside meteorology. Summer months in the LCAB are characterized by high temperatures of approximately 90 degrees Fahrenheit (ºF), with little to no rainfall. Winter months are mild, with high temperatures in the mid-50s ºF. During the winter, annual rainfall averages 27 inches. Annual rainfall in Middletown (roughly 10 miles southeast of the project site) averages approximately 44 inches.

Ambient Air Quality

The United States Environmental Protection Agency (U.S. EPA) has established a National Ambient Air Quality Standard (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter fewer than 10 microns in diameter (PM_{10}), particulate matter fewer than 2.5 microns in diameter ($PM_{2.5}$), and lead (PB). The California Air Resources Board (CARB) has established a California Ambient Air Quality Standard (CAAQS) for ozone, NO_2, CO, SO_2, sulfates, PM_{10}, $PM_{2.5}$, lead, hydrogen sulfide (H_2S), sulfates, vinyl chloride, and visibility-reducing particles. The LCAB is designated as in attainment or unclassified for all NAAQS and CAAQS.

Ambient Air Quality Monitoring

The LCAQMD and various geothermal generating stations operate the Geysers Air Monitoring Program (GAMP) in the vicinity of the project site. The GAMP is designed to intensively monitor ambient air concentrations of H_2S but have historically also monitored other pollutants such as PM_{10}. A GAMP monitoring site at the base of High Valley Road (Glenbrook Monitoring Station) has been historically used to assess downdraft impacts from geothermal operations that include the existing BRPP operations. This data is representative of the area. Two other certified monitoring stations were previously located close to the project site to distinguish the air

quality at the BRPP separate from neighboring geothermal facilities; however, the two onsite monitoring stations (West Coleman Pad and High Valley Road) were removed by LCAQMD after BRPP operations ceased in 2015.

Greenhouse Gas Emissions

Unlike criteria pollutants and other air pollutants, which are regional and/or local pollutants of concern, *greenhouse gases* (GHGs) are global pollutants. The most prominent GHGs that have been identified as contributing to climate change are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Emissions of GHGs contributing to global climate change are attributable largely to human activities associated with the industrial/manufacturing, utility, residential, and agricultural sectors. The transportation sector is the largest emitter of GHGs in California, followed by electricity generation. CO_2 is a byproduct of the fossil fuel combustion associated with both the transportation and the utility sectors. CH_4, a highly potent GHG, results from off-gassing associated with agricultural practices and landfills. Processes that absorb and accumulate CO_2, often called CO_2 "sinks," include uptake by vegetation and dissolution into the ocean. GHG emissions are typically reported in terms of pounds (lbs) or metric tons of CO_2 equivalent (CO_2e). CO_2e is calculated as the product of the mass of a given GHG emitted and its specific global warming potential.

3.1.2 Environmental Analysis

Air Quality and GHG Thresholds

For the purposes of this analysis, the thresholds of significance described below were used to determine whether implementation of the amended BRPP would result in significant air quality impacts.

Construction Emissions and Operational Mobile Source Emissions

Lake County is in attainment or unclassified for all criteria air pollutants and, therefore, LCAQMD has not adopted specific thresholds relating to air quality. Because the LCAQMD does not have thresholds of significance for criteria air pollutants and no thresholds for criteria air pollutants are included in the existing BRPP air permits, Bay Area Air Quality Management District (BAAQMD) thresholds were used to evaluate the impacts of the amended BRPP. BAAQMD's thresholds are based on the air quality within the San Francisco Bay Area Air Basin (SFBAAB). Air quality within the SFBAAB is lower than air quality within the LCAQMD as the SFBAAB is nonattainment for several state and federal ambient air quality standards whereas the LCAQMD is in attainment for all state and federal standards. Consequently, using BAAQMD's thresholds to determine significance is an extremely conservative approach. This is a similar approach, however, to the one used by the Northern Sonoma County Air Pollution Control District, which has similarly not adopted its own air quality standards. BAAQMD set the following air quality thresholds for criteria air pollutants (BAAQMD 2017):

- Average daily construction exhaust emissions of 54 lbs per day of reactive organic gases (ROG), NO_x, or $PM_{2.5}$ or 82 lbs per day of PM_{10}

- Average daily operation emissions of 54 lbs per day of ROG, NOx, or $PM_{2.5}$ or 82 lbs per day of PM_{10}
- Daily emissions that result in annual emissions of 10 tons per year of ROG, NOx, or $PM_{2.5}$ or 15 tons per year of PM_{10}

Operation of the amended BRPP would result in approximately six vehicle round-trips per day, resulting in negligible CO emissions, and the geothermal process would not produce CO. Therefore, the project modifications would have no impact related to CO emissions, and CO emission impacts are not discussed further in this analysis.

The LCAB is in attainment or unclassified for all CAAQS and NAAQS. Consequently, there are no air quality plans for the LCAB. Therefore, the project modifications would have no impact related to conflicts with or obstructions of air quality plans, and conflicts with air quality plans are not discussed further in this analysis.

Stationary Source Air Quality Emissions
Stationary source emissions from operation of the amended BRPP were compared to existing permitted levels for the BRPP as well as any applicable LCAQMD thresholds to determine significance.

GHG Emissions
GHG emissions from operation of the amended BRPP were compared to existing permitted levels included in the prior BRPP amendments. Lake County and LCAQMD have not adopted thresholds or approaches for evaluating a project's GHG emissions.

Emissions Calculations Methodology

Construction Emissions
Construction emissions were estimated for off-road equipment, on-road trucks for material delivery and equipment hauling, and worker commute trips using the California Emissions Estimator Model (CalEEMod) Version 2022.1(California Air Pollution Control Officers Association, CalEEMod). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model quantifies direct emissions from construction and operational activities (including off-road equipment and on-road vehicle use) as well as indirect emissions such as GHG emissions from energy use, solid waste disposal, and water use/wastewater disposal. A detailed description of the assumptions used to estimate construction emissions and modeling results are included in Appendix B.

Operational Emissions
Operation of the amended BRPP would result in geothermal process emissions from *non-condensable gases* (NCGs) released through the NCG outlet on each ORC. The NCGs would be processed in the Stretford H_2S scavenging system prior to being released to the ambient air. The Stretford H_2S scavenging system would be refurbished as described in Section 2.0 Project

Description and would provide H_2S and mercury removal (via scrubbers) equivalent to levels during the prior amendment approval in 2006. During periods when the Stretford H_2S scavenging system is down for maintenance, a catalyst reactor would be used as backup H_2S scavenging. Emissions of NCGs were quantified using historical chemistry data from prior BRPP operation and NCG gas flow rates from project engineers. Calculation of H_2S scavenging for the Stretford system and the catalyst reactor assumed a control efficiency of 98.89 percent or more based on historical efficiency rates and published efficiencies (Purification Solutions 2022).

Operational emissions were also estimated for on-road vehicles. The only operational combustion sources would be employee vehicles, vendor trucks, and haul trucks. Motor vehicle combustion and fugitive emissions were calculated using CalEEMod Version 2022.1 and a one-way vehicle trip length of 50 miles for employee vehicles (equivalent to construction worker vehicles) and 20.0 miles per one-way trip for vendor and haul trucks. A detailed description of the assumptions used to estimate operational emissions and modeling results is included in Appendix B.

Air Quality Impacts

Criteria Air Pollutants

The amended BRPP would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard because the LCAB is in attainment or unclassified for all CAAQS and NAAQS. Nevertheless, construction and operational emissions of criteria pollutants are assessed for significance using the significance thresholds adopted by the BAAQMD.

Construction Impacts

Construction of the amended BRPP would generate emissions from on-site heavy equipment and motor vehicles (i.e., worker vehicles, vendor trucks, and haul trucks). Table 3.1-1 presents the average daily construction emissions and compares them to BAAQMD's significance thresholds. Construction would be located within a paved and graveled area and would not generate significant fugitive dust.

Table 3.1-1 Project Average Daily Construction Emissions

Source	ROG	NOx	PM_{10} [a]	$PM_{2.5}$ [a]
Average daily construction emissions (lbs.)	0.76	7.85	0.19	0.17
Significance threshold	54	54	82	54
Threshold exceeded?	No	No	No	No

[a] BAAQMD construction significance thresholds for PM_{10} and $PM_{2.5}$ apply to exhaust emissions only.

Source: CalEEMod Version 2022.1 (California Air Pollution Control Officers Association)

Construction emissions would be below the BAAQMD's significance thresholds. Therefore, criteria pollutant emissions during construction of the amended BRPP site would be in accordance with COCs and all applicable LORS. No impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

Operational Impacts

Operation of the amended BRPP would only generate criteria air pollutants from on-road vehicles (i.e., employees, vendors, and haul trucks). Geothermal process emissions would not result in the release of criteria air pollutants. Table 3.1-2 presents the amended BRPP's operational emissions and compares them to BAAQMD's significance thresholds. Emissions from the amended BRPP would not only be below BAAQMD's significance thresholds but would result in decreased operational emissions compared to the approved BRPP due to reduced level of equipment use and vehicle trips for the amended BRPP relative to the approved BRPP. Therefore, criteria pollutants emissions during operation of the amended BRPP would not exceed any air quality thresholds. No impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

Table 3.1-2 Project Average Daily and Annual Operational Emissions

Source	ROG	NOx	PM_{10}	$PM_{2.5}$
Average daily operational emissions (lbs.)	0.08	0.07	0.27	0.07
Significance threshold (lbs/day)	54	54	82	54
Threshold exceeded?	No	No	No	No
Annual operational emissions (tons)	0.01	0.01	0.05	0.01
Significance threshold (tons/year)	10	10	15	10
Threshold exceeded?	No	No	No	No

Source: CalEEMod Version 2022.1 (California Air Pollution Control Officers Association)

Substantial Pollutant Concentrations

Asbestos

The amended BRPP would be located within the disturbed graveled and paved BRPP site, and the new segment of steam pipeline and condensate pipeline would be located immediately adjacent the BRPP fence, within previously disturbed areas. No areas containing serpentine soils or naturally occurring asbestos (NOA) occur in the amended BRPP area. The amended BRPP would have no impact from disturbance of NOA.

NCG Emissions

Emissions of NCGs were quantified using historical chemistry data from prior BRPP operation and NCG flow rates from project engineers. Table 3.1-3 presents the average volume of each NCG constituent and the projected NCG outlet flow rate. Based on this historical chemistry data, the NCG is roughly 4.65 percent H_2S and 2.22 percent ammonia (NH_3) (by volume). The remaining NCG constituents are CO_2 and CH_4 (discussed in the GHG emissions analysis) and

nitrogen and hydrogen. There are also other trace NCG constituents (discussed in subsection 3.9 Public Health).

Table 3.1-3 NCG Average Dry Gas Volume and Flow Rate

Pollutant	Average volume of dry gas (%)	NCG outlet flow rate (lbs/hour) [a]
Carbon Dioxide (CO_2)	64.00	1,090.96
Hydrogen Sulfide (H_2S)	4.65	61.38
Ammonia (NH_3)	2.22	14.64
Nitrogen (N_2)	2.09	22.67
Methane (CH_4)	6.12	38.02
Hydrogen (H_2)	20.86	16.32

[a] Based on a projected NCG outlet flow rate of 1,244 lbs/hour

Source: BRPP Historical Chemistry Database

As shown in Table 3.1-4, assuming a minimum control efficiency of 98.89 percent from the existing Stretford H_2S scavenging and the catalyst reactor H_2S scavenging tanks, controlled H_2S emissions from operation of the amended BRPP would be less than 14 percent of the BRPP permitted emissions of 5 lbs per hour. NH_3 emissions would be approximately 14.64 lbs per hour, below the permitted emissions threshold.

Table 3.1-4 Amended BRPP NCG Emissions Compared to Permitted NCG Emissions

Pollutant	Uncontrolled project NCG emissions (lbs/hour)	Controlled project NCG emissions (lbs/hour)	Uncontrolled existing permitted emissions (lbs/hour)	Controlled existing permitted emissions (lbs/hour)
Hydrogen sulfide (H_2S)	61.38	0.68	450	5
Ammonia (NH_3)	14.64	14.64	140	100–140

Source: BRPP Historical Chemistry Database and CEC (California Energy Commission 2006)

Chapter II, article III, section 421.2 of the LCAQMD rules and regulations stipulates that geothermal power plants shall not emit more than 50 grams of H_2S per gross megawatt hour (MWh). That would equate to 1.06 lbs per hour of H_2S (50 grams multiplied by 58megawatt [MW] gross). Therefore, neither H_2S scavenging option under the amended BRPP would exceed the LCAQMD standard. Furthermore, the existing BRPP had a permitted emissions limit of 5 lbs per hour of H_2S; therefore, the amended BRPP would result in substantially less H_2S emissions than the level allowed at the existing BRPP under the existing BRPP permits. The amended BRPP would also capture all condensate and transfer the condensate to the geothermal reservoir via the proposed condensate pipeline. Because the condensate would not

be exposed to the air at any point in the process there would be no H_2S emissions from the condensate.

There is no LCAQMD standard or existing permit limit for NH_3 under the existing BRPP. The existing BRPP was estimated to generate approximately 100 to 140 lbs per hour of NH_3. The amended BRPP would also result in a reduction in NH_3 emissions compared to the approved BRPP. Therefore, NCG emissions during operation of the amended BRPP would not exceed the levels allowed for the existing BRPP and would be in accordance with COCs and all applicable LORS. No impacts would exceed those described in Order 79-AFC-4 and subsequent amendments.

Toxic Air Contaminants

NCGs also contain small quantities of *toxic air contaminants* (TACs) such as benzene, arsenic, and mercury. The nearest residential structure is approximately 1,500 feet northeast of the project site. RCH and Panorama staff met with the LCAQMD on November 30, 2022, and LCAQMD confirmed that a health risk assessment and dispersion modeling would not be required for the project modifications. The project modifications would result in a reduction in TAC emissions compared to what is currently permitted at BRPP because the total volume of emissions would be less, and the emissions point would be at the same approximate location and distance from sensitive receptors as the emissions for the permitted BRPP. Therefore, TAC emissions during operation of the amended BRPP would be in accordance with COCs and all applicable LORS. No impacts would exceed those described in Order 79-AFC-4 and subsequent amendments.

Odors

The amended BRPP would not introduce a new odor source to the area. H_2S is known to produce odors and odors from H2S were previously evaluated as part of the BRPP licensing process and subsequent amendments. The amended BRPP would result in a reduction of H_2S emissions compared to what is currently allowed at the BRPP under the existing permits, as discussed above. The project modifications would result in decreased odors compared to currently permitted operations due to the proposed decreased NCG and associated H_2S emissions of the amended BRPP. Therefore, impacts related to odors during operation of the amended BRPP would be in accordance with COCs and all applicable LORS. No impacts would exceed those described in Order 79-AFC-4 and subsequent amendments.

GHG Emissions

GHG emissions would be generated through project construction and operation.

Construction Impacts

Construction emissions were estimated to be approximately 665 metric tons of CO_2e during the construction period. BAAQMD has not adopted a significance threshold for construction GHG emissions because, according to BAAQMD, construction emissions represent a very small portion of a project's lifetime GHG emissions and are not considered significant. Thus,

construction of the amended BRPP would not result in a significant impact related to construction GHG emissions.

Operational Impacts

Operational GHG emissions would be released through the geothermal process and generated by on-road vehicles (i.e., employee vehicles, vendor trucks, and haul trucks). On-road vehicles were estimated to generate approximately 40 metric tons of CO_2e per year. Geothermal process emissions would result from NCGs released through the NCG outlet on each ORC. Emissions of NCGs were quantified using historical chemistry data from prior operation of the BRPP and NCG gas flow rates from project engineers. Based on historical chemistry data (see Table 3.1-3, pg. 38), the NCG gas emission is approximately 64 percent CO_2 and 6 percent CH_4 (by volume). Geothermal process GHG emissions for the amended BRPP were estimated to be approximately 8,137 metric tons of CO_2e per year as shown in Table 3.1-5. The amended BRPP would not exceed the significance threshold of 10,000 metric tons of CO_2e per year and GHG emissions impacts would be less than significant. Impacts related to GHG emissions during the operation of the amended BRPP would be in accordance with COCs and all applicable LORS. No impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

Table 3.1-5 Annual Amended BRPP Operational GHG Emissions

Source	CO_2e (metric tons per year)
Geothermal process released emissions	8,137
Mobile sources	40
Total amended BRPP emissions	8,177
Significance Threshold	10,000
Significant	No

Source: CalEEMod Version 2022.1 (California Air Pollution Control Officers Association), BRPP Historical Chemistry Database, and 2009 PTA

Furthermore, the project supports the state's efforts to increase electricity generation from renewable energy sources and reduce GHG emissions from the electricity generation sector. Table 3.1-6 compares the amended BRPP CO_2 emissions to other geothermal and fossil fuel energy sources. The amended BRPP would result in CO_2 emissions below the California and United States average for geothermal facilities and other fossil fuels sources. The amended BRPP would be in support of state's goals for reducing GHG emissions as outlined in CARB's Scoping Plans. Therefore, the operation of the amended BRPP would not conflict with plans, policies, or regulations adopted for the purpose of reducing GHG emissions.

Table 3.1-6 CO_2 Emission Factors of Geothermal and Fossil Fuel Electricity Generation

Source	Average CO_2 Emission Factor (g/kWh)
Amended BRPP	66
Geothermal CA Average	107
Geothermal US Average	122
Natural Gas	480
Oil	660
Coal	900

[a] CO_2 only – does not account for other GHGs such as CH_4 and N_20.

Source: (Energy Sector Management Assistance Program, 2016)

3.1.3 Compliance with Laws, Ordinances, Regulations, and Standards

The emissions resulting from construction of the amended BRPP would be below the BAAQMD's significance thresholds, which were used to assess significance since LCAQMD has no such thresholds. Furthermore, the amended BRPP would comply with all LCAQMD rules and regulations. Operation of the amended BRPP would conform with all applicable LORS related to air quality, as discussed in 3.1.2 Environmental Analysis, and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

For GHG emissions, additional state regulations have been adopted since the initial decision and subsequent amendment that are applicable to the amended BRPP. These include Executive Order No. B-30-15, Senate Bill 32, Senate Bill 100, Senate Bill 1020, Assembly Bill 1279, and Executive Order B-55-18, all of which aim to reduce the state's GHG emissions over time and accelerate the state's generation of renewable energy to eventually achieve carbon neutrality. As a renewable energy project, the amended BRPP conforms with the applicable LORS related to GHG emissions and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.1.4 Conditions of Certification

Applicable Conditions

The amended BRPP would not result in any new or more severe air quality impacts than the approved BRPP and no additional COCs are needed to address air quality. The amended BRPP is subject to COCs which address any potential impacts from the amended BRPP. The amended BRPP would comply with the following COCs to address potential air quality impacts:

- DOC-1 through DOC-23
- AC20-1 through AC20-6
- AC24-1 through AC24-6
- AC25-1 through AC25-6

- AC26-1 through AC26-6
- 1-3 through 1-8
- 2-2.

Amended Conditions

Some COCs require modifications as shown in ~~strikethrough~~ and underline below to reflect changes to the operating equipment. COCs applicable to air quality that require modifications includeDOC-2, DOC-3, DOC-6, DOC-7, DOC-10, DOC-14, DOC-20, AC25-2, and 1-3. The proposed change to each measure is listed below. With the proposed changes in the COCs, the amended BRPP would comply with current LORS and impacts of the amended BRPP would not exceed the impacts of the approved BRPP.

District Permit # A/C 80-034A, Modified Determination of Compliance

DOC-2 The atmospheric emissions control system (AECS) described in the AFC and revision to the AFC, April 18, 1980, shall be utilized. The system as described, which constitutes the best available control technology, shall consist of the following concurrently available major components:

a) A ~~surface condenser~~ condensate tank to facilitate the partitioning of H2S into the non condensable gas phase;

b) A Stretford unit or a catalyst reactor as specified in the AFC to reduce the H2S concentration in the non condensable gases to 10 parts per million by volume (ppmv) or less;

c) Secondary condensate treatment which includes sufficient hydrogen peroxide (H2O2) and catalyst injection and reaction time to ensure the power plant will comply with the emission limitation specified in Condition DOC-1;

d) A turbine by-pass system sufficiently sized to accept 100 percent of full steam flow during generating outages so that the power plant emission control system can be utilized to treat steam normally stacked during the outage.

e) The air emissions control system specified above shall be properly winterized.

f) If a solids removal system is necessary as a result of solids formation in the condensate, such facility shall be incorporated into the system.

g) In the event of Bottle Rock generation loss, an alternate source of power to enable the continued use of the air emissions control system specified above shall be available.

h) A stand by generator capable of sustaining station power and the Emergency ~~Stacking~~ Venting System shall be available and fueled with low sulfur fuel of 0.5 percent or less for use in case of concurrent transmission line and generator failure.

DOC-3 The major components of the air emissions control system, Stretford, catalyst reactor, and vent system abatement ~~Turbine by-pass, and condensate abatement~~ shall incorporate a design to enable a 99 percent availability excluding scheduled maintenance on these individual major components. If such design criteria cannot be established, abatement systems shall be retrofitted as necessary to achieve performance at this level.

DOC-6 The off-gas vent to the atmosphere shall be used only during legitimate emergencies and to enable the cold start-up of the power plant ~~turbine~~. Steam flows shall not exceed 25,000 lbs/hr to the power plant during direct venting of untreated non condensable gases in the steam. The ~~turbine by-pass~~ vent system abatement shall be used if possible to avoid direct venting into the atmosphere of undiluted non-condensables. The LCAQMD shall be notified when cold start-ups in excess of 5 lbs H2S/hr are to occur and may cancel such activity if deemed necessary.

DOC-7 The project ~~owner~~ operator shall install alarms and switches on the following units to ensure immediate corrective action is initiated to prevent outages and potential ~~stacking~~ venting. Alarm/trip conditions noted with an asterisk have a separate alert and trip alarm function and those alarm/trip conditions without an asterisk are coincident alarm/trip functions:

Turbine Generator –

1. Excessive vibration switch, alarm and trip;
2. Lateral motion switch on the turbine shaft, alarm and trip;
3. * High lube oil temperature switch, alarm and trip;
4. * Low lube oil pressure switch with indicating light in control room;
5. * Low lube oil sump level switch, alarm;
6. Over-speed switch, alarm and trip;

7. * High hydrogen gas temperature and low purity hydrogen alarm and trip;

8. * Seal oil level switch and alarm;

9. * Differential pressure switch to prevent low differential pressure between the seal oil and hydrogen pressure, alarm and trip;

10. * Generator moisture detector and alarm;

11. * Vacuum switch to prevent low vacuum in the seal oil detaining tank, alarm and trip;12. *Turbine bearing metal temperature alarm and trip.

ORC Units-

1. Excessive vibration switch, alarm, and trip;
2. *High lube oil temperature switch, alarm, and trip;
3. *Low lube oil pressure switch with indicating light in control room;
4. *Low lube oil sump level switch alarm;
5. Over-speed switch, alarm and trip;
6. *Expander bearing metal temperature alarm and trip;
7. Evaporator high pressure alarm and trip

Condensers -

1. * Pressure switch to prevent condenser pressures from exceeding design levels, alarm and trip;

2. * Condensate level switches to start and stop pump, prevent excessively high condensate levels in hot well;

3. * High or low condensate levels alarms. Pressure switch to prevent ~~condenser~~ heat exchanger pressures from exceeding design levels, alarm and trip;

Cooling Towers -

1. *Float switches and indicators to start and stop the pump in the cooling tower overflow basin and provide alarms;

2. Vibration switch~~es~~ and alarms on each cooling tower fan.

Electrical System -

1. Generator differential current trip and alarm;

2. Generator over-current trip and alarm;

3. Generator ground fault trip and alarm;

4. Generator anti-motoring trip and alarm;

5. Generator field ground trip and alarm;

6. * Generator stator over temperature alarm and trip;

7. Loss of excitation trip and alarm;

8. System negative phase sequence trip and alarm;

DOC-10 The project owner's approved-for-construction drawings or other drawings acceptable to the LCAPCO of the Stretford unit and/or scavenging system ~~turbine bypass, and secondary abatement (condensate treatment) system~~ shall be submitted to the LCAQMD and CEC for comment and review at the earliest possible date and in time for such drawings to be commented upon and modified if necessary.

The project owner shall not be required to submit proprietary information unless specifically requested by the LCAPCO pursuant to Section 91010, Title 17, California Administrative Code.

DOC-14 Within sixty (60) days after initial power production, the project owner shall demonstrate that the applicable emissions limitations are being maintained during normal power plant operations. The project owner shall submit a detailed performance test plan to the LCAQMD at least thirty (30) days prior to such tests. Such plans shall also be designed to determine the particulate emissions rate and components of particulate emitted. The project owner's proposed test plan must receive LCAQMD and CEC staff approval before such tests may be conducted to determine compliance.

The ARB shall arbitrate difference if concurrence on a test procedure can not be reached between CEC, the project owner and the LCAQMD and recommend a binding procedure. Safe sampling access and ports to enable the LCAQMD to gather samples from the freshly treated condensate, cooling tower stack, the ~~and~~ treated gas from the Stretford or catalyst reactor system shall be provided.

DOC-20 H2S emissions shall be monitored continuously by measuring total volume flow rates and H2S concentrations at the following locations: a) incoming steam; and b) outlet of the Stretford unit or catalyst reactor; and c) in the treated condensate. A log of such monitoring shall be maintained and be made available to LCAQMD staff upon request. The devices must have accuracies of +1 ppm, provide measurements at least every 15 minutes, and be accessible to LCAQMD staff. Flow rate measuring devices must have accuracies of +5 percent at 40 to 100 percent of the total flow rate and calibrations must be performed at least

quarterly. Calibration records must be made available to LCAQMD staff upon request. Monitoring shall be required pursuant to Section 42303 of the California Health and Safety Code. In the event that acceptable continuous monitors are not available,

The project owner shall conduct testing no less than once every thirty (30) days to ensure the efficiencies of the H2S abatement or scavenging ~~abatement~~ systems are being maintained. The testing procedure used to determine compliance must be approved by the LCAPCO. A log of such testing shall be maintained and be available to LCAQMD staff upon request. The project owner shall on an annual basis after the date of the decision submit for approval by the LCAQMD, CEC and ARB a summary of the project owner's efforts to develop, research, let for contract to research, or let for contract to implement use of equipment, that is to be a likely candidate for a continuous condensate and noncondensable gas monitor for hydrogen sulfide.

In either case, a summary of the monitoring and/or testing shall be forwarded to the LCAQMD every three (3) months.

District Permit # A/C 2006-24, Condensate H2S Abatement System Modifications

AC25-2 Stretford or catalyst reactor tail gas monitor output shall be recorded ~~on a continuous paper strip chart recorder or an APCO approved equivalent device in a DCS historian system~~.

District Permit # A/C 2006-26, Steam Transmission Line Modification

1-3 The project owner shall use atmospheric emissions control systems as specified by the LCAQMD Authority to Construct for the Bottle Rock Power Plant (Permit # 80-034A) and approved by the CEC CPM. The emissions control systems shall include a Stretford or catalyst reactor H2S scavenging ~~abatement~~ system, a secondary H2S treatment system utilizing iron chelate and/or hydrogen peroxide injected into hot condensate, and an emergency ~~steam turbine bypass~~ system for outages.

Inapplicable COCs

COC DOC-11 applies to a pilot test program that was proposed as part of the prior BRPP operation. The method of H2S abatement is not proposed as part of the amended BRPP and, therefore, measure DOC-11 is not applicable to the amended BRPP.~~**DOC-11** The project owner shall submit to the LCAQMD, ARB, and CEC the results of the pilot test program performed by Bechtel National, Inc., no later than February 1, 1982, or within one month before the finishing of final design of the hydrogen peroxide/catalyst abatement system.~~

3.1.5 References

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3.2 Biological Resources

This subsection includes an evaluation of the amended BRPP effects on biological resources and compliance with applicable LORS and COCs. The amended BRPP would not create new significant impacts on biological resources, and no impacts would be greater than those previously analyzed in Order 79-AFC-4. The project modification is consistent with Order-79 AFC-4, and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.2.1 Affected Environment

A habitat evaluation was conducted in 2023 to identify and characterize existing conditions within amended BRPP site and 1,000 feet surrounding the BRPP site (study area), as well as to assess the potential for special-status species, sensitive habitats, and jurisdictional features to occur in the area (Vollmar 2023). A subsequent habitat evaluation was completed in 2024 to characterize the vegetation communities and habitat conditions within the area of the four proposed groundwater wells and water supply pipelines outside of the BRPP. The Biological Evaluation Report and supplemental habitat assessment are provided in Attachment B. The study area was previously evaluated for biological resources in Order 79-AFC-4 and the Bottle Rock Power Steam Project EIR (Lake County 1979).

Vegetation Communities/Habitat Evaluation

The areas within the fenced BRPP site consists of developed areas that are paved or graveled and devoid of vegetation. Access roads to the BRPP site are paved. Habitats within the buffer areas surrounding the BRPP site consist of cismontane woodland, chaparral, lower montane coniferous forest, serpentine chaparral, and valley and foothill grassland as shown on Figure 3.2-1. The vegetation communities in the BRPP study area are generally consistent with those evaluated in Order 79-AFC-4; however, the areas adjacent to BRPP infrastructure are currently subject to routine vegetation clearing for defensible space consistent with CAL FIRE requirements.

The area within the groundwater supply well disturbance areas consists of valley and foothill grassland and chaparral vegetation communities (Figure 3.2-2). Areas within the water supply pipeline routes include disturbed areas (i.e., access roads and well pad) valley and foothill grassland, chaparral, valley oak woodland, and cismontane woodland. No riparian habitat or wetlands occur within the pipelines or groundwater well disturbance area; however, wetland areas were identified within the study area along the southern pipeline route.

Special-Status Species

Special-status species are species legally protected under the California Endangered Species Act (CESA) and federal Endangered Species Acts (FESA) or under other regulations, or are species

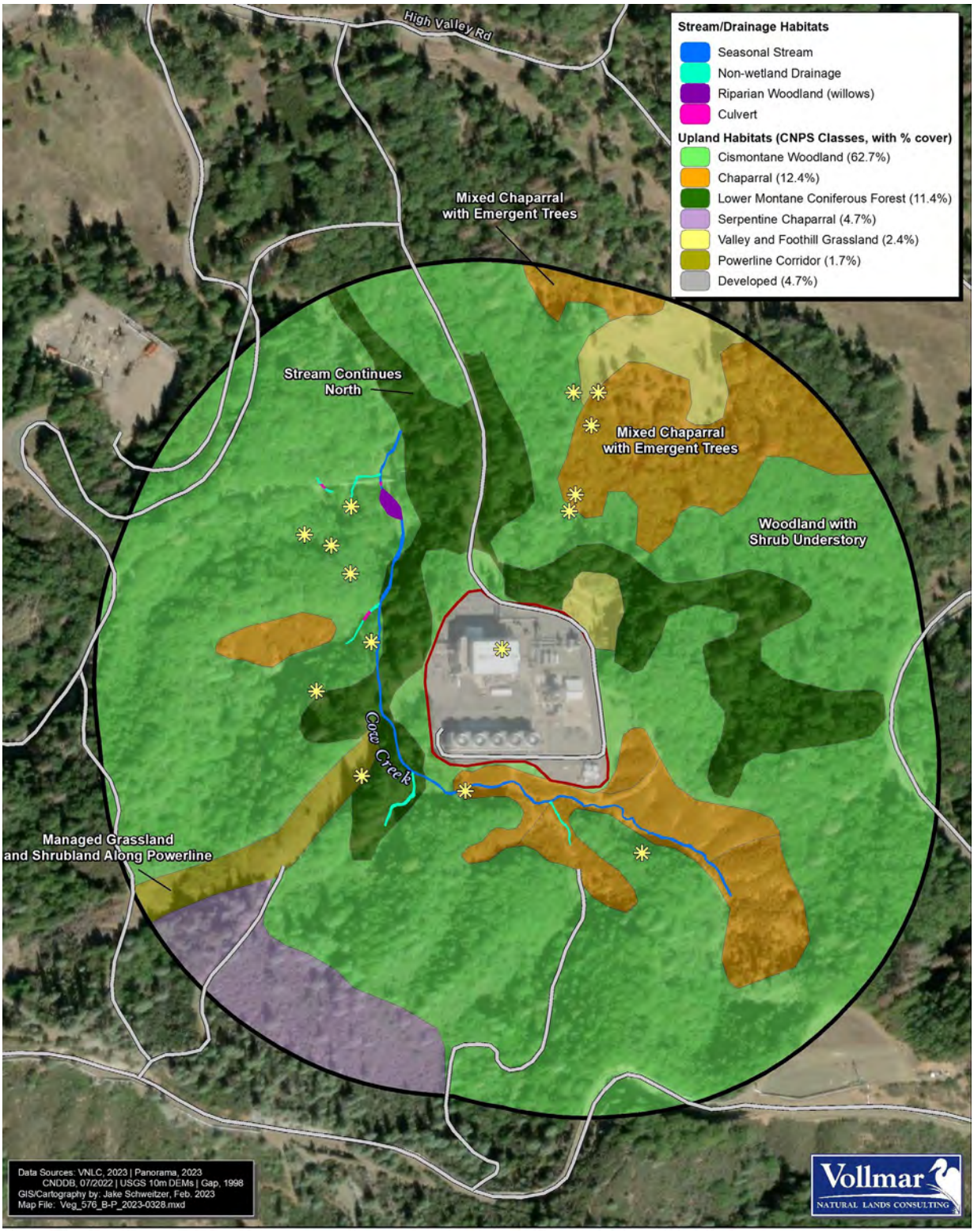
that are considered sufficiently rare by the scientific community to qualify for such listing. These species meet one of the following criteria:

1. Species listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR § 17.12 [listed plants], 17.11 [listed animals] and various notices in the Federal Register [FR] [proposed species]);
2. Species that are candidates for possible future listing as threatened or endangered under the federal ESA (61 FR § 40, February 28, 1996);
3. Species listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 CCR § 670.5);
4. Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 *et seq.*);
5. Species that meet the definitions of rare and endangered under CEQA. CEQA Guidelines Section 15380 provides that a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists;
6. Plants considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (California Rare Plant Rank 1A, 1B, 2A, and 2B) as well as California Rare Plant Rank 3 and 4 plant species;
7. Species designated by CDFW as Fully Protected or as a Species of Special Concern;
8. Species protected under the federal Bald and Golden Eagle Protection Act;
9. U.S. Fish and Wildlife Service Birds of Conservation Concern (BCC) or species included in the 2014 State of the Birds Watch List; and
10. Bats considered by the Western Bat Working Group (WBWG) to be "high" or "medium" priority (Western Bat Working Group 2015).

Based on habitat requirements and occurrence distributions, there are a total of ten special-status wildlife species and eighteen special-status plant species with some potential to occur within the study area (Vollmar 2023, Appendix B). No special-status species were documented within the study area during the reconnaissance biological surveys.

The potential for each special-status species to occur in the study area is summarized in Table 3.2-1 and additional details are provided in Appendix B. While the study area was previously evaluated in the BRPP Decision and subsequent amendments, species distribution patterns and listing status have changed since 1980. Table 3.2-1 includes the current listing status of wildlife species that could occur in the study area. Northern spotted owl is the only special-status wildlife species that is currently listed under FESA and CESA with potential to occur in the study area. Monarch butterfly is currently a federal candidate species; however, no overwintering habitat for monarch butterfly is present within the study area. All other wildlife species are California species of special concern, which are species tracked by the State of California for potential future listing. Table 3.2-2 provides the current California Rare Plant Rank (CRPR) for special-status plants that could occur in the study area. None of the special-status plants that have a potential to occur in the study area are state or federally listed species.

Figure 3.2-1 Vegetation Communities in Bottle Rock Study Area



Source: Vollmar 2003

Figure 3.2-2 Vegetation Communities/Habitats in Groundwater Well and Pipeline Study Area

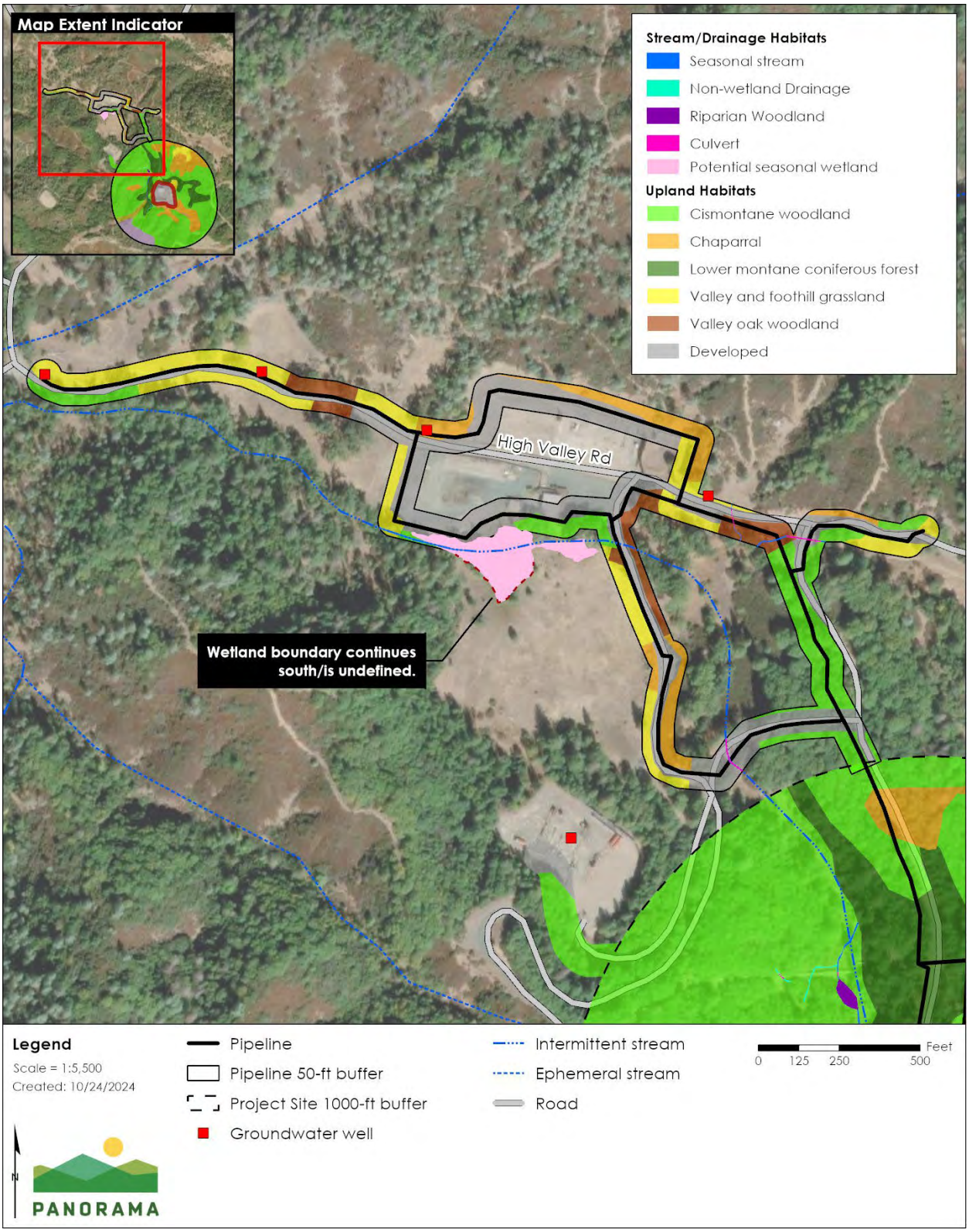


Table 3.2-1 Special-Status Species Potential to Occur in the Study Area

Species	Status	Habitat	Potential to Occur in Study Area
Amphibians			
Foothill yellow-legged frog (*Rana boyleg*)	SSC (North Coast Clade)	Rocky streams in a variety of habitats.	**Potential.** Cow Creek provides low-to-moderately suitable habitat for dispersal (not breeding). There are a few pools, sunny areas, and some gravelly substrate.
Red-bellied newt (*Taricha rivularis*)	SSC	Redwood forest, conifer and hardwood woodland, and rapid/permanent streams.	**Low potential**. Cow Creek provides low-to-moderately suitable habitat for overland migration. Newt could utilize drainages to migrate through to other more suitable stream habitats in the watershed. Species has been identified around Cobb Mountain in recent years.
Birds			
Purple martin (nesting) (*Progne subis*)	SSC	Mountain forests or Pacific lowlands, woodpecker cavities and dead snags.	**Potential**. Nesting habitat is present within the study area. Several snags were observed and at least one woodpecker cavity is present.
Northern spotted owl (*Strix occidentalis caurina*)	FT (listed in 1990 ST (listed in 2016)	Dense blocks of mature, multi-layered forests of mixed conifer, redwood, and Douglas-fir habitat.	**Low potential**. Cismontane woodland and coniferous forest habitats within the study area could provide suitable habitat for the species. Designated critical habitat is present approximately 2.8 miles from the study area. Recently documented within 4 miles of the study area.
Insects			
Monarch butterfly (*Danaus plexippus plexippus*)	FC(listed in 2020)	Wind-protected tree groves, tall trees in large groups, milkweed (*Asclepias sp.*) vegetation.	**Potential**. Outside of the known overwintering range (generally within 1.5 miles of the coast) of this species. The study area could provide suitable spring/summer breeding and foraging habitat but does not contain overwintering habitat.
Mammals			
Pallid bat (*Antrozous pallidus*)	SSC; WBWG:H	Rocky outcrops and cliffs, caves, mines, trees, and various human structures (bridges, barns, porches, bat boxes, and buildings).	**Potential**. Trees and buildings could provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed during the field survey.

Species	Status	Habitat	Potential to Occur in Study Area
Townsend's big-eared bat (*Corynorhinus townsendii*)	SSC; WBWG:H	Caves, cliffs, rock ledges, and man-made structures.	**Potential**. Could roost within buildings and hollow trees within the study area. Grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed.
Hoary bat (*Lasiurus cinereus*)	WBWG: M	Deciduous and coniferous forests and woodlands, including areas altered by humans. Open areas, including spaces over water and along riparian corridors.	**Potential**. Trees provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed.
Long-eared myotis (*Myotis evotis*)	WBWG: M	Semiarid shrublands, sage, chaparral, agricultural areas, and coniferous forests. Roost under exfoliating tree bark, hollow trees, caves, mines, cliff crevices, sinkholes, rocky outcrops and human structures (buildings and under bridges).	**Potential**. Trees provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed.
Fringed myotis (*Myotis thysanodes*)	WBWG: H	Pinyon-juniper, valley foothill hardwood, and hardwood-conifer.	**Potential**. Trees provide suitable day and night roosts, and grassland, woodland, and forests provide suitable foraging habitat. No obvious roost locations were observed.

Notes:
FT = federally listed as threatened
ST = state listed as threatened
FC = candidate for federal listing
SSC = species of special concern
WBWG (Western Bat Working Group)
H = high priority
M = medium priority

Source: Vollmar 2023

Table 3.2-2 Special-Status Plants Potential to Occur in the Study Area

Species	Status	Habitat, Elevation, and Blooming Period	Potential to Occur in Study Area
Plants			
Dimorphic snapdragon *Antirrhinum subcordatum* (Plantaginaceae)	CRPR 4.3	Chaparral, Lower montane coniferous forest. Microhabitat: Serpentinite; 605-2,625 feet; April-July	**Potential**. Suitable habitat is present.
Konocti manzanita *Arctostaphylos manzanita ssp. Elegans* (Ericaceae)	CRPR 1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest. Microhabitat: Volcanic; 1,295-5,300 feet; (January) March-May (July)	**Potential**. Suitable habitat is present.
Rincon Ridge ceanothus *Ceanothus confuses* (Rhamnaceae)	CRPR 1B.1	Chaparral, Cismontane woodland, Closed-cone coniferous forest. Microhabitat: Serpentinite, Volcanic; 245-3,495 feet; February-June	**Potential**. Suitable habitat is present
Calistoga ceanothus *Ceanothus divergens* (Rhamnaceae)	CRPR 1B.2	Chaparral (rocky, serpentinite, volcanic). Microhabitat: none; 560-3,115 feet; February-April	**Potential**. Suitable habitat is present
Cascade downingia *Downingia willamettensis* (Campanulaceae)	CRPR 2B.2	Cismontane woodland (lake margins), Valley and foothill grassland (lake margins), Vernal pools. Microhabitat: none; 50-3,640 feet; June-July (September)	**Potential**. Suitable habitat is present
Brandegee's eriastrum *Eriastrum brandegeeae* (Polemoniaceae)	CRPR 1B.1	Chaparral, Cismontane woodland. Microhabitat: Sandy, Volcanic; 1,395-2,755 feet; April-August	**Potential**. Suitable habitat is present
Greene's narrow-leaved daisy *Erigeron greenei* (Asteraceae)	CRPR 1B.2	Chaparral (serpentinite, volcanic). Microhabitat: none; 260-3,295 feet; May-September	**Potential**. Suitable habitat is present
Snow Mountain buckwheat *Eriogonum nervulosum* (Polygonaceae)	CRPR 1B.2	Chaparral (serpentinite). Microhabitat: none; 985-6,905 feet; June-September	**Potential**. Suitable habitat is present

Species	Status	Habitat, Elevation, and Blooming Period	Potential to Occur in Study Area
Toren's grimmia *Grimmia torenii* (Grimmiaceae)	CRPR 1B.3	Chaparral, Cismontane woodland, Lower montane coniferous forest. Microhabitat: Carbonate, Openings, Rocky, Volcanic, boulder and rock walls; 1,065-3,805 feet; no bloom period listed	**Potential**. Suitable habitat is present
Hall's harmonia *Harmonia hallii* (Asteraceae)	CRPR 1B.2	Chaparral (serpentinite). Microhabitat: none; 1,000-3,200 feet; (March) April-June	**Potential**. Suitable habitat is present
Glandular western flax *Hesperolinon adenophyllum* (Linaceae)	CRPR 1B.2	Chaparral, Cismontane woodland, Valley and foothill Grassland. Microhabitat: Serpentinite (usually); 490-4,315 feet; May-August	**Potential**. Suitable habitat is present
Two-carpellate western flax *Hesperolinon bicarpellatum* (Linaceae)	CRPR 1B.2	Chaparral (serpentinite). Microhabitat: none; 195-3,295 feet; (April) May-July	**Potential**. Suitable habitat is present
Colusa layia *Layia septentrionalis* (Asteraceae)	CRPR 1B.2	Chaparral, Cismontane woodland, Valley and foothill Grassland. Microhabitat: Sandy, Serpentinite; 330-3,595 feet; April-May	**Potential**. Suitable habitat is present
Cobb Mountain lupine *Lupinus sericatus* (Fabaceae)	CRPR 1B.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest. Microhabitat: none; 900-5,005 feet; March-June	**Potential**. Suitable habitat is present
Sonoma beardtongue *Penstemon newberryi* var. *sonomensis* (Plantaginaceae)	CRPR 1B.3	Chaparral (rocky). Microhabitat: none; 2,295-4,495 feet; April-August	**Potential**. Suitable habitat is present
Socrates Mine jewelflower *Streptanthus brachiatus ssp. brachiatus* (Brassicaceae)	CRPR 1B.2	Chaparral, Closed-cone coniferous forest. Microhabitat: Serpentinite; 1,790-3,280 feet; May-June	**Potential**. Suitable habitat is present

Species	Status	Habitat, Elevation, and Blooming Period	Potential to Occur in Study Area
Freed's jewelflower *Streptanthus brachiatus ssp. hoffmanii* (Brassicaceae)	CRPR 1B.2	Chaparral, Closed-cone coniferous forest. Microhabitat: Serpentinite; 1,790-3,280 feet; May-June	**Potential**. Suitable habitat is present
Oval-leaved viburnum *Viburnum ellipticum* (Viburnaceae)	CRPR 1B.2	Chaparral, Cismontane woodland. Microhabitat: Serpentinite; 1,610-4,005 feet; May-July	**Potential**. Suitable habitat is present

Source: Vollmar 2023

Critical Habitat

The study area is not located within any designated critical habitat areas.

Riparian Areas, Wetlands, and Sensitive Natural Communities

Cow Creek and its tributaries include wetland and riparian vegetation along the stream banks and surroundings. The riparian areas within the study area are shown on Figure 3.2-1. The wetlands along Cow Creek appear to be limited to small, localized portions of Cow Creek below the tops of banks. Wetlands were mapped south of the southern pipeline route along the groundwater well pipeline corridor. Aside from Cow Creek, its tributaries, and wetlands south of the southern pipeline, there are no sensitive habitats within the study area. None of the onsite natural habitats within the study area would be classified as sensitive due to their species composition. All of the dominant plant species within the habitat types in the study area are relatively common in the region or otherwise common in California.

3.2.2 Environmental Analysis

Special-Status Species

Overview

Activities to construct and operate the amended BRPP would not result in a loss of vegetation or wildlife habitat because all proposed modifications would be conducted in previously disturbed areas. The fenced BRPP site is developed and does not contain habitat. The area immediately east of the BRPP fence where the steam pipeline and condensate pipeline are proposed were disturbed during grading of the BRPP site and are currently subject to annual vegetation management activities including vegetation clearing to maintain defensible space around the BRPP. The area of new foundations and excavation would be contained within the graded and disturbed BRPP site. The amended BRPP activities at the BRPP site would not require vegetation removal, and, therefore would not directly remove habitat for any special-status species. The new groundwater supply wells would be located in areas containing grasslands and chaparral and would result in vegetation removal to accommodate the well drilling. The new pipeline would also require some vegetation removal where the pipeline

would be trenched in areas containing vegetation. The eastern pipeline route would be attached to the existing steam supply pipeline and would not require vegetation removal.

Plants, Amphibians, and Insects

The amended BRPP would involve removal of vegetation along the water supply pipelines where trenching would occur and for the groundwater wells. Construction of the groundwater supply wells has the potential to disturb special-status plants where the groundwater supply wells and pipelines are located in chaparral, cismontane woodland, and grasslands (suitable habitat for special-status plants). The applicant will conduct a focused rare plant survey in the spring of 2025 prior to construction of the water supply wells and pipelines. If any special-status plants are observed within the area of the proposed water supply well or pipeline, the well or pipeline location would be adjusted to avoid the special-status plant. The wells and pipelines are located outside of CEC jurisdiction and would be constructed in compliance with all applicable LORS for protection of special-status plants and any additional Lake County requirements. Because the pipeline and groundwater supply wells will avoid any special-status plants, the project would not directly impact special-status plants.

The areas of construction and operation of the BRPP within developed or disturbed areas at the BRPP would not remove vegetation and would have no potential direct effect on special-status plants or insects. The amended BRPP does not require any new roads or modify any crossings of streams and would not affect any habitat for special-status amphibians. The eastern water supply pipeline would cross Cow Creek along the steam supply pipeline and would not create any new ground disturbance or vegetation removal adjacent to Cow Creek. Because the pipeline would not discturb habitat adjacent to Cow Creek, the pipeline would avoid impacts on species that use habitat within and adjacent to Cow Creek. The amended BRPP would involve implementation of erosion control measures in COCs 5-1.e, 5.1-f, and 5-3.h to avoid effects from erosion and sedimentation on habitat for special-status plants, amphibians, or insects. Because the amended BRPP would avoid special-status plants, would not affect any habitat for special-status amphibians and insects, and sufficient erosion control measures are required under existing COCs, the amended BRPP would not affect special-status plants, amphibians, or insects.

Construction

The project would not remove any nesting habitat for special-status birds. No tree removal would be required to construct the portions of the water supply pipeline within cismontane woodland and valley oak woodland as the water supply pipeline would be attached to the existing steam supply pipeline within these habitats. Construction of the amended BRPP would involve use of noise-generating heavy equipment. Impacts to wildlife from increased noise during construction would be short-term (8 months). Construction is anticipated to occur between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday. No work would occur on Sundays or holidays. While construction activities would be short-term, the irregular noise and increased noise levels at the site could potentially affect special-status bird nesting activities if construction activities commenced during the nesting season for special-status birds in proximity to active bird nests.

Northern Spotted Owl

U.S. Fish and Wildlife Service (USFWS) recommends a no disturbance buffer of 0.25 mile from any nest of Northern spotted owl during the nesting season. In order to avoid potential effects on Northern spotted owl breeding behavior and to comply with USFWS guidance for avoidance of noise disturbance, if project construction activities commence during nesting/breeding season of Northern spotted owl (typically February 1 to July 31), applicant proposed measure (APM) BIO-1 includes protocol surveys would be conducted by a qualified biologist, following USFWS 2011 Northern Spotted Owl survey protocol. If any Northern spotted owl nesting pair was documented within 0.25 mile of the amended BRPP site, no construction activity would commence until after the Northern spotted owl nesting season. APM BIO-1 includes procedures to avoid affects on Northern spotted owl nesting consistent with current LORS.

> **APM BIO-1. Northern Spotted Owl Avoidance.** If project construction commences during nesting/breeding season of northern spotted owl (February 1 to July 31), protocol surveys for noise disturbance projects shall be conducted by a qualified biologist, following USFWS's 2011 Northern Spotted Owl survey protocol. This protocol requires six visits between March 15 and May 31, and the goal would be to determine if spotted owls are nesting in the immediate vicinity of the project area. The surveys shall cover all spotted owl habitat within 0.25-mile of the project site. If no nests are documented, the surveys are effective until the beginning of the following nesting season (February 1). If northern spotted owl nests are documented in the immediate project area no construction activities may commence within 0.25 mile of any active nest and the United States Fish and Wildlife Service (USFWS) shall be consulted to define appropriate nest buffers or other mitigation measures.

Purple Martin

If construction activities were to commence during the nesting season for purple martin (February 15 to August 15) and purple martin were nesting within proximity to the project site, the construction noise could affect purple martin nesting activities. To avoid impacts on purple martin and other migratory birds, APM BIO-2 includes a pre-construction survey for nesting birds conducted by a qualified biologist at most two weeks prior to initiation of on-the-ground activities, for commencement of activities within nesting/breeding season (February 15 to August 15). If any nesting birds are observed during the pre-construction survey a no-disturbance buffer of 50 feet for passerines, 200 feet for raptors, and 500 feet for rookery nests shall be established until the young have fledged the nest. APM BIO-2 includes protocols to avoid effects on purple martin and other nesting birds consistent with current LORS.

> **APM BIO-2. Nesting Bird and Raptor Avoidance.** Project construction shall be timed to avoid bird nesting season (February 15 – August 15) to the extent feasible. If construction activities start during the nesting season, a pre-construction survey for nesting birds shall be conducted by a qualified biologist within one week prior to initiation of construction activities. If construction ceases for a period of 48 hours or more or if construction activities move into areas that have not been subject to routine construction noise disturbance then new avian surveys shall be conducted for nesting

birds. If active nests are observed in proximity to the construction, the following standard no-disturbance buffers shall be implemented: 50-foot buffer for passerine (songbird) nests, 200-foot buffer for raptor nests, and 500-foot buffer for purple martin nests. The no disturbance buffer may be adjusted by the biologist based on site specific conditions. The no disturbance buffer shall be maintained until the young have fledged and left the nest, as determined by a qualified biologist.

Mammals

Townsend's bat and pallid bat use buildings, such as those on the BRPP site, as roosting habitat. Hoary bat, long-eared myotis, and fringed myotis could potentially use trees in proximity to the BRPP site as roosting habitat. The project would not remove any bat roosting habitat including buildings or trees. Construction of the amended BRPP would occur more than 50 feet from any suitable bat roosting areas including the existing BRPP building. Because the amended BRPP would not affect any bat habitat or use heavy equipment in proximity to suitable roosting habitat, the amended BRPP would not affect special-status bats.

Operation

Operation of the amended BRPP would generate constant sound at the ORC units. Sound reduction measures including enclosures around the ORC expanders are included as part of the project to reduce noise levels to 45 dB at the nearest property line. Because the noise increase from operation of the amended BRPP would be contained to the BRPP site and would not generate increased noise levels in areas containing habitat, noise generated during operation of the amended BRPP would not impact special-status birds or mammal species.

The amended BRPP would also include installation of lighting on steel posts (up to 30 feet tall) around the perimeter of the new ORC units. Lighting would be on motion sensors, downcast, and dark sky compliant to avoid impacts on the night sky. Where it is feasible to use shorter light posts due to focused work areas on the ground, lights would be mounted at a height of 10 to 16 feet to reduce light scatter. Lighting would comply with outdoor lighting standards in California Energy Code Title 24 part 6. Because all lighting would be located within the perimeter of the BRPP site, which already contains lighting and lighting would be focused on the amended BRPP infrastructure, no new impacts to wildlife from lighting would occur.

Riparian Habitat, Sensitive Natural Communities, and Wetlands

The amended BRPP would not locate any infrastructure in riparian habitat or wetlands. No sensitive natural communities occur within the project area therefore no sensitive natural community would be affected by the amended BRPP. The amended BRPP construction would be focused in areas that are currently developed and would not increase the risk of erosion and associated sediment impacts on riparian habitat or wetlands. The groundwater supply wells are not located in wetlands, riparian areas, or sensitive habitats and would avoid impacts on wetlands, riparian areas, and wetlands. The water supply pipeline would cross Cow Creek and adjacent riparian habitat along an existing road/culvert and by attaching to the existing steam supply pipeline to avoid impacts on any stream and riparian habitat. In addition, the amended

BRPP would involve implementation of erosion control measures in COCs 5-1.e, 5.1-f, and 5-3.h to avoid effects from erosion and sedimentation on any riparian habitat or wetlands.

Connectivity Corridors
The amended BRPP would be located within the developed BRPP site and directly adjacent to the site. The amended BRPP would not affect any wildlife migration or connectivity corridor.

Critical Habitat
No critical habitat occurs on the BRPP site or in the study area. The amended BRPP would not affect any critical habitat.

Summary
The amended BRPP involves very limited earth work and ground disturbance would primarily occur in developed and disturbed areas. The only vegetated areas/habitat that would be affected by the project are located within the groundwater supply well and pipeline areas, which would be subject to Lake County approval. While the groundwater supply wells and portions of the pipelines occur in areas that provide suitable habitat for special-status plants, focused surveys for special-status plants would be conducted in spring of 2025 and the water supply wells and pipelines would be relocated if needed to avoid any special-status plants. In addition, APMs BIO-1 and BIO-2are proposed to reduce and avoid impacts on special-status species that could use habitat in proximity to the BRPP site. Therefore, no impacts to biological resources beyond those described in Order 79-AFC-4 and subsequent amendments would occur. All amended BRPP activities would be conducted in accordance with the 2013 COCs, as modified, and all applicable LORS.

3.2.3 Consistency with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to biological resources and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments. Changes in species listing status are addressed in Section 3.2.1. Implementation of APMs BIO-1 and BIO-2 will ensure compliance with applicable LORS for those species which are now considered special-status.

3.2.4 Conditions of Certification

Applicable Conditions
The amended BRPP would comply with biological resources COCs:

- COCs 5-1 a, b, e, f
- COC 5-2
- COCs 5-3 a-d, h-j.

Amended Conditions
COCs that require modification are shown in ~~strikethrough~~ and <u>underline</u> below. COCs 5-1b, 5-2, 5-3b, and 5-3i include minor changes to reflect the name change from California Department of Fish and Game to California Department of Fish and Wildlife. The naming conventions and

timing of surface and groundwater sampling in measures COC 5.3-b and 5.3-c has been updated to reflect the naming convention and sampling timing in water board Order 99-091 for the project. Two groundwater wells, Union Oil Spring and Jadiker (Wright) Spring are located on Calpine leases and are not accessible to the applicant for sampling. Sampling of Union Oil Spring is also unsafe; therefore, those groundwater sampling locations have been recommended for removal from COC 5.3-c. In addition, measure 5.3-d is proposed for deletion because years of biological monitoring in the area have demonstrated that species prefer use of the native habitat rather than the nest boxes. With the proposed changes in the COCs, the amended BRPP would comply with current LORS, and impacts of the amended BRPP would not exceed the impacts of the approved BRPP.

5-1.b. The project owner shall prepare a revised detailed Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP) which includes mitigation measures with their implementing methodologies, and submit it to the CEC CPM for review and approval in consultation with the California Department of Fish and ~~Game~~ Wildlife(CDF~~G~~W). The project owner shall implement the approved biological resources mitigation and monitoring measures specified in the approved BRMIMP.

5-2. One year prior to power plant deactivation, the project owner shall include in the decommissioning plan a biological resources element identifying mitigation measures.

Verification: The project owner shall submit the biological resources element of the decommissioning plan to the CEC CPM for a determination in consultation with CDF~~G~~W of adequacy and acceptability.

5-3.b. The project owner shall continue surface water sampling at the following 5 sites: Kelsey Creek near Kelseyville (SW-6), Kelsey Creek above High Valley Road (SW-7), High Valley Creek above Kelsey Creek (SW-8), Adler Creek above Glenbrook (SW-9), and Kelsey Creek above Glenbrook (SW-10).~~Kelsey Creek immediately upstream of the confluence with Alder Creek; Kelsey Creek 500 feet downstream of its confluence with High Valley Creek; Alder Creek immediately upstream of its confluence with Kelsey Creek; High Valley Creek immediately upstream of its confluence with Kelsey Creek; and Kelsey Creek near Kelseyville.~~

Sampling shall be conducted in quarterly ~~April, July, and October~~ of each year.

Protocol: Each surface water sample shall be analyzed for boron, sodium, sulfate, calcium-magnesium hardness, Ph, alkalinity, settlable solids, nonfilterable residue, turbidity, specific electrical conductivity, magnesium, calcium, copper, iron, lead, manganese, and zinc.

As determined necessary by the CEC CPM, based on water quality sampling results and consultation with the CDF~~G~~W, the project owner shall, during April, July and October, collect and identify bottom-dwelling organisms from at least one square meter of

stream-bed at each site and make special trace metal determinations for copper, iron, manganese, lead and zinc.

5-3.c. The project owner shall continue groundwater sampling at the following five sites: ~~Nance~~ Barrett Spring (GW-1), ~~Union Oil Spring ,~~ Coleman Well (GW-4), ~~Jadiker Spring~~ and Francisco Well (GW-3).

Sampling shall be conducted in ~~April, July, and October of~~ quarterly each year.

Protocol: Each groundwater sample shall be analyzed for boron, sodium, sulfate, calcium-magnesium hardness, pH, alkalinity, non-filterable residue, specific electrical conductivity, copper, iron, manganese, lead and zinc.

~~**5-3.d.** The project owner shall replace and maintain the nest boxes as originally prescribed, and maintain wildlife water basins in working condition. Wildlife use of these habitat improvement projects shall be monitored biennially using the same methodology that has been used in the past and thoroughly described in the BRMMSP. (See 5-3.i. below)~~

5-3.i. A Biological Resources Mitigation and Monitoring Status Report (BRMMSR) shall be prepared to provide the results of the previous year's monitoring. This report shall be submitted by December 15th each year. The report will collate and summarize all monitoring results including methodologies used to satisfy conditions 5-3.a. through 5-3.h. The project owner shall include in the BRMMSR appropriate maps of suitable scale with a detailed discussion of the current status of all mitigation and monitoring actions.

Verification: The project owner shall submit to the CEC CPM by December 15th, of each year, an annual BRMMSR which verifies compliance with the Biological Resource Conditions of Certification.

Upon reasonable notice the CEC CPM, Lake County staff, the Regional Water Quality Control Board staff, and the California Department of Fish and ~~Game~~Wildlife (CDF~~G~~W) staff, shall be granted access for inspections.

3.2.5 References

CEC. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of Ownership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

—. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

Lake County. 1979. California Department of Water Resources, Bottle Rock Geothermal Power Plant Draft Environmental Impact Report. *Application No. 79-AFC-4*.

Vollmar. 2023. Biological Evaluation Report. Mayacma Geothermal Project, Lake County, California. Prepared by Vollmar Natural Lands Consulting.

3.3 Cultural Resources

This subsection provides an evaluation of the amended BRPP's effects on cultural resources and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts on cultural resources, and no impacts would be greater than those previously analyzed in Order 79-AFC-4. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.3.1 Affected Environment

The amended BRPP affected environment consists of the developed BRPP site, which primarily encompasses the graveled and paved pad within the fence line of the BRPP. A new condensate pipeline and new segment of steam pipeline would extend from the ORC units within the BRPP site to the east of the BRPP fence line, and then would turn north and parallel the fence line just outside the site boundary. Four new groundwater supply wells and water supply pipelines would be constructed outside of the BRPP fence and would supply water to the cooling tower. All areas of ground disturbance were previously evaluated in 79-AFC-4 and Bottle Rock Power Steam Project EIR (DWR 1979). A record search and field investigation were conducted for the proposed water supply pipelines and groundwater wells (Appendix D). Four eligible resources were previously recorded in proximity to the groundwater supply wells and pipelines. No cultural resources were identified within the water supply well or pipeline routes during the field survey in 2024. One of the water supply pipeline route options passes through site CA-LA-974H; however, the pipeline route is located within the roadway where it passes through the resource boundaries.

The BRPP is less than 50 years old and is therefore not eligible as a historic resource. No cultural resources have been identified at the BRPP site (including areas within the proposed steam and condensate pipelines alignment adjacent to the fence).

3.3.2 Environmental Analysis

Development within BRPP Site

As discussed in Section 2.0 Project Description, the project involves construction of the amended BRPP, including installation of two new ORC units, new segments of steam pipeline and vent stack, new condensate pipeline, and new electrical lines. The new ORC units would be located on foundations that would extend up to 5 feet below grade. The new electrical pipelines would be buried in a trench that would extend up to 3 feet below grade. The new condensate and steam pipeline segments would be co-located on new pipeline supports secured to foundations that would extend up to 5 feet below grade. The area of new foundations and excavation would be contained within the graded and disturbed BRPP site, and there is very low potential for disturbance of cultural resources given the history of grading and disturbance

within and adjacent to the BRPP site and absence of any known cultural resources in the area. No impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

Groundwater Supply Wells and Pipelines

The proposed groundwater wells would require well drilling in undeveloped areas and the proposed water supply pipelines would be trenched within developed roadways and undeveloped areas. The proposed new groundwater wells and water supply pipelines, except for the segment of pipeline within CA-LA-974H, avoid all recorded cultural resources. The segment pipeline within CA-LAK-974H, an unevaluated historic archaeological site is located within the developed access road area and will not have impact any of the qualities that could make the resource eligible for either the NRHP or CRHP under Criterion D as the data indicate that they are outside of the alignment to the west. No subsurface testing for buried archaeological resources appears necessary based on the information from previous archaeological studies, the current negative field inventory and the proposed installation within or adjacent to existing pipelines and road alignments within the facility (Appendix D).

Resource protection measures 4-1 through 4-5 included in the existing 2013 COC are adequate to address potential impacts to cultural resources due to the amended BRPP (see management recommendations in Appendix D). All amended BRPP activities would be conducted in accordance with the 2013 COCs and all applicable LORS.

3.3.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP complies with all applicable LORS related to cultural resources and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.3.4 Conditions of Certification

Applicable Conditions

The amended BRPP would be subject to the following conditions:

- COC 4-2
- COC 4-4

Amended Conditions

The following COC would be amended as shown in ~~strikethrough~~ and <u>underline</u> below to address change in agencies and procedures since the time of licensing:

> **4-3.** If previously unidentified cultural resource sites are discovered or unearthed during construction, work in the immediate area will be halted until the archaeologist evaluates the significance of the resource. If the resource is determined to be significant, the project owner shall promptly notify the CEC CPM of the resource discovery and work stoppage. Representatives of the project owner <u>and</u> the CEC CPM~~, and the Anthropology Lab at Sonoma State University~~ shall meet with the project owner's archaeologist within one working day of the notification to discuss the possible

mitigation measures. Pending resolution of this matter, construction activity in the resource area shall remain stopped. If the Professional Archaeologist determines that any cultural resources exposed during construction constitute a historical resource and/or unique archaeological resource under CEQA, he/she shall notify the project proponent and other appropriate parties of the evaluation and recommend mitigation measures to mitigate to a less-than significant impact in accordance with California Public Resources Code Section 15064.5. Mitigation measures may include avoidance, preservation in-place, recordation, additional archaeological testing and data recovery among other options. The completion of a formal Archaeological Monitoring Plan (AMP) and/or Archaeological Treatment Plan (ATP) that may include data recovery may be recommended by the Professional Archaeologist if significant archaeological deposits are exposed during ground disturbing construction. Development and implementation of the AMP and ATP and treatment of significant cultural resources will be determined by the Professional Archaeologist in consultation with the CEC CPM.

Verification: The project owner shall notify the CEC CPM within one working day of the resource discovery and the work stoppage.

3.3.5 References

Archaeological Services, Inc. 2010. "Bottle Rock Power Stream Project Cultural Resources Investigation Near Glenbrook, Lake County, California."

Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant. 2013. Docket Number: 79-AFC-04C. (California Energy Commission, December 16).

Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project. 1980. Docket Number 79-AFC-4 (California Energy Commission, November).

DWR. 1979. "Bottle Rock Geothermal Power Plant, Lake County, CA Draft Environmental Impact Report."

Order Approving the Change of Ownership, the Restart of Operation after Suspension, and 11 Facility Design Changes. 2006. Docket No. 79-AFC-4C (California Energy Commission, December 13).

3.4 Geologic Hazards and Resources

This subsection includes an evaluation of the amended BRPP effects on geologic resources and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts from geologic hazards nor create greater impacts to geologic resources that were not previously analyzed in Order 79-AFC-4. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.4.1 Affected Environment

The affected environment includes the existing BRPP site, the area of the proposed steam pipeline and condensate pipeline located immediately adjacent to the BRPP fence, and the area of the proposed groundwater supply wells and water supply pipelines. The BRPP site was graded to construct the BRPP, and the current conditions of the site include a paved and graveled area. All facilities within the BRPP site are as described and previously evaluated in Order 79-AFC-4 and the Bottle Rock Power Steam Project EIR (DWR 1979). No mineral resources or unique geological resources of historical, scientific, or recreational interest are found within the BRPP site (DWR 1979).

No known traces of active faults are located at the project site or in the immediate vicinity; however, the site is subject to seismic shaking based on the presence of faults in the region. The primary earthquake hazards are ground shaking and its potential to induce landslides. Earthquake potential and potential for earthquake induced landslides in the area were previously evaluated for the BRPP. Earthquake risk and associated hazards have not changed since licensing of the BRPP.

3.4.2 Environmental Analysis

The proposed modifications to the BRPP would be completed within and immediately adjacent to the existing developed BRPP site. Construction of the amended BRPP would require excavation of approximately 500 cubic yards of material for installation of subsurface electrical lines and construction of the ORC pad and placement of approximately 750 cubic yards of concrete for new foundations and concrete pads. The depth of excavation for the proposed foundations would be up to 5 feet if spread footings are used. All trenching and foundation drilling would be located within previously graded, compacted graveled, or paved areas. Excavation and foundation construction would not create a new risk of geologic hazards as all areas of excavation would be repaved and stabilized and the foundations would be designed to meet current engineering standards.

The proposed groundwater supply wells would be drilled into the shallow groundwater aquifer and would be located adjacent to existing roadways. The water supply pipelines would be located below grade (approximately 3 feet deep) and would primarily be located within developed/disturbed roadways and areas adjacent to the existing Franciscan well pad.

3.4 GEOLOGIC HAZARDS AND RESOURCES

All facilities for the amended BRPP would be constructed in accordance with the current California Building Standards Code (CBSC), also known as, California Code of Regulations, Title 24, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the amended BRPP would begin. A geotechnical investigation and final geotechnical report would be prepared before completion of the final engineering design. The final engineering design would comply with all geotechnical recommendations.

The existing geotechnical/seismic hazards and civil engineering COCs included in the existing BRPP license ensure that construction-related activities at the project site would comply with appropriate geologic hazard and resource protection plans and applicable LORS. Because all major infrastructure (i.e., ORCs and H_2S scavenging) included in the amended BRPP would be located within the existing graded and developed BRPP site, the amended BRPP would not result in potential geologic hazards, nor would it result in potential impacts to geologic resources more significant than those analyzed in Order 79-AFC-4 and subsequent amendments. The minor ground disturbance associated with the new groundwater supply wells and water supply pipelines would not create any geologic instability. The geologic resource COCs included in the existing BRPP license address the geologic hazards and potential impacts to geologic resources that could result from construction activities of the amended BRPP. The amended BRPP would be constructed in accordance with applicable LORS and COCs.

The potential for ground rupture at the site is considered low, and it is therefore unlikely that faults within the immediate area would produce any large damaging earthquakes due to either natural or induced activity during the economic life of the proposed facilities. Activities associated with the withdrawal of steam for producing electric power may cause or induce small quakes to occur in the field; these smaller quakes are frequently felt by those who work at the field and by nearby residents (USGS 2023). Seismic hazards would be minimized by conformance with the recommended seismic design criteria of the current CBC. Compliance with the current CBC requirements (and other state and local LORS) would reduce the exposure of people to the risks associated with large seismic events, liquefaction potential, and expansive soils to less-than-significant levels. Additionally, major structures would be designed to withstand the strong ground motion of a *design-basis earthquake* as defined by the CBC. Compliance with CBC standards would ensure no impacts associated with geologic hazards beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

The amended BRPP would be located in the same areas and on the same geologic units as the existing BRPP and would not result in a loss of availability of a known mineral resource that would be of value to the region and the residents of the state. No such resources have been identified on or near the site; therefore, no impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

3.4.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to geologic hazards, including the 2022 CBSC, which went into effect on January 1, 2023. The amended BRPP would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.4.4 Conditions of Certification

Applicable Conditions

The amended BRPP would be subject to the following conditions:

- COC 7-1
- COC 7-3
- COC 10-2
- COC 10-3
- COC 10-4

Amended Conditions

COCs 10-1, 10-5, and 10-6 require modifications for the amended BRPP, as shown in ~~strikethrough~~ and underline below, to reflect the current LORS and to reflect changes in proposed BRPP infrastructure. With the proposed changes in the COCs, the amended BRPP would comply with current LORS, and impacts of the amended BRPP would not exceed the impacts of the approved BRPP.

10-5. The project owner will file with the CEC CPM or its designated agent substantial design changes to the final plans as required by CBSC ~~2001~~ 2022. "Substantial changes" include all changes requiring an alteration in design concept and preparation of new design plans consistent with the AFC conditions of certification. Minor changes shall be reflected in the "as-built" drawings submitted after construction.

10-6. Inspection shall be performed in accordance with ~~Chapters 3 and 70 of the Uniform Building Code (1979 edition)~~ the International Building Code (2024 edition). The CEC CPM or its designated agent may delegate responsibility for special and continuous inspections to the project owner as provided in the CBSC ~~2001~~ 2022. The CEC CPM or its designated agent, may upon reasonable notice, inspect the construction at any time.

The project owner will provide, through its Construction Office, a staff of field engineers and inspectors to monitor conformance with the accepted final plans, specifications, and change orders. These field engineers and inspectors will be present on site at all times to monitor construction activities.

Upon submittal by the project owner to the CEC CPM of adequate quality assurance/quality control procedures for inspection of construction work, CEC staff may delegate to the project owner responsibility for determining that construction work conforms with CBSC ~~2001~~ 2022 or other requirements of the certificate.

Should the CEC delegate responsibility for inspections to the project owner, the project owner shall certify that the designated inspectors have the authority to:

- Stop construction work which does not conform with approved plans, specifications, and change orders;
- Require changes or remedial work to reestablish conformance; and
- Report substantial nonconformance to the CEC or its designated agent as soon as discovered.

Should the project owner propose substantial corrective measures for any nonconforming construction work, the project owner's responsible engineer shall sign and stamp the proposed corrective plan, and specifications shall certify that they conform with the applicable criteria. Any nonconformance shall be justified by the project owner.

Any proposed substantial corrective measures shall be reviewed by the CEC or its designated agent to determine that they conform with the applicable criteria or with the design intent.

Upon request by the project owner's responsible engineer, selected fabricated materials shall be inspected for compliance with contract specification, either in the supplier's shops or on site, by the utility's Engineering Quality Control Inspection Group. The test requirements shall be described in the project owner's contract specification or referenced standards.

3.4.5 References

CEC. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of Ownership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

—. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

DWR. 1979. " Bottle Rock Geothermal Power Plant Draft Environmental Impact Report. *Application No. 79-AFC-4.*"

USGS. 2023. Frequently Asked Questions. Why are there so many earthquakes in the Geysers area in Northern California? Website accessed 02/20/2023: https://www.usgs.gov/faqs/why-are-there-so-many-earthquakes-geysers-area-northern-california#faq.

3.5 Hazards and Hazardous Materials

This subsection includes an evaluation of the amended BRPP effects on human health and the environment from the storage and use of hazardous materials as well as compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts from the storage or use of hazardous materials, and no impacts would be greater than those previously analyzed in Order 79-AFC-4 and subsequent amendments. The proposed modification would be consistent with Order 79-AFC-4, and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

An evaluation of impacts from potentially hazardous waste materials are addressed in the "Waste Management," subsection.

3.5.1 Affected Environment

The amended BRPP affected environment for hazards and hazardous materials consists of the existing BRPP site as licensed under Order 79-AFC-4, the area of the proposed steam pipeline and condensate pipeline located immediately adjacent to the BRPP fence, and the area of the proposed groundwater supply wells and water supply pipelines. The existing BRPP is currently non-operational, but the existing facilities and storage and use of hazardous materials are covered in various plans, policies, and permit conditions that are designed to avoid or reduce impacts to human health and the environment from the storage and use of hazardous materials.

Existing Hazardous Materials Storage and Use

The main plant building contains offices, electrical rooms, a maintenance room, a computer room, a three-stage turbine, a condensate process equipment room, and an associated switchyard. The aboveground pipeline connects the plant to the three well fields and includes the main steam-header inlet pipe, steam-stacking unit (emergency steam bypass), and chemical storage area. Additional on-site structures include a wellfield office and laydown yard, the Stretford H_2S scavenging facility, an outdoor parts storage area, a standby generator and weather station building, a water-cooling condensing tower and pumping station, a hazardous waste storage and parts building, and two water supply well buildings. The open surface areas of the geothermal plant are primarily asphalt and graveled. The main access to the site is from High Valley Road.

Three diesel and one gasoline AST and two lube oil tanks are present on the site (Wood 2022). In addition, 22 ASTs associated with the geothermal process are located on site and include process water, sodium hypochlorite, hydrogen peroxide, sodium hydroxide, condensate, and potassium carbonate tanks. Various drums of lubricants and oils, *intermediate bulk containers* (IBCs; commonly called totes) containing various chemicals, and smaller quantities of chemicals were identified around the BRPP and associated buildings. All chemicals are stored on secondary spill containment pallets or in nonflammable cabinets. No staining of soil was observed near the ASTs and chemical storage areas.

Four transformers occur on the BRPP site (Wood 2022). Three of the transformers are owned by BRPP and were installed between 1983 and 1984, based on the attached name plates. One transformer is owned by PG&E and appears to have been recently installed. The transformers are located on concrete pads. A *de minimis* stain was observed on the concrete pad below the transformer located in the switchyard. No other concrete or soil stains were observed near the transformers.

A review of the federal, state, tribal, and proprietary records summary provided by EDR (a third-party provider of environmental and land use records) indicates the site was listed in four databases (Wood 2022):

- Lists of state and tribal registered storage tanks
- List of hazardous waste/ contaminated sites
- Local list of registered storage tanks
- Certified Unified Program Agency Database (CUPA)

An off-site listing called "Intermountain High School" was identified within 0.5 and 1 mile of the site and was listed in the Department of Toxic Substances Controls (DTSC) – Site Mitigation Brownfields Reuse Program (SMBRP). No other federal, state, or tribal findings were identified within the respective American Society for Testing Materials (ASTM) standard search radii. In addition, no orphan sites near the target property were reported. Results of the Phase I Environmental Site Assessment (ESA) concluded that the sites listed in the databases would not pose an environmental threat to the site (Wood 2022). No *recognized environmental conditions* (RECs) were observed on site during the completion of the Phase I ESA in 2022 (Wood 2022). There are no documented hazardous materials release sites in the vicinity of the project area based on a review of the State Cortese List (CAL 2023) and the Phase I ESA (Wood 2022).

Hazardous Materials Management

The BRPP's Hazardous Materials Business Plan (HMBP) contains detailed information about the storage of hazardous materials at the site, including a hazardous materials inventory, related emergency response/contingency plans and an employee training plan (Bottle Rock Power 2012). The current Spill Prevention, Control, and Countermeasures (SPCC) Plan establishes the procedures to prevent discharge of oil and hazardous substances and defines activities required to mitigate discharges should they occur (ES Engineering 2017).

Fire Risk

The BRPP is located in a *very high fire hazard severity zone* (VHFHSZ). There is an existing fire protection system in place at the BRPP, including fire hydrants and pumps designed to protect the BRPP from fires. Fire hazard is also reduced with the maintenance of defensible space surrounding the site. The BRPP is responsible for maintaining defensible space in compliance with the Wildland Fire Operating Plan developed by the Geysers steam field operators, including The Geysers Power Company, LLC, Northern California Power Agency, Ormat, and AltaRock, and the Sonoma-Lake Napa Unit of CalFire (Geysers Power Company, AltaRock, NCPA, Ormat 2022).

Naturally Occurring Asbestos

The project area is located in a known geothermal resource area that has naturally occurring hazardous substances (e.g., asbestos) found in the soils, groundwater, and geothermal steam. NOA occurs in serpentine soils in proximity to the BRPP site. The presence of NOA was previously documented and evaluated on the BRPP parcels including surrounding area.

3.5.2 Environmental Analysis

Hazardous Materials Transport and Use

No substantial impacts to the environment related to hazardous materials have historically occurred as a result of licensed BRPP operations, and none would occur with the amended BRPP. Although some hazardous substance releases, such as spills of condensate, have occurred in the past, BRPP has taken corrective action to comply with permit conditions. Small spills and releases that have occurred did not exceed hazardous cleanup levels. The amended BRPP would maintain the previously constructed impermeable spill-collection containment system to preclude discharges of hazardous waste and materials from the power plant pad.

The amended BRPP would use and store hazardous materials during project construction, operation, and decommissioning in a manner similar to the licensed BRPP. The types and volume of hazardous materials used and stored on site would be similar to or less than those analyzed in Order 79-AFC-4 and subsequent amendments due to the smaller geothermal generation capacity of the amended BRPP and associated reduction in demand and use of hazardous materials. Hazardous materials would be stored in the existing hazardous material storage room between the generator building and the BRPP or in the chemical storage area within the Stretford control building. The hazardous materials storage room has secondary containment and complies with all standards for storage of hazardous materials. Two 500-gallon ASTs and one 1,000-gallon AST located at the BRPP would also continue to be used for storage of diesel fuel for operation of the emergency generator. All ASTs would continue to be monitored to ensure that there are no leaks of diesel fuel. ASTs would continue to be anchored to prevent overturning or sliding during seismic events.

The transportation of hazardous materials during project construction, operation, and decommissioning of the proposed project would comply with Code of Federal Regulations Title 29, part 1910 (Occupational and Safety Health Standards), the Resource Conservation and Recovery Act, U.S. Department of Transportation regulations, the California Vehicle Code (CVC) sections 34500 and 31303 through 31309, and all other applicable codes and regulations. The transport of hazardous materials during construction, operation, and decommissioning of the amended BRPP would not result in a greater impact than those analyzed in Order 79-AFC-4 and subsequent amendments.

Fire Hazard

The existing fire protecting system, including the fire water system, would be re-used to the extent possible, and any modifications would meet current fire code standards. A sprinkler system would be installed for any proposed elements that contain more than 500 gallons of oil.

All proposed facilities would be constructed with metal to reduce fire risk. Operation and maintenance of the proposed facilities includes routine inspections and maintenance of the facility to ensure proper operating conditions and maintenance of defensible space around the facility in compliance with California Department of Forestry and Fire Protection requirements and annual updates to the Geysers Wildland Fire Operating Plan.

Conclusion

Safety of the public and on-site workers as well as protection of the environment are implemented and documented through existing BRPP policies and procedures, as described in the Hazardous Materials Business Plan, including the SPCC, emergency response site contingency plans, incident reporting requirements, final closure plan, and annual compliance plans. Compliance with all applicable LORS relating to potential hazards in the project area would ensure the protection of public health, worker safety, and the environment. The storage and use of hazardous materials associated with decommissioning, construction, operations, and final closure at the amended BRPP site are in accordance with COCs and all applicable LORS. No impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

3.5.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to storage and use of hazardous materials. Defensible space around the facility would continue to be maintained in compliance with California Department of Forestry and Fire Protection (CalFIRE) requirements. The amended BRPP would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.5.4 Conditions of Certification

The amended BRPP would not result in changes to human health and the environment from the storage and use of hazardous materials or increase risk associated with potential hazards from hazardous spills, fire, or other events.

Applicable Conditions

The following COCs apply to hazards and hazardous materials for the amended BRPP

- COM-12
- COM-13
- COM-15
- COC 6-2
- COC 6-3
- COC 6-6
- COC 12-4
- COC 12-6
- COC 12-7
- COC 12-8
- COC 12-9

- COC 12-10
- COC 13-2
- 13-6

Amended Conditions

COC 11-2 shall be modified to incorporate the spent surfactant from the catalyst reactor (if used). BRPP amendment.

> 11-2. The only Stretford process waste is sulfur cake with some entrained process chemicals. The project owner shall ensure that the sulfur cake is properly stored in an appropriate container and removed periodically to be sold or disposed at a site approved for such wastes. Spent surfactant from the catalyst reactors shall be removed and disposed at a site approved for such wastes.

Verification: The project owner shall submit final design plans and "As-Built" drawings to the Lake County CBO incorporating these design features. In addition, the project owner shall each month submit completed hazardous waste manifests to the Department of Toxic Substances Control under the California Environmental Protection Agency in compliance with Section 66262.20 of Title 22, CCR

3.5.5 References

Bottle Rock Power LLC. 2012. Hazardous Materials Business Plan.

CAL. 2023. California EnviroStor. Department of Toxic Substances Control. Site/Facility Search Tool, accessed February, 6, 2023: https://www.envirostor.dtsc.ca.gov/public/map/?global_id=17100002.

CEC. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." Docket Number 79-AFC-4. October.

—. 2006. "Order Approving the Change of Ownership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

—. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." Docket Number: 79-AFC-04C. December.

ES Engineering. 2017, October. Spill Prevention, Control, and Countermeasures Plan, Bottle Rock Power Plant and Steam Field, Cobb, California. Prepared for Bottle Rock Power, LLC.

Geysers Power Company, AltaRock, NCPA, Ormat. 2022. Wildland Fire Operating Plan.

Wood. 2022. Phase I Environmental Site Assessment for the Bottle Rock Geothermal Facility. Prepared for Open Mountain Energy, Project No. 2281400507.

3.6 Land Use

This subsection includes an evaluation of the amended BRPP's effects on land use and compliance with applicable LORS and COCs. The amended BRPP would not create any land use related impacts. The project modification would be consistent with Order 79-AFC-4 and subsequent amendments and will comply would all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.6.1 Affected Environment

The affected environment for land use includes the existing BRPP site, the area of the proposed steam pipeline and condensate pipeline located immediately adjacent to the BRPP fence, and the area of the proposed groundwater supply wells and water supply pipelines. The Lake County General Plan land use designation for the BRPP site (Parcel 013-002-04) is designated as *rural lands* (Lake County 2008). Typical uses permitted in the rural lands designation include, but are not limited to, animal raising, crop production, single-family residences, game preserves, and fisheries. Other typical uses permitted conditionally include, but are not limited to, recreational facilities, agricultural processing operations, geothermal power production, mining, and airfields. Residences in very low-density settings, some of which are occupied seasonally, are located near the project area. The nearest residence is approximately 1,500 feet northeast of the BRPP.

3.6.2 Environmental Analysis

The amended BRPP's impacts on land use would remain unchanged from the licensed BRPP. Designated land use within the amended BRPP site would not change, and the amended BRPP would be consistent within the Lake County General Plan land use designation and zoning codes that currently apply to the licensed BRPP (Lake County 2008). Land use impacts from the BRPP and the BRPP's compatibility with nearby existing and planned land uses or other designations in the General Plan were considered insignificant (Lake County 1979). The amended BRPP involves geothermal power production and would be consistent with the existing geothermal use of the site. The geothermal wells, pipelines, and access roads would continue to be maintained in compliance with the existing Lake County use permits. A Lake County use permit is anticipated to be required for the groundwater supply wells and pipelines. The amended BRPP would not result in land use impacts.

3.6.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP complies with all applicable LORS related to land use and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.6.4 Conditions of Certification

No COCs apply to land use. Because the modification would not impact land use, no COCs are required for land use.

3.6.5 References

CEC. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

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3.7 Noise and Vibration

This subsection includes an evaluation of the amended BRPP effects on noise and vibration and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts from noise and vibration and no impacts to noise and vibration would be greater than those previously analyzed in Order 79-AFC-4. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.7.1 Affected Environment

The affected environment for noise includes the existing BRPP site and areas where noise generated from the amended BRPP would be audible to sensitive receptors. All facilities within the BRPP site are as described and previously evaluated in Order 79-AFC-4 and the Bottle Rock Power Steam Project EIR (Lake County 1979).

Prior BRPP Operational Noise

Previous noise sources at the BRPP include the operation of facilities that were licensed by the CEC under Order 79-AFC-4. Major noise sources during prior BRPP operations included the water cooling towers, steam stacking system and rock muffler, a small facility located directly south of the office and communications building, and the Stretford system. Noise levels measured from these sources when the BRPP was operational in 2009 ranged from 75 to 81 decibels (dB) (Illingworth & Rodkin 2009).

In 2009, Lake County received a noise complaint from a neighboring residence, and a formal noise survey was conducted at the BRPP. This noise survey indicated that noise levels at the nearest residence were typically in the range of 45 dB and noise at the property line was in the range of 65 dB and out of compliance with COC 16-1 (Bottlerock Power, Rives and McKinsey 2012). The project owner identified two oxidizer blowers located on the Stretford system as the likely source of the off-site noise and the high-pitch tones (Bottlerock Power, Rives and McKinsey 2012). In 2010 and 2011, there were two more complaints regarding the noise emanating from the BRPP (Bottlerock Power, Rives and McKinsey 2012). In November 2011, a second noise survey was performed, and it was determined that the new blowers on the Stretford system produced significantly less ambient noise compared to the old blowers and were measured at typically around 40 dB at the nearest residence and 60 dB at the nearest fence line (Bottlerock Power, Rives and McKinsey 2012). Although the BRPP was in compliance with the 45 dB *equivalent continuous sound level* (L_{eq}) threshold at the nearest residence, the noise levels at the BRPP property line (typically around 60 dB) were above the limit allowed in Noise COC 16-1 (Bottlerock Power, Rives and McKinsey 2012). Lake County indicated that if a project exceeds the County's noise standards but the local property owners are not disturbed by it, the County does not generally take any action (Bottlerock Power, Rives and McKinsey 2012). Since there were no further complaints from the neighboring residence, the County considered the case resolved and did not require any further noise abatement at the BRPP (Bottlerock Power,

Rives and McKinsey 2012). A sound wall was constructed directly north of the Stretford system, to reduce operational noise.

Noise-sensitive Receptors

Noise-sensitive receptors in the Lake County Noise Element are defined to include residential areas, hospitals, convalescent homes and facilities, schools, and other similar land uses. The nearest residential structure to the BRPP is approximately 1,500 feet northeast of the fence line, and the nearest property line is approximately 200 feet east of the BRPP site fence line. No new noise-sensitive receptors have established in proximity to the BRPP site since the time of the initial BRPP AFC and Decision (Order 79-AFC-4). No other noise-sensitive receptors such as hospitals, schools, convalescent homes, and other similar land uses are within 1 mile of the BRPP.

Noise Measurement Surveys 2022

Continuous long-term (72-hour) noise measurements were conducted between November 15, 2022, and November 17, 2022, to evaluate the ambient noise environment at the BRPP. Additional short-term measurements were conducted at the BRPP well pad location and in the vicinity of the nearest residence to the northeast of the BRPP. Table 3.7-1 summarizes the locations and results of the noise measurements. Figure 3.7-1 shows the noise-measurement locations. The BRPP was non-operational when noise measurements were conducted. The main sources of existing noise at the BRPP are the existing transformer and backup generator, airplanes, birds, and wind (RCH Group, 2024). Noise measurement data is provided in Appendix D.

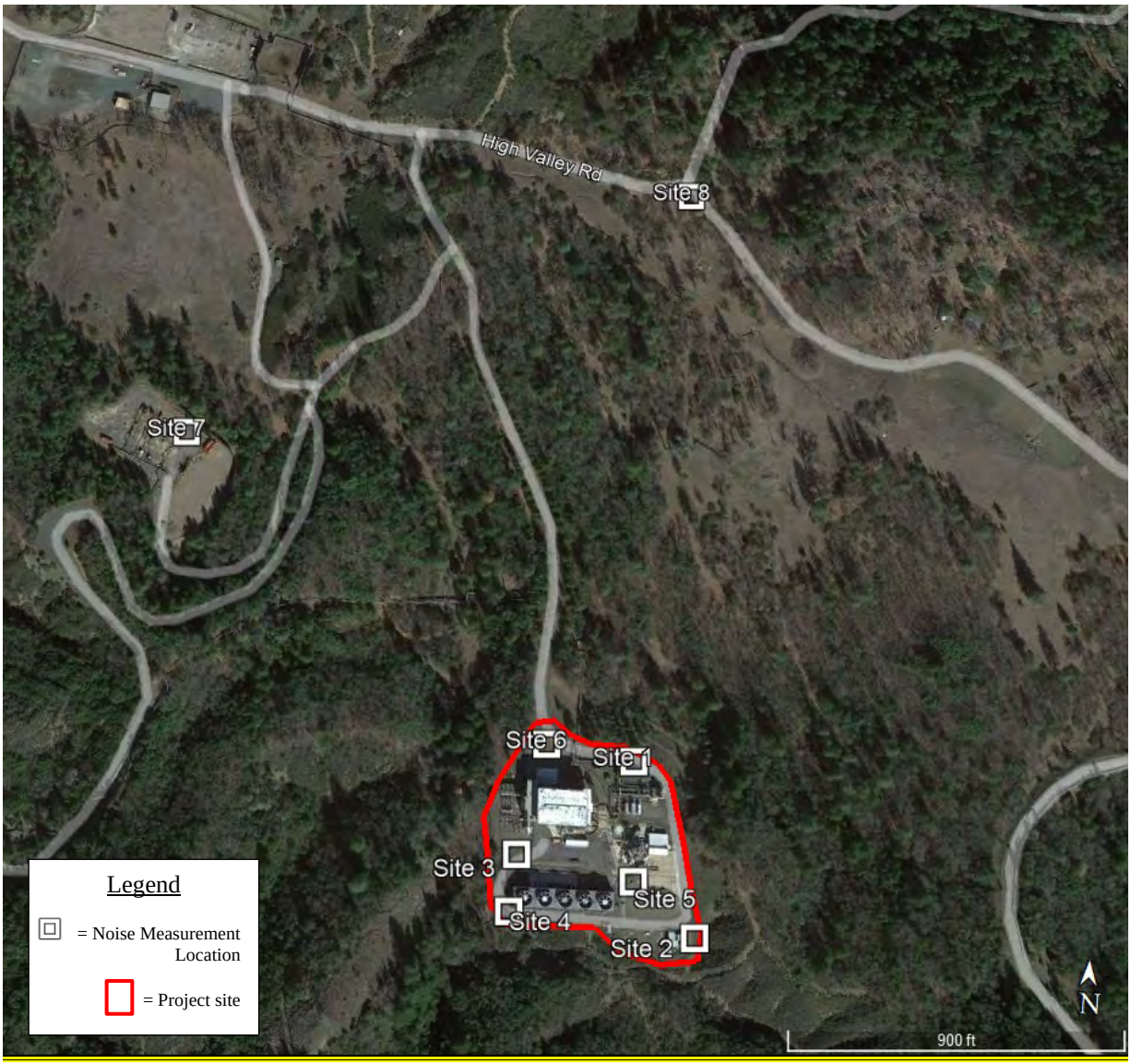
Table 3.7-1 Existing Noise Levels

Location	Time period	Noise levels (decibels)	Noise sources
Site 1: Northeast area of project site, on a chain-link fence	Tuesday November 15, 12:00 a.m. through November 17, 11:59 p.m. 72-hour measurement	Hourly L_{eq} ranged from 40 to 45 dB CNELs: 47 dB, 46 dB, 47 dB *	Unattended noise measurements do not identify noise sources.
Site 1: Northeast area of project site, on a chain-link fence	Monday, November 14, 2022, 10:34 a.m. to 10:44 a.m.	5-minute L_{eq}: 34 dB, 37 dB	Very quiet area. Wind: 40 dB
Site 2: Southeast area of project site, on a chain-link fence	Tuesday, November 15, 12:00 a.m. through Thursday November 17, 11:59 p.m. 72-hour measurement	Hourly L_{eq} ranged from 43 to 47 dB CNELs: 49 dB, 49 dB, 49 dB	Unattended noise measurements do not identify noise sources.

Location	Time period	Noise levels (decibels)	Noise sources
Site 2: Southeast area of project site, on a chain-link fence	Monday, November 14, 10:07 a.m. to 10:17 a.m.	5-minute L_{eq}: 41 dB, 40 dB	Constant buzzing from backup generator facility: 40 dB.
Site 3: East area of project site, approximately 50 feet south of existing electrical transformer	Monday, November 14, 2022, 9:33 a.m. to 9:43 a.m.	5-minute L_{eq}: 50 dB, 50 dB	Constant buzzing from the transformer: 50 dB; wind: 49 dB
Site 4: Southwest area of project site, directly south of cooling towers	Monday, November 14, 2022, 9:45 a.m. to 10:05 a.m.	5-minute L_{eq}: 37 dB, 36 dB, 36 dB, 43 dB	Very quiet area. Birds: 42 dB.
Site 5: East of cooling tower	Monday, November 14, 10:18 a.m. to 10:28 a.m.	5-minute L_{eq}: 38 dB, 37 dB	Very quiet area. Wind: 40 dB.
Site 6: Directly south of main entrance	Monday, November 14, 10:47 a.m. to 10:57 a.m.	5-minute L_{eq}: 40 dB, 44 dB	Maintenance manager truck passby: 55 dB.
Site 7: Approximate center of the Coleman Well Pad	Monday, November 14, 2022 11:03 a.m. to 11:13 a.m.	5-minute L_{eq}: 37 dB, 39 dB	Very quiet area. Chain rattling on nearby equipment: 38 dB.
Site 8: Intersection of High Valley Road and private residential access road	Monday, November 14, 2022 11:28 a.m. to 11:38 a.m.	5-minute L_{eq}: 43 dB, 33 dB	Very quiet area: Wind 45 dB.

Source: (RCH Group, 2024)

Figure 3.7-1 Noise Measurement Locations at BRPP



Source: (RCH Group 2022); (GoogleEarth 2023)

3.7.2 Environmental Analysis

Noise and Vibration Thresholds

Per Lake County Code section 41.11(e)(5), noise from construction sites is exempt from Lake County noise standards from the hours of 7:00 a.m. to 7:00 p.m. Construction noise would be considered a significant impact of the amended BRPP should construction occur outside the hours of 7:00 a.m. to 7:00 p.m.

Per Lake County Code chapter 21, article 41, sections 21 through 41 and 41.11, operational noise impacts would be significant if the amended BRPP would generate noise levels at the nearest property line that would exceed the following 1-hour average exterior noise levels: 55 dB from 7:00 a.m. to 10:00 p.m. or 45 dB from 10:00 p.m. to 7:00 a.m. Because operation of the new equipment would be constant at the amended BRPP site, the applicable standard exterior noise standard would be 45dB L_{eq}[11] for any 1 hour at the nearest residential property line.

For vibration, the Federal Transit Administration (FTA) considers a *peak particle velocity* (ppv) threshold of 0.5 inch per second or greater to be potentially significant because it can cause architectural damage and minor structural damage. Vibration impacts from the amended BRPP would be significant should construction or operation vibration exceed the structural damage threshold of 0.5 ppv for structures on adjacent properties.

Construction Noise Impacts

Construction activities would result in a temporary increase in ambient noise levels in the vicinity of the BRPP. Construction activities would require the use of numerous pieces of noise-generating equipment, such as excavating machinery (e.g., excavators, loaders) and other construction equipment (e.g., scrapers, dozers, compactors, trucks). The noise levels generated by construction equipment would vary greatly depending upon factors such as the type and specific model of the equipment, the operation being performed, the condition of the equipment, and the prevailing wind direction. The maximum noise levels for various types of construction equipment that would be used during project construction are provided in Table 3.7-2. Maximum noise levels generated by construction equipment used for the project would range from 74 to 85 dB L_{max} at a distance of 50 feet (see Table 3.7-2). Table 3.7-3 provides typical construction activity noise levels (in dB L_{eq}) at 50 feet for various phases of construction.

Per Lake County Code Section 41.11 (e)(5), noise from construction sites is exempt from Lake County noise standards from the hours of 7:00 a.m. to 7:00 p.m. Construction activities would only occur during the hours of 7:00 a.m. to 7:00 p.m. and would not conflict with the exempt hours of construction outlined in Lake County Code section 41.11(e)(5). The types of construction equipment used for construction of the amended BRPP would be similar to the

[11] This is the maximum 1-hour average noise level. Because equipment during operations would be operating constantly, this would equate to an L_{max} level at the nearest residential property line.

types of construction equipment that were previously evaluated for construction of the licensed BRPP and prior amendments, with the exception that the construction activities would not involve any grading and would be less intensive and of shorter duration than the initial construction activities. Therefore, project construction noise would be consistent with local noise standards and no impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

Table 3.7-2 Typical Noise Levels from Construction Equipment

Construction equipment	Noise level (dB L_{max} at 50 feet)
Air compressor	78
Backhoe	78
Drill rig	85
Dozer	82
Front end loader	79
Water truck	80
Crane	81
Manlift	75
Welder/torch	74
Pneumatic tools	85
Dump truck	76
Concrete mixer truck	79

NOTES:
dB L_{max} = the highest sound level measured during a single noise event

Source: (Federal Highway Administration (FHWA) 2006)

Table 3.7-3 Typical Construction Activities Noise Level

Construction phase	Noise Level (dB $_{Leq}$ at 50 feet)
Ground clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89

NOTES:
Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

Source: (U.S. Environmental Protection Agency 1973)

Operational Noise Impacts

Operational Noise Sources

Since the Stretford facility and the water cooling towers are licensed by the CEC under 79-AFC-04 as part of the overall BRPP, these components are not considered new sources of noise during proposed operations. Thus, the operational noise analysis only considers new components, such as the ORC units. Because operations from the new equipment would be constant at the site, the applicable standard exterior noise standard would be 45dB, Leq[12] for any one (1) hour at the nearest residential property line. The amended BRPP includes installation of the following equipment, which would produce noise during operation:

- **ORC units.** Two new units capable of producing a combined total of 7.5 MW net of geothermal power are proposed. The ORC units would be installed within an graveled portion of the site currently used for equipment storage. Each ORC unit would be approximately 40 feet long by 60 feet wide and up to 24.6 feet in height. The expander on the ORC units would be the primary source of noise. Noise enclosures would be placed either around both ORC units or around the expanders on each ORC unit. The model assumes that each ORC unit would produce a constant noise level of 86 dB, Leq at 50 feet[13]. The enclosure walls on the

[12] This is the maximum 1-hour average noise level. Because equipment during operations would be operating constantly, this would equate to an Lmax level at the nearest residential property line.
[13] This is the noise level produced from the binary power plant units observed at the Star Peak Geothermal site. The binary power plants at the Star Peak Geothermal site are designed for a 12.5 MW system and did not have any noise reduction features that were installed to the system (e.g., sound blankets or sound walls) when RCH recorded ambient measurements. Therefore, the representative noise level of 86 dB, Leq at 50 feet is a conservative assumption (RCH Group, 2024).

north, south, and west would have soundproof rating of 39 *outdoor/indoor transmission class* (OITC) and a roof with a soundproof rating of 24 OITC. No walls are proposed on the east due to the absence of sensitive receptors to the east.

- **Relocated vent stack.** The vent stack would be used during shutdowns and would not produce noise during routine operation. The vent stack would be relocated to the southern portion of the BRPP site and would be further from sensitive receptors. The vent stack would include modern technology for noise reduction during venting of steam.

The existing Stretford H_2S scavenging system would be refurbished for the amended BRPP. The refurbished Stretford H_2S scavenging system would generate noise levels similar to the noise levels produced by the Stretford equipment during operation of the BRPP after installation of the new, less noisy blowers. The sound wall north of the Stretford H_2S scavenging system would be restored and would continue to be used during operation of the facility. Because noise from the Stretford H_2S scavenging system was previously analyzed in Order 79-AFC-4, no additional analysis of the Stretford equipment is included in the PTA. The catalyst reactor would not involve noise-producing equipment and is therefore not included in the noise modeling.

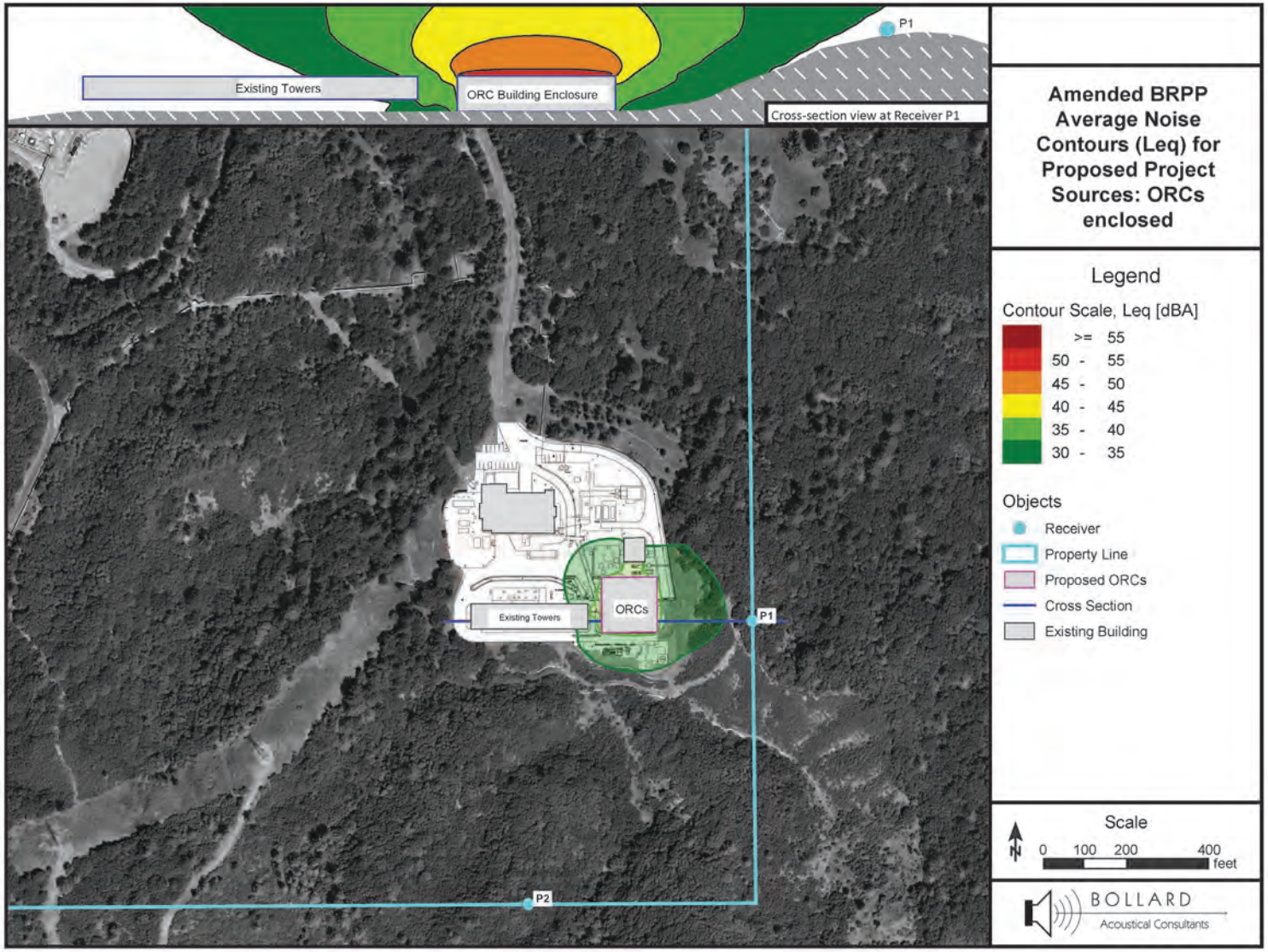
Noise Modeling Approach

SoundPLAN Version 8.2 was used to model the noise generation from the proposed ORC units. The model assumes that each ORC unit would produce a noise level of 86 dB L_{eq} at a distance of 50 feet. This is the noise level produced from similar ORC units observed at the Star Peak Geothermal site (RCH Group, 2024). The ORC units at the Star Peak Geothermal site are designed for a 12.5-MW system and did not have any noise reduction features (e.g., sound blankets, sound walls) that were installed to the system when RCH recorded ambient measurements. Therefore, the representative noise level of 86 dB L_{eq} at 50 feet is a conservative assumption, and the actual noise levels at the amended BRPP ORC units would be less. The model assumes that each ORC unit would be located within a sound enclosure with walls that have an OITC soundproof rating of 39 and a roof with an OITC soundproof rating of 24 (RCH Group, 2024).

Operational Noise Impacts

Figure 3.7-2 shows the predicted noise level contours from operations of the ORC units in terms of the average noise descriptor (dB L_{eq}).

Figure 3.7-2 Modeled Noise Contours for Amended BRPP



The noise modeling indicates that the noise levels at the nearest single-point receiver at the nearest property line (P-1) to the east would be approximately 28.2 dB L_{eq} and would be well below the Lake County exterior noise standard of 45 dB, Leq[14]. Noise levels at the nearest residence would be well below 45 dB L_{eq}.

The amended BRPP would comply with COC Noise 16-1, which requires noise levels to not exceed 45 dB at any point beyond the property line, and COC Noise 16-2, which requires the project owner to prepare a noise survey and report within 90 days after the project reaches its rated power generation capacity. If operational noise were observed to exceed the thresholds in COC 16-1 during the survey, additional measures such as modifications to equipment to reduce noise levels or installation of a sound barrier along the eastern property line would be implemented to meet the noise standard. Because the amended BRPP facility would produce less noise than the previously approved BRPP facility, and because the amended BRPP would comply with all applicable COCs and LORS, impacts from noise generation would not exceed those described in Order 79-AFC-4 and subsequent amendments.

Vibration Impacts

Construction activities have the potential to result in varying degrees of temporary ground vibration, depending on the specific construction equipment used and operations involved. In most cases, vibration induced by typical construction equipment does not result in adverse effects on people or structures (Caltrans, 2013). Vibrational effects from typical construction activities are only a concern within 25 feet of existing structures (Caltrans 2002). There are no off-site structures within 25 feet of the amended BRPP construction areas. The nearest residential structure is approximately 1,500 feet northeast of the fence line of the BRPP site. At this distance, vibration would be well below the 0.5-ppv threshold. Operation of the project would generate minimal vibration that would not be perceptible to anyone outside the project site. No vibration impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

3.7.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to noise and vibration and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

[14] The SoundPLAN modeling assumed the ORC units would be fully enclosed. The final site design could include an open portion on the west side of the ORC enclosure (i.e., 3 walls and 1 roof). An ORC enclosure that is open on the western side could result in noise levels slightly higher than the modeled noise level, but would not exceed the County noise standard of 45 dB L_{eq}

3.7.4 Conditions of Certification

The conditions listed below apply to the PTA. The amended BRPP would not result in new or more significant impacts from generation of noise or vibration, and no additional COCs are needed to address the amended BRPP's noise and vibration impacts.

Applicable Conditions

The following COCs would apply to noise for the amended BRPP:

- COC 16-3

Amended Conditions

COCs 16-1 and 16-2 require minor clarifications, as shown in ~~strikethrough~~ and underline below, to improve implementation of the COCs during the amended BRPP implementation.

16-1. Project owner shall comply with Lake County's noise ordinance, which is 55 dBA L_d[15] and 45 dBA L_n[16] at any point beyond the property line of the source. In the event the Lake County or the project owner receives public complaints of any noise, project owner and Lake County (if requested by the complainant) agree to promptly conduct and investigation to determine the extent of the problem. Project owner shall take reasonable measures to resolve the complaints.

Protocol: Within 10 days of a request by Lake County or the CEC CPM, project owner shall conduct noise surveys at the sensitive receptors registering complaints and at the facility property line nearest the complaining receptors. Surveys shall be conducted, when possible, under circumstances similar to those when the complaints were perceived. The survey should be reported in terms of hourly L_{eq} and hourly L_x[17]~~z~~ at levels x=10, 50, and 90.

16-2. Within 90 days after the plant reaches its rated power generation capacity and construction is complete, the project owner shall conduct a noise survey at 500 feet from the generating station or at a point acceptable to ~~DWR,~~ CEC CPM~~,~~ and Lake County.

[15] L_d (or L_{day}) is the A-weighted L_{eq} over the 12-hour day period (07:00–19:00).
[16] L_n (or L_{night}) is the A-weighted, L_{eq} over the 8-hour day period (23:00–07:00).
[17] L_x is the percentile noise level, where *x* is a percentage of time between 0.01 percent and 99.9 percent, calculated by statistical analysis, and usually includes a descriptor. The most common L_x values are the L_{10} and L_{90} level, widely used in the assessment of environmental noise levels and regulations.

The survey will cover a 24 hour period with results reported in terms of hourly L_x (x= 10, 50, and 90), hourly L_{eq}[18] ~~Z~~ and Ldn[19] levels.

The project owner or operator shall prepare a report of the survey that will be used to determine the plant's conformance with county standards. In the event that county standards are being exceeded, the report shall also contain a mitigation plan and a schedule to correct the noncompliance. No additional noise surveys of off-site operational noise are required unless the public registers complaints or the noise from the project is suspected of increasing due to a change in the operation of the facility.

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[18] L_{eq} (equivalent sound level) is the value of a constant sound level for a given measurement period that has sound energy equal to the time-varying sound energy of the same measurement period.
[19] L_{dn} is the day–night average sound level that is equal to the 24-hour A-weighted equivalent sound level with a 10-decibel penalty applied to night, defined as between 10:00 p.m. and 7:00 a.m.

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3.8 Paleontological Resources

This subsection includes an evaluation of the amended BRPP's effects on paleontological resources and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts on paleontological resources, and no impacts would be greater than those previously analyzed in Order 79-AFC-4. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2013; CEC 2006).

3.8.1 Affected Environment

The affected environment includes the developed BRPP site, the area of the proposed steam pipeline and condensate pipeline located immediately adjacent to the BRPP fence, and the area of the proposed groundwater supply wells and water supply pipelines. All areas of ground disturbance were previously evaluated in 79-AFC-4 and Bottle Rock Power Steam Project EIR (Lake County 1979). Two paleontological studies were previously conducted at the BRPP site and vicinity. The previous paleontological investigations identified areas containing chert and areas with excavation greater than 4 meters (13.2 feet) within the Franciscan mélange as geologic units that could produce fossils. The BRPP site and adjacent steam and condensate pipeline alignment are located in the Franciscan formation and no paleontological resources were previously identified in the area (Archaeological Services, Inc. 2010).

3.8.2 Environmental Analysis

The proposed modifications to the BRPP would occur within the developed BRRP site and immediately adjacent to the eastern side of the BRPP fence. In addition, the groundwater supply wells and pipelines would be located near the Franciscan well pad and existing access roads. The amended BRPP would construct two ORC units, new segments of steam pipeline and vent stack, new condensate and steam pipelines, and electrical lines, as well as up to four new groundwater wells and water supply pipelines. Construction would require excavation of approximately 500 cubic yards of material for installation of subsurface electrical lines and construction of the ORC pad and placement of approximately 750 cubic yards of concrete for new foundations and concrete pads. The area of new foundations and excavation would be contained within previously graded and developed areas within and immediately adjacent to the BRPP site, and there is very low potential to disturb paleontological resources given the history of grading at the site. The amended BRPP is within the Franciscan Formation and no chert has been mapped for the area. The depth of excavation would be approximately 5 feet if spread footings were used and would not extend to an excavation depth of 13.2 feet; therefore, the likelihood of fossils being impacted during construction is very low within the BRPP site. The groundwater supply wells would be constructed to a similar depth as the existing groundwater supply wells and would be located within the same geologic units as the existing wells. The water supply pipelines would be approximately 3 feet below ground. Given the limited amount of earthwork and ground disturbance for the amended BRPP and the absence of

known paleontological resources in the area, no impacts to paleontological resources beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

3.8.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to paleontological resources and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.8.4 Conditions of Certification

The amended BRPP would not result in changes to previously identified paleontological resource impacts. No COCs apply to paleontological resources, and no COCs for paleontological resources are required for the amended BRPP.

3.8.5 References

Archaeological Services, Inc. 2010. "Bottle Rock Power Stream Project Cultural Resources Investigation Near Glenbrook, Lake County, California."

CEC. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

—. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of Ownership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

Lake County. 2010. "Bottle Rock Power Steam Project Draft Environmental Impact Report/ Environmental Assessment." September 16.

3.9 Public Health

This subsection includes an evaluation of the amended BRPP effects on public health and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts on public health, and no impacts would be greater than those previously analyzed in Order 79-AFC-4 and subsequent amendments. The project modification would be consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980, 2006, 2013).

3.9.1 Affected Environment

Sensitive Receptors

A *sensitive receptor* is defined as a facility or land use that includes members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. The CARB has identified the following groups of individuals as those most likely to be affected by air pollution: persons over 65, children under 14, athletes, and persons with cardiovascular or chronic respiratory diseases such as asthma, emphysema, and bronchitis. The nearest sensitive receptor is a resident located approximately 1,500 feet northeast of the power plant. The location of the nearest sensitive receptor has not changed since the BRPP was approved in 1980, and the land uses surrounding the BRPP site are the same as those considered in the Order 79-AFC-4 and subsequent amendments.

BRPP Resource Composition

The composition of the geothermal resource at the amended BRPP would be very similar to the resource composition at the time of prior BRPP operation. The NCG composition and flow rate for the amended BRPP are presented in Table 3.1-3, in Subsection 3.1 Air Quality. The BRPP geothermal resource also contains other minerals and potential pollutants, as presented in Table 3.9-1.

Table 3.9-1 BRPP Geothermal Resource Concentration

Constituent	Concentration in steam	Analysis date	Location
Benzene	1.15 mg/kg	Average 2009–2013	Main steam
Radon-222	2.7 pCi/kg	Average 2009–2013	Main steam
Arsenic	0.0163 mg/L	Average 2009–2013	Main steam
Mercury	0.0047 mg/L	Average 2009–2013	Main steam
Boron	5.97 mg/L	Average 2009–2013	Main steam
Silica	0.0088 mg/L	Average 2009-2013	Main steam
Fluoride	205 ppb	Average 1980	Main Steam

Notes:

[b] mg/kg = milligram/kilogram, ppm = parts per million

[c] pCi/kg = picocurie/kilogram

[d] mg/L = milligram/liter

[e] ppb= parts per billion

Source: (AltaRock 2015)

3.9.2 Environmental Analysis

Construction

As discussed in Section 2.0 Project Description, the amended BRPP involves installation of two new ORC units, new segments of steam and condensate pipelines, and electrical lines. During construction, localized emissions of criteria air pollutants would be generated from construction vehicles and equipment powered by internal combustion engines as well as earth moving activities. Operation of diesel-powered equipment would generate diesel exhaust emission, a TAC. TAC emissions associated with construction of the amended BRPP are presented in Subsection 3.1 Air Quality, Table 3.1-1. As discussed in Subsection 3.1, Air Quality, the emissions from construction of the BRPP would be below the significance thresholds and would not exceed those analyzed in Order 79-AFC-4. The amended BRPP facilities would be located on the disturbed BRPP site and would not require grading. The level of construction activity would be much less than the initial BRPP site development and construction activity.

Operation and Maintenance

The amended BRPP would generate 7.5 MW of geothermal power, and the steam production would constitute approximately 13 percent of the approved 55-MW facility. Mercury, arsenic, silica, boron, benzene, ammonia, and radon-222 would be emitted with the NCGs at the Stretford system during operation of the amended BRPP. A mercury scrubber was added to the Stretford system during a prior BRPP amendment in 2006 (CEC 2006). The mercury scrubber on the Stretford system would be maintained for the new amended BRPP use. In addition, a mercury scrubber has been included in the design of the catalyst reactor so that mercury

removal would be included when the catalyst reactor is operating (e.g., during Stretford system maintenance).

Vanadium is used in the Stretford H_2S scavenging system and would be present in the sulfur produced from the amended BRPP at the same levels as operation of the licensed BRPP. As discussed in Subsection 2.4 of the Project Description, approximately 12 percent of the sulfur byproduct produced from the Stretford system has historically produced sulfur materials containing vanadium in excess of 24 milligrams per liter (mg/L), which would be processed as hazardous waste and sent to a facility that is licensed to accept hazardous waste in compliance with LORS.

The amended BRPP consists of a binary power plant, which would return the majority of the geothermal resource to the geothermal reservoir as condensate rather than evaporating the resource through a dry steam process. The condensate would be collected during the power production process and sent to the Coleman Well Pad for reinjection via a new condensate pipeline. The processed condensate would not be exposed to the air and would not be a source of emissions. Because the condensate would not be exposed to the air, the amended BRPP would avoid the existing BRPP process emissions impacts from the condensate in the cooling tower basin.

Because the total volume of geothermal resource/steam that would be processed would be approximately 13 percent of the permitted capacity and the project would use equipment that performs with the same or better efficiency in H_2S and mercury removal, total emissions generated from operation of the amended BRPP would be substantially less than those analyzed in Order 79-AFC-4 and subsequent amendments (see also Subsection 3.1 Air Quality). The pollutant concentrations at any sensitive receptor would be less than those previously considered in Order 79-AFC-4 and subsequent amendments because the total emissions would be substantially less than permitted while the point of emissions would be at the same distance from the nearest sensitive receptor. Therefore, potential public health impacts during operation of the amended BRPP would be in accordance with COCs and all applicable LORS. No impacts to public health beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

3.9.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP complies with all applicable LORS related to public health and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.9.4 Conditions of Certification

The amended BRPP would not result in any new or more severe public health impacts, and no additional COCs are needed to address public health impacts of the amended BRPP.

Applicable Conditions

The following COCs for public health would apply to the amended BRPP:

- COCs 2-1
- COC 2-2
- COC 2-3
- COC 2-4
- COC 2-5
- COC 2-10 (CEC 2013)

Amended Conditions

No COCs applicable to public health would be modified as a result of the proposed BRPP amendment.

3.9.5 References

AltaRock. 2015. "Bottle Rock Steam Chemistry Database Final ."

CEC. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

—. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of OWnership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

3.10 Socioeconomics/Aesthetics

This subsection includes an evaluation of the socioeconomics and aesthetic effects from the amended BRPP and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant socioeconomic or aesthetic impacts, and no impacts would be greater than those previously analyzed in Order 79-AFC-4 and subsequent amendments. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.10.1 Affected Environment

Socioeconomics

The affected socioeconomic environment for the amended BRPP is Lake County and the surrounding Cobb community. As of the 2020 census, the population in Lake County was 68,163 people (U.S. Census Bureau 2023). Approximately 67 percent of the population is white alone (not Hispanic or Latino) and about 24 percent of the population is considered Hispanic or Latino. Based on preliminary 2022 estimates, the civilian labor force in Lake County is 28,130 workers, with 1,430 unemployed. The unemployment rate in Lake County was 5.1 percent in December 2022, one percent higher than the state of California's unemployment rate (Lake County 2023). Lake County's unemployment rate in December 2022 earned it the ranking of 41 statewide among the state's 58 counties. Most industry sectors in Lake County showed drops in employment rates or no change, with the exception of professional and business services, which showed an increase of 2.8 percent, and retail trade, up by 0.4 percent in the December 2022 report (Lake County 2023). Overall, the socioeconomic conditions in the surrounding project area are similar to the conditions at the time the initial BRPP was permitted. There has not been any major residential development in the area surrounding the project; residences, some of which are occupied seasonally, are in very low-density settings near the project area. The nearest residence is 1,500 feet from the BRPP.

Aesthetics

Aesthetics include the natural and cultural features of the environment that can be seen and that contribute to the public's enjoyment of the environment. The affected aesthetic environment for the amended BRPP includes Lake County and the surrounding Cobb community.

3.10.2 Environmental Analysis

Socioeconomics

Labor and Workforce

Lake County is expected to experience increased employment and income directly and indirectly attributable to construction and operation of the amended BRPP. Construction would employ an average of 15 workers per day, with a maximum of 30 workers per day over an eight-month period. The construction workers are expected to be recruited from the local labor force. The use of local labor during construction would not strain the local labor supply. The

project construction would have a temporary positive impact on employment and income for employees in Lake and Sonoma counties and would generate indirect and induced income from construction workers and suppliers purchasing meals and supplies from businesses in proximity to the project. Due to the short duration of construction (8 months) and limited number of workers (15 employees) that would be employed during construction, construction of the amended BRPP would have a less than significant impact on employment and income in the region and no impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

Operation and maintenance of the amended BRPP would require approximately two to four full-time employees. Because of on-going geothermal power plant operations in the Geysers, a labor pool of geothermal power plant operators currently resides near the project area. Therefore, with this small number of additional staff added, the potential for the proposed project to result in income and employment effects would be low and no impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

Because the labor requirements for the amended BRPP could be drawn from the existing resident labor workforce, without significantly increasing the population, the amended BRPP would not adversely affect socioeconomic infrastructure of the area. Possible changes in community structure lifestyle would not occur because the workforce is already present to a large degree in the resident populations of Lake County. Therefore, construction and operation of the amended BRPPP would not result in impacts beyond those described in Order 79-AFC-4 and subsequent amendments.

Public Health

Sections 3.1, Air Quality, and 3.9, Public Health, examine the project's potential impacts to public health and do not identify any disproportionately high or adverse human health effects related to the project. During construction, localized air emissions of criteria pollutants would be generated from construction vehicles and equipment powered by internal combustion engines as well as from earth moving activities. Operation of diesel-powered equipment would generate diesel exhaust emission, a TAC. Exhaust emissions would disperse rapidly from the project site and would not substantially impact the nearest sensitive receptors.

Because the total volume of geothermal resource/steam that would be processed for the amendment would be far less than the permitted BRPP and the amended BRPP would employ equipment that has equivalent or better efficiency of H_2S and mercury removal, total emissions generated from operation of the amended BRPP would be substantially less than those analyzed in Order 79-AFC-4 and subsequent amendments (see also Section 3.1, Air Quality). Pollutant concentrations at any sensitive receptor would be less than those previously analyzed in Order 79-AFC-4 and subsequent amendments because the total operational emissions of the amended BRPP would be substantially less than that of the permitted BRPP.

Local Economy
Construction and operation of the amended BRPP would generate local sales and tax revenue in Lake County and there would be no adverse effect on the local economy from construction or operation of the amended BRPP. The effect would be beneficial.

Conclusion
The project would not result in a substantial adverse change to social, economic, physical, environmental, or health conditions so as to disproportionately affect any particular low-income or minority population. The proposed project would not adversely impact any particular population, including minority or low-income populations, and the population in the vicinity of the proposed project is not comprised primarily of minority or low-income populations.

The amended BRPP would have an overall positive socioeconomic impact on Lake County through creation of local jobs during construction, purchase of local materials where possible, and generation of annual tax revenue for the County. The amended BRPP would not result in greater socioeconomic impacts than those analyzed in Order 79-AFC-4 and subsequent amendments.

Aesthetics

Aesthetic impacts are generally defined in terms of a project's physical characteristics and potential visibility as well as the extent to which the project's presence would change the visual character and quality of the environment in which it would be located. Proposed modifications to the site include installation of two ORC units, refurbishment of the Stretford system with no change in appearance or height, and installation of new segments of steam pipeline and condensate pipeline that would be less than 20 feet at maximum height (i.e., road crossing). The majority of the proposed infrastructure would be located within the interior of the BRPP site and would be shorter in elevation than the existing infrastructure on the site. Each ORC unit would be approximately 120 feet long by 50 feet wide and up to 20 feet in height, and wholly contained within a new sound-attenuation building in the southeast area of the existing facility footprint and would not be visible from any public vantage point. The new condensate and steam pipelines would follow the existing fence line and would be consistent with the existing industrial nature of the BRPP landscape and existing adjacent steam pipelines. The groundwater supply wells would be less than 4 feet in height and the water supply pipelines would be buried. Furthermore, the amended BRPP would not be visible from any publicly accessible vantage point. As such, the amended BRPP would not affect visual resources in the surrounding area, and no impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

The proposed amendment includes installation of new lighting at the ORC units. The lighting would be on motion sensors and would comply with Title 24 outdoor lighting requirements if the lighting is in an unenclosed area. Furthermore, all outdoor lighting would be downcast and dark sky compliant. While the amended BRPP includes new sources of light, the proposed amendment would not create a substantial source of light that would affect nighttime views. No impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

3.10.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP conforms with all applicable LORS related to socioeconomics and aesthetics. The proposed lighting would comply with the requirements of the 2022 California Energy Code, including section 140.7 – Prescriptive Requirements for Outdoor Lighting. The amended BRPP would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.10.4 Conditions of Certification

Applicable Conditions

The existing BRPP was developed in compliance with Socioeconomic/Aesthetic COCs 3-1 and 3-2. Because the amended BRPP facilities would be shorter in height than the existing facilities at the BRPP and would be shielded from view, no COCs are applicable to socioeconomics or aesthetics for the proposed BRPP amendment.

Amended Conditions

No COCs would be amended for the BRPP amendment.

3.10.5 References

CEC. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of Ownership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

—. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

Lake County. 2023. Employment Development Department, Labor Market Information Division. Industry Employment and Labor Force Information. January 20, 2023.

US Census Bureau. 2023. Quick Facts, Lake County, California. Website: https://www.census.gov/quickfacts/fact/table/lakecountycalifornia/PST045222#PST045222, accessed 02/23/2023.

3.11 Soil and Water Resources

This subsection includes an evaluation of the amended BRPP effects on soil and water resources and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts on soil and water resources, and no impacts would be greater than those previously analyzed in Order 79-AFC-4. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2013; CEC 2006).

3.11.1 Affected Environment

The affected environment for soil and water resources consists of the developed BRPP site, the area of the proposed steam pipeline and condensate pipeline located immediately adjacent to the BRPP fence, and the area of the proposed groundwater supply wells and water supply pipelines. The affected environment for the groundwater supply wells includes the extent of the underlying groundwater aquifer. The existing BRPP is covered with impervious surfaces including pavement and compacted gravel that impedes or prevents natural infiltration of water into soil. The proposed steam pipeline and condensate pipeline would follow the existing fence line in an areas that are previously disturbed and cleared of vegetation to maintain defensible space. The groundwater supply wells and water supply pipelines would be located adjacent to or within existing access roads. All areas of ground disturbance within the BRPP site were previously evaluated in Order 79-AFC-4 and the Bottle Rock Power Steam Project EIR (Lake County 1979).

Groundwater Elevations

Available historic groundwater elevation data at the BRPP is limited. Water surface elevations were monitored at the two existing water supply wells on site in 2024. During the 6-month monitoring period (May to October 2024), water surface elevations ranged from 8.5 to 16.5 feet below land surface (bls) at Well 1 and 6.0 to 18.7 feet bls at Well 2.

The BRPP is in the Clear Lake Volcanics Groundwater Source Area. Elevations in the Clear Lake Volcanics Groundwater Source Area (CLVGWSA) Basin generally are high during the spring, decrease over the summer, and recover during the winter. Groundwater elevations in the Collayomi Valley Basin which is located near the town of Middletown and south of the BRPP follow similar trends. In the spring, water elevations in the basin are relatively shallow, ranging from 3 to 15 ft bls. During the summer months, elevations drop further, ranging from 5 to 20 feet bls (Appendix F).

Groundwater Supplies

According to the Sustainable Groundwater Management Act (SGMA) basin prioritization, the BRPP and surrounding area are in a non-prioritized basin (non-basin) consisting of impermeable granitic, metamorphic, volcanic, or consolidated rocks with groundwater primarily stored within fractures or other voids.

Groundwater recharge is primarily from precipitation and surface water runoff. Relative to alluvial aquifer systems, fracture systems can experience a more complex and sometimes delayed response to both recharge and drought conditions. Due to the complex structure of the CLVGWSA and the lack of groundwater monitoring data, the water budget method was selected to estimate groundwater availability. The water budget method is a simple equation that uses precipitation, surface water flow onto the site (run on), surface water flow off the site (runoff), and evapotranspiration to calculate the amount of water that can infiltrate back to the aquifer. The water budget method does not account for recharge that could occur from interconnected basins.

The BRPP is located within the boundaries of the Kelsey Creek Watershed and the Kelsey Creek Watershed was selected as the evaluation area for estimating recharge and groundwater supplies. The Kelsey Creek watershed covers 28,493 acres and extends from the northwest side of Cobb Mountain to Clear Lake. It is bordered by the Mayacamas Mountain Range to the south and various ridges and mountains to the north. The estimated average annual groundwater recharge in the Kelsey Creek Watershed is 18,407 during a normal year (refer to Table 8 in Appendix F, Groundwater Supply Assessment) and no recharge would occur during dry years.

Water Quality

Water quality samples were collected by OME personnel from water supply Well 1 and Well 2 in June 2024. The samples were analyzed for inorganics and uranium as a radionuclide. Results from the samples collected are summarized in Appendix F. None of the analytes exceeded the National Primary or Secondary Drinking Water Regulations maximum contaminant level (MCL) established by the Environmental Protection Agency (EPA).

3.11.2 Environmental Analysis

Construction

Construction of the majority of the proposed infrastructure modifications would be completed on paved and graveled areas within the existing BRPP site. The proposed steam and condensate pipelines would be co-located on new pipeline supports located on the perimeter of the BRPP site just outside of the eastern fence line. Project construction would require excavation of approximately 500 cubic yards of material for installation of subsurface electrical lines and construction of the ORC pad and placement of approximately 750 cubic yards of concrete for new foundations and concrete pads. The depth of excavation for the proposed foundations would be up to 5 feet if spread footings are used. All trenching and foundation drilling would be located within the graded, compacted graveled, or paved areas in or adjacent to the BRPP site. Excavation and foundation construction would not create a new risk of erosion as all areas of excavation would be repaved and stabilized at the completion of construction.

The amended BRPP would not change the drainage patterns of the BRPP site. Stormwater would be conveyed to the existing injection well via the existing HDPE pipeline. The amended BRPP would continue to collect and manage stormwater runoff in the same manner as the existing BRPP.

Access would be provided via the existing access road and entrance gate. Work crews would access the project site via Bottle Rock Road and High Valley Road, which are maintained in compliance with Lake County Use Permit MMU 10-01. Staging and storage of equipment would occur within existing paved areas at the BRPP or the existing storage area at Francisco Well Pad. Ground disturbance associated with site access, staging, and storage of equipment would be confined to areas that were graded and disturbed during development of the BRPP site. The new water supply wells would require a small area of ground disturbance (approximately 100 square feet) for drilling of the groundwater well. The water supply pipelines would be trenched within existing access roads, located on the ground surface, or attached to the existing steam supply pipeline supports to minimize ground disturbance.

Construction water use would be limited to water required for dust control, concrete mixing, compaction, and worker drinking water and sanitation. Construction would require both potable and non-potable water. Approximately 225 gpd of potable water and 460 gpd of non-potable water would be required during construction. The total water use during construction would be approximately 685 gpd or 0.37 AFY.

Operation

Operations and maintenance are anticipated to use up to 400 gpm for the cooling towers process fluid. The 400 gpm is based on anticipated needs during the warmer summer months while less water would be needed during the cooler winter months. Taking a conservative approach and assuming a flow rate of 400 gpm year-round, the estimated annual non-potable water demand for operations is approximately 613 AFY. Potable water would be approximately 0.07 AFY so total annual water use during operations would be approximately 614 AFY. Operational water for worker use would be sourced from the two existing groundwater wells on the site and up to four new groundwater supply wells.. Fire water or general plant washdown water would be used for plant washdown during normal operation and Stretford system cleanout (approximately 67,000 gallons once every 2 years). Fresh water would also be needed for the mist eliminator cleaning spray lance on top of the polishing tower that operates six times a day for 30 seconds at a time. A sprinkler system would be needed for fire protection of the ORCs. The amended BRPP would use the existing water supply system, septic system, and fire water system at the BRPP, with only a minor modification to the fire-water system proposed with the addition of a sprinkler system for the ORCs. Maintenance and testing of the water supply, septic, and fire-water facilities would be conducted prior to operation to ensure proper function of the facilities in compliance with LORS and COCs.

The water supply for the amended BRPP would be sourced from the fault-controlled fractured rock aquifer systems. During a normal precipitation year, sufficient groundwater recharge is expected based on the water demands at the site. As discussed above and documented in Appendix F, average annual groundwater recharge within the Kelsey Creek Watershed is approximately 18,407 AFY during a normal year. The projected availability of groundwater is highly dependent on the storage capacity and extent of the fault-controlled fractured aquifer systems. Implementation of a groundwater monitoring plan would provide additional data that would help better define the projected groundwater availability. Because fractured aquifer

systems are often isolated and have limited lateral connectivity, the risk of groundwater overdraft from the Amended BRPP affecting surrounding areas is low.

During dry or multiple dry years, groundwater recharge may become insufficient to fully replenish the aquifer system at the site such that the supply wells may become unable to produce groundwater at the design capacities. The water supply wells would be continuously monitored and the amended BRPP designed so the plant operations can decrease pumping rates from the shallow groundwater and utilize an increasing volume of steam condensate on an as-needed basis (up to 100 percent steam condensate if necessary) during extended dry periods as indicated in APM Water-1.

> **APM Water-1. Groundwater Monitoring.** The Project operator shall prepare and implement a groundwater monitoring program. The groundwater supply monitoring program shall include continuous monitoring of groundwater elevations within each of the groundwater supply wells. If the groundwater elevations reach an elevation that could not sustain continued operation of the Project water cooling towers, the Project shall switch to cooling using condensate for up to 100 percent of cooling water demand until aquifer levels have rebounded. The groundwater monitoring program shall be prepared by a qualified hydrologist/hydrogeologist and shall include specific action levels when water cooling shall switch to condensate to sustain project operations.

3.11.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP construction would comply with all applicable LORS related to soil and water resources, including the requirements of the State of California Construction General Permit (Order 2009-000--DWQ). The amended BRPP would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.11.4 Conditions of Certification

Applicable Conditions

The amended BRPP would be subject to the following conditions for soil and water resources:

- COC 6-1
- COC 6-2
- COC 6-3
- COC 6-5
- COC 6-5
- COC 6-6
- COC 8-1
- COC 8-4

Amended Conditions

No COCs applicable to soil and water resources would be modified as a result of the proposed amendment.

3.11.5 References

CEC. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of Ownership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

—. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

Lake County. 1979. California Department of Water Resources, Bottle Rock Geothermal Power Plant Draft Environmental Impact Report. *Application No. 79-AFC-4*.

3.12 Traffic and Transportation

This subsection provides an evaluation of the amended BRPP effects on traffic and transportation and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts on traffic and transportation, and no impacts would be greater than those previously analyzed in Order 79-AFC-4 and subsequent amendments. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.12.1 Affected Environment

The affected environment for traffic and transportation includes the road network that would be accessed to construct and operate the amended BRPP. No major changes to existing transportation infrastructure have occurred since development of the BRPP under Order 79-AFC-4. Regional access to the project site is provided by California State Route (SR) 175. Local access to the project site includes the following roadways (Lake County 2010):

- **Bottle Rock Road.** Bottle Rock Road is a remote two-way public road maintained by the County with 12-foot-wide travel lanes and limited shoulders. The speed limit is generally 45 miles per hour (mph) and reduced to 25 mph through curves.
- **High Valley Road.** High Valley Road is a narrow one-lane private road that connects Bottle Rock Road to the BRPP access road. The speed limit is 15 mph and contains various traffic control devices and signs, including radar speed feedback signs, mirrors at curves, and yield signs.

A secure gate with remote-open capabilities and code-entry system is located at the intersection of Bottle Rock Road and High Valley Road. Residents and property owners along High Valley Road have 24-hour access to the gate (Bottle Rock Power, LLC 2011). The County and emergency service providers also have access to the code for the gate at the intersection of High Valley Road and Bottle Rock Road (Bottle Rock Power, LLC 2011).

There is no existing public transportation available on Bottle Rock Road and High Valley Road. Lake Transit operates the Route 2 bus route Monday through Friday along SR 175 from Kit's Corner to the Twin Pines Casino. No existing bicycle routes are within the vicinity of the project site or surrounding roadways (Lake County 2017). However, The Lake County Regional Transportation Plan (2017) identifies Bottle Rock Road as a Class III proposed bikeway[20] (Lake County 2011).

[20] A Class III bikeway is defined as a bike route that provides a right-of-way designated by signs or permanent markings and shared with pedestrians or motorists.

3.12.2 Environmental Analysis

Construction and Operational Traffic

Construction of all proposed infrastructure modifications would be completed within or immediately adjacent to the existing BRPP site. Access to the amended BRPP site during project construction and operation would be provided via existing access roads. High Valley Road and Bottle Rock Road would continue to provide emergency access to the project site. As such, emergency vehicle access would be the same as that analyzed in the Order 79-AFC-4 and subsequent amendments.

Vehicle Hazards

The amended BRPP would continue to maintain High Valley Road in compliance with the Lake County Traffic Control and Road Maintenance Plan (MMU 10-01). Construction and operation of the amended BRPP would not alter the conditions of any public roads. As with the existing facility, any large loads accessing the amended BRPP would comply with the requirements of Caltrans Transportation Permit(s), if applicable.

Appropriate traffic control devices would be installed along access roads to control vehicle speed and traffic during construction. Traffic controls would follow the recommendations in the California Temporary Traffic Control Handbook regarding basic standards for the safe movement of traffic on highways and streets in accordance with section 21400 of the California Vehicle Code. In addition, the access roads and vehicle traffic would continue to be maintained in compliance with the Traffic Control and Road Maintenance Plan (MMU 10-01).

The transportation of hazardous materials during project construction and operation of the amended BRPP would need to comply with CCR Title 29, section 1910, the Resource Conservation and Recovery Act, U.S. Department of Transportation regulations, the CVC sections 34500 and 31303 through 31309, and all other applicable codes and regulations. The transport of hazardous materials during construction and operation of the amended BRPP would not result in a greater impact than those analyzed in the Order 79-AFC-4 and subsequent amendments.

Vehicle Miles Traveled

The Office of Planning and Research identifies a screening threshold to define *small land use project* as a project that generates or attracts fewer than 110 trips per day. Projects that generate fewer than this threshold number may be assumed to cause a less-than-significant transportation impact (Office of Planning and Research 2017). Approximately 1,218 total truck trips are expected during construction of the amended BRPP. As shown in Section 2.0, Project Description, Table 2.3-2, daily construction-vehicle trips would range from 8 to 50 vehicle trips depending on the construction phase. Construction of the amended BRPP would generate a peak of 50 one-way worker trips per day, which is fewer than the screening threshold number of 110 trips per day. Operation of the amended BRPP would generate approximately 20 vehicle trips per day and would not exceed the screening threshold of 110 trips per day. The amended

BRPP would not generate traffic greater than that analyzed in Order 79-AFC-4 and subsequent amendments.

3.12.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to traffic and transportation and would not alter the conclusions made in the Order 79-AFC-4 and subsequent amendments. High Valley Road would continue to be maintained in compliance with Lake County requirements.

3.12.4 Conditions of Certification

The amended BRPP would not result in changes to previously identified traffic and transportation impacts. No COCs apply to traffic and transportation, and no COCs for traffic and transportation are required for the amended BRPP.

3.12.5 References

Bottle Rock Power, LLC. 2011. "Traffic Control and Road Maintenance Plan for High Valley Road."

CEC. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

—. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of OWnership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

Lake County. 2011. "2011 Lake County Regional Transportation Bikeway Plan."

Lake County. 2010. "Bottle Rock Power Stream Project Draft Environmental Impact Report/Environmental Asessment."

Lake County. 2017. "Lake County Regional Transportation Plan Final."

Office of Planning and Research. 2017. *Technial Advisory on Evaluating Transportation Impacts in CEQA.* Sacramento: State of California.

3.13 Waste Management

This subsection includes an evaluation of the amended BRPP's effects on human health from nonhazardous and hazardous waste generation and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts from waste generation, and no impacts would be greater than those previously analyzed in Order 79-AFC-4. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.13.1 Affected Environment

Class III nonhazardous waste disposal facilities located in proximity to the BRPP site include the Eastlake Sanitary Landfill, South Lake Resource Recovery and Compost, Healdsburg Transfer Station, and Lake County Waste Solutions. The Eastlake Sanitary Landfill and South Lake Resource Recovery and Compost facilities are located in Lake County, approximately 12 miles northeast of the amended BRPP, and have permitted capacities of 200 tons per day. The Lake County Waste Solutions facility is also located in Lake County, approximately 14 miles northwest of the amended BRPP, and has a permitted capacity of 250 tons per day. The Healdsburg Transfer Station is located in Sonoma County, approximately 14 miles southwest of the amended BRPP, and has a permitted capacity of 720 tons per day. The nearest Class I facility permitted to accept hazardous waste is the Kettleman Hills Landfill, which has a permitted capacity of 9,000 cubic yards per day.

3.13.2 Environmental Analysis

The amended BRPP would generate hazardous and nonhazardous waste during project construction and operation. Nonhazardous waste generated during construction would include lumber, excess concrete, metal, glass scrap, empty nonhazardous containers, and waste generated by workers. Office waste and other waste generated by workers would be the primary source of solid waste during operation. Nonhazardous waste would be disposed of at a Class III facility or an appropriate recycling center. As discussed above, three Class III waste facilities in Lake County and one facility in Sonoma County are within 14 miles of the amended BRPP and could accept nonhazardous waste. Non-recyclable waste generated by construction and operation of the amended BRPP would be hauled to the Eastlake Sanitary Landfill, Healdsburg Transfer Station, or Lake County Waste Solutions facilities. The South Lake Resource Recovery and Compost facility would be able to accept any recyclable or compostable waste generated during construction or operation of the amended BRPP. The types of nonhazardous waste generated during construction and operation would be similar to those analyzed in Order 79-AFC-4 and subsequent amendments. Because the power produced by the amended BRPP would be less than the licensed BRPP, the associated number of workers and equipment generating waste would also be reduced. Therefore, the total volume of waste generated by the amended BRPP would be less than that generated by the licensed BRPP.. The spent catalyst within the catalyst reactor tank would be removed and sent to a Class III landfill

as needed. The sulfur produced from the Stretford operation that contains less than 24 mg/L vanadium would be reused commercially and would not be sent to a landfill.

During project operations, the Stretford facility would generate approximately 200,000 lbs of sulfur annually that would be classified as hazardous waste due to vanadium concentrations that exceed 24 mg/L. In addition, the mercury produced in the activated carbon mercury vessels would be classified as hazardous waste. These types of hazardous waste would be the similar to those analyzed in Order 79-AFC-4 and subsequent amendments, but the total volume of hazardous waste produced, including sulfur containing vanadium in excess of 24 mg/L and mercury from the activated carbon filter, would be substantially less due to the smaller geothermal generation capacity of the amended BRPP (the currently proposed 7.5 MW compared to the previously permitted 55 MW). Hazardous wastes would be recycled or managed and disposed properly at the Kettleman Hills Landfill facility, which is authorized to accept the waste. Transport, use, and disposal of hazardous waste would be conducted in accordance with applicable LORS and the existing COCs. No impacts beyond those described in Order 79-AFC-4 and subsequent amendments would occur.

3.13.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to waste management, including CALGreen which requires diversion of at least 65 percent of construction materials and California's Short-Lived Climate Pollutant Reduce Law (Senate Bill 1383) which sets goals to reduce disposal of organic waste in landfills. The amended BRPP and would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.13.4 Conditions of Certification

Applicable Conditions

The amended BRPP would not result in new or more significant impacts from generation of nonhazardous or hazardous wastes. The following COCs for solid waste and management apply to the amended BRPP:

- COC 11-1
- COC 11-4
- COC 11-5
- COC 11-6
- COC 11-7
- COC 11-8

Amended Conditions

COC 11-2 requires modifications to address waste from the catalyst reactor. With the proposed changes in the COCs, the amended BRPP would comply with current LORS, and impacts of the amended BRPP would not exceed the impacts of the approved BRPP.

11-2. The only Stretford process waste is sulfur cake with some entrained process chemicals. The project owner shall ensure that the sulfur cake is properly stored in an appropriate container and removed periodically to be sold or disposed at a site approved for such wastes. Spent surfactant from the catalyst reactors shall be removed and disposed at a site approved for such wastes.

3.13.5 References

CEC. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

—. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of OWnership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

3.14 Worker Health and Safety

This subsection includes an evaluation of the effects of the amended BRPP on worker health and safety and compliance with applicable LORS and COCs. The amended BRPP would not create any new significant impacts on worker health and safety, and no impacts would be greater than those previously analyzed in Order 79-AFC-4 and subsequent amendments. The project modification is consistent with Order 79-AFC-4 and subsequent amendments and would comply with all applicable LORS and COCs (CEC 1980; CEC 2006; CEC 2013).

3.14.1 Affected Environment

The affected environment for worker health and safety for the amended BRPP reflects the conditions of the developed BRPP, including existing equipment and facilities. The BRPP is currently non-operational; however, the existing BRPP could resume operation under its existing permits at any time, and the affected environment reflects the safety conditions under operation of the permitted BRPP. Maintenance workers at the BRPP are currently subject to the safety risks presented from the non-operational equipment, including the fire risk from the wooden water-cooling tower, and have also historically been subject to safety risks from the operational equipment during active BRPP operations.

3.14.2 Environmental Analysis

Construction would primarily occur within the existing BRPP site. Construction and operation of the amended BRPP would expose workers to construction and operational hazards similar to those of the existing BRPP. During construction, operation, and maintenance of the amended BRPP, workers could be exposed to potential hazards from loud noises, operation of heavy equipment, hazardous materials, fires, and equipment exhaust.

The amended BRPP would implement several plans to achieve worker health and safety objectives, including an Emergency Preparedness and Action Plan and an Injury and Illness Prevention Plan. The Emergency Preparedness and Action Plan includes employee training in emergency notification and communication, rescue and medical response, evacuation procedures, fire prevention and control, and hazardous materials management. In accordance with CCR Title 8, section 3203 et seq., the amended BRPP would implement an Injury and Illness Prevention Program to ensure employees comply with safe and healthy work practices.

The amended BRPP would adhere to all applicable Occupational Safety and Health Administration (OSHA) and California Occupational Safety and Health Administration (Cal/OSHA) regulations. Compliance with all applicable LORS relating to potential hazards in the project area would ensure worker health and safety. As discussed in Section 3.5, Hazards and Hazardous Materials, measures to ensure the health and safety of workers are implemented and documented through BRPP policies and procedures such as the emergency response site contingency plans, incident reporting requirements, final closure plan, and annual compliance plans.

The amended BRPP would use the existing fire protection system on the BRPP site and would include installation of sprinklers for any new equipment containing more than 500 gallons of oil, as described in Section 2.0, Project Description. The amended BRPP would continue to implement the Wildland Fire Operating Plan (CALFIRE and Geyers Steam Field Operators 2022) in coordination with California Department of Forestry and Fire Protection (CalFIRE) Sonoma-Lake-Napa Unit and regional geothermal operators. The Wildland Fire Operating Plan identifies potential fire hazards and ignition sources and describes fire prevention activities and operating procedures to minimize the potential for wildland fires. In the event of a fire, the South Lake County Fire District would continue to provide emergency service to the amended BRPP.

3.14.3 Compliance with Laws, Ordinances, Regulations, and Standards

The amended BRPP would comply with all applicable LORS related to worker health and safety, including all current OSHA standards and requirements. The amended BRPP would not alter the conclusions made in Order 79-AFC-4 and subsequent amendments.

3.14.4 Conditions of Certification

The amended BRPP would not result in new or increased impacts from generation of nonhazardous and hazardous wastes.

Applicable Conditions

The amended BRPP is subject to the following COCs for worker health and safety and public health:

- COCs 2-1
- COC 2-2
- COC 2-3
- COC 2-4
- COC 2-5
- COC 2-10
- COC 12-1
- COC 12-4
- COC 12-6
- COC 12-7
- COC 12-8
- COC 12-9
- COC 12-10

Amended Conditions

No COCs would be modified as a result of the proposed amendment.

3.14.5 References

CALFIRE and Geyers Steam Field Operators. 2022. "2022 Wildland Fire Operating Plan."

CEC. 2013. "Commission Decision on the Petition to Amend the Conditions of Certification for the Bottle Rock Geothermal Power Plant." *Docket Number: 79-AFC-04C.* December.

—. 1980. "Decision on the Department of Water Resources Application for Certification for the Bottle Rock Geothermal Project." *Docket Number 79-AFC-4.* October.

—. 2006. "Order Approving the Change of OWnership, the Restart of Operation after Suspension, and 11 Facility Design Changes ." December.

Appendix A – Property Owners

APPENDIX A – MAILING LIST

Table 1 Mailing List for Property Owners within 1,000 feet of BRPP Parcels

Assessor's Parcel Number	Contact and Mailing Address
1300210	2870 LOWELL AVE RICHMOND CA 94804
1300209 1300249	226 SHERMAN DR RED BLUFF CA 96080
1300240	PO BOX 3288 HOUSTON TX 77253

Appendix B – Air Quality Technical Report

MAYACMA GEOTHERMAL PROJECT

AIR QUALITY AND GREENHOUSE GAS EMISSIONS SUPPORTING INFORMATION

October 2024

Prepared by:

RCH GROUP
planning & environmental consulting

AIR QUALITY SETTING

AIR QUALITY ENVIRONMENTAL SETTING

The project site is in the southern portion of Lake County, California, which is located within the Lake County Air Basin (LCAB) and is within the jurisdictional boundaries of the Lake County Air Quality Management District (LCAQMD). The LCAB is a federally and state recognized geographic area that is the same as the county boundary.

Topography, Climate, and Meteorology

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions, including wind speed, wind direction, stability, and air temperature, in combination with local surface topography (i.e., geographic features such as mountains, valleys, and water bodies), determine the effect of air pollutant emissions on local air quality.

The LCAB lies entirely within the Coast Range Mountains and constitutes one of the major inter-mountain basins of the region. Isolated valleys can prevent the dispersion of trapped pollutants during inversion periods. Inversion is an atmospheric condition where a layer of cold air is trapped near the ground by an overlying layer of warm air. The warm air prevents the cooler air from rising and dispersing any accumulated pollutants. Instead, the contaminated air is spread horizontally, exacerbating the situation.

Mountains surrounds the LCAB, which is why it is rarely influenced by outside meteorology. Summer months in the LCAB are characterized by high temperatures, approximately 90 degrees Fahrenheit (ºF) with little to no rainfall. Winter months are mild with temperatures in the mid-50 ºF. During the winter, rainfall averages 27 inches. Annual rainfall in Middletown average approximately 44 inches.[1]

Criteria Air Pollutants

Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health with a determined margin of safety. Ozone (O_3), coarse particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) are considered to be local pollutants because they tend to accumulate in the air locally. PM_{10} and $PM_{2.5}$ are also considered a local pollutant.

Carbon Monoxide

CO in the urban environment is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. CO combines with hemoglobin in the bloodstream and reduces the

[1] Western Regional Climate Center (WRCC), Middletown, California (045598), Period of Monthly Climate Summary, accessed at: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca5598

amount of oxygen that can be circulated through the body. High CO concentrations can cause headaches, aggravate cardiovascular disease, and impair central nervous system functions. CO concentrations can vary greatly over comparatively short distances. Relatively high concentrations of CO are typically found near crowded intersections and along heavy roadways with slow moving traffic. Even under the most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within relatively short distances of the source.

Nitrogen Oxides

Nitrogen gas comprises about 80 percent of the air and is naturally occurring. At high temperatures and under certain conditions, nitrogen can combine with oxygen to form several different gaseous compounds collectively called nitric oxides (NO_x). Motor vehicle emissions are the main source of NO_x in urban areas. NO_x is very toxic to animals and humans because of its ability to form nitric acid with water in the eyes, lungs, mucus membrane, and skin. In animals, long-term exposure to NO_x increases susceptibility to respiratory infections, and lowering resistance to such diseases as pneumonia and influenza. Laboratory studies show that susceptible humans, such as asthmatics, who are exposed to high concentrations can suffer from lung irritation or possible lung damage. Precursors of NO_x, such as NO and NO_2, attribute to the formation of O_3 and $PM_{2.5}$. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

Sulfur Oxides

SO_2 is a combustion product of sulfur or sulfur–containing fuels such as coal and diesel. SO_2 is also a precursor to the formation of atmospheric sulfate and particulate matter and contributes to potential atmospheric sulfuric acid formation that could precipitate downwind as acid rain.

Ozone

O_3 is a secondary pollutant, meaning it is not directly emitted. It is formed when volatile organic compounds (VOCs) or reactive organic gases (ROGs) and NOx undergo photochemical reactions that occur only in the presence of sunlight. The primary source of ROG emissions is unburned hydrocarbons in motor vehicle and other internal combustion engine exhaust. NOx forms as a result of the combustion process, most notably due to the operation of motor vehicles. Sunlight and hot weather cause ground-level O_3 to form. Ground-level O_3 is the primary constituent of smog. Because O_3 formation occurs over extended periods of time, both O_3 and its precursors are transported by wind and high O_3 concentrations can occur in areas well away from sources of its constituent pollutants.

People with lung disease, children, older adults, and people who are active can be affected when O_3 levels exceed ambient air quality standards. Numerous scientific studies have linked ground-level O_3 exposure to a variety of problems including lung irritation, difficult breathing, permanent lung damage to those with repeated exposure, and respiratory illnesses.

Particulate Matter

PM includes both aerosols and solid particulates of a wide range of sizes and composition. Of concern are those particles smaller than or equal to 10 micrometers in diameter size (PM_{10}) and small than or equal to 2.5 micrometers in diameter ($PM_{2.5}$). Smaller particulates are of greater concern because they can penetrate deeper into the lungs than larger particles. PM_{10} is generally emitted directly as a result of mechanical processes that crush or grind larger particles or form the resuspension of dust, typically through construction activities and vehicular travel. PM_{10} generally settles out of the atmosphere rapidly and is not readily transported over large distances. $PM_{2.5}$ is directly emitted in combustion exhaust and is formed in atmospheric reactions between various gaseous pollutants, including NOx, sulfur oxides (SOx) and VOCs or ROGs. $PM_{2.5}$ can remain suspended in the atmosphere for days and/or weeks and can be transported long distances.

The principal health effects of airborne PM are on the respiratory system. Short-term exposure of high $PM_{2.5}$ and PM_{10} levels are associated with premature mortality and increased hospital admissions and emergency room visits. Long-term exposure is associated with premature mortality and chronic respiratory disease.

Lead

Ambient lead concentrations meet both the federal and State standards in the Project area. Lead has a range of adverse neurotoxin health effects and was released into the atmosphere via leaded gasoline products. The phase-out of leaded gasoline in California has resulted in dramatically decreased levels of atmospheric lead. Metal processing is currently the primary source of lead emissions in the SCAB. The highest concentrations of lead in air are generally found near lead smelters and general aviation airports, where piston aircraft use leaded fuel. Other stationary sources that generate lead emissions include waste incinerators, utilities, and lead-acid battery manufacturers. The maximum lead concentrations recorded in the Project area are below federal and California standards. Notably, diesel fuel does not contain lead emissions and gasoline fuel is unleaded.

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, toxic air contaminants (TACs) are another group of pollutants of concern. TACs are considered either carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For regulatory purposes, carcinogenic TACs are assumed to have no safe threshold below which health impacts would not occur, and cancer risk is expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

There are many different types of TACs, with varying degrees of toxicity. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Public exposure to TACs can result from emissions from normal operations, as well as from

accidental releases of hazardous materials during upset conditions. The health effects of TACs include cancer, birth defects, neurological damage, and death.

Most recently, California Air Resources Board (CARB) identified DPM as a TAC. DPM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Diesel exhaust is a complex mixture of particles and gases produced when an engine burns diesel fuel. DPM is a concern because it causes lung cancer; many compounds found in diesel exhaust are carcinogenic. DPM includes the particle-phase constituents in diesel exhaust. Some short-term (acute) effects of diesel exhaust include eye, nose, throat, and lung irritation, and diesel exhaust can cause coughs, headaches, light-headedness, and nausea. DPM poses the greatest health risk among the TACs; due to their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

Ambient Air Quality

The only California Ambient Air Monitoring Network monitoring station employed by CARB in the LCAB is the Lakeport-South Main Street station approximately 24 miles northwest of the project site. The Lakeport-South Main Street station measures levels of hourly ozone, eight-hour ozone, PM_{10}, and $PM_{2.5}$. **Table AQ-1** summarizes the most recent three years of data (2021 through 2023) from the Lakeport-South Main Street station. PM_{10} state standards and $PM_{2.5}$ national standards were exceeded in 2021, likely due to wildfire events.

TABLE AQ-1 SUMMARY OF ANNUAL MONITORING DATA OF AMBIENT AIR QUALITY

Pollutant	Standard	2021	2022	2023
Ozone				
Maximum Concentration (1-hour/8-hour average)	ppm	0.075/0.055	0.063/0.053	0.061/0.057
Number of days State standard exceeded (1-hour/8-hour)	0.09/0.070	0/0	0/0	0/0
Number of days National standard exceeded (8-hour)	0.070	0	0	0
Fine Particulate Matter (PM_{10})				
Maximum Concentration (24-hour)	$\mu g/m^3$	**88.9**	35.2	31.2
Number of days State/National standard exceeded (24-hour measured)	50/150	**1**/0	0/0	0/0
Annual Average (State standard)	20	15.6	11.4	10.7
Fine Particulate Matter ($PM_{2.5}$)				
Maximum Concentration (24-hour)	$\mu g/m^3$	**64.4**	22.4	17.9
Number of days National standard exceeded (24-hour measured/estimated)	35	**1/6**	0/0	0/0
Annual Average (State/National standard)	12/12.0	6.3	4.2	4.1

NOTES:
ppm = parts per million, $\mu g/m^3$ = micrograms per cubic meter **bold values** exceeded the State and/or National standard

SOURCE: CARB, *iADAM: Air Quality Data Statistics*, https://www.arb.ca.gov/adam, Accessed October 16, 2024.

Odors

Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to

physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors. Odor impacts should be considered for any proposed new odor sources located near existing receptors, as well as any new sensitive receptors located near existing odor sources.[2]

Sensitive Receptors

Sensitive receptors are defined as facilities or land uses that include members of the population who are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis. The nearest residential structure is approximately 1,500 feet northeast of the project site, and the nearest residential property line is approximately 200 feet east of the project site.

AIR QUALITY REGULATORY SETTING

Ambient Air Quality Standards

Regulation of air pollutants is achieved through both national and state ambient air quality standards (AAQS) and emissions limits for individual sources. Regulations implementing the federal Clean Air Act (CAA) and its subsequent amendments established national ambient air quality standards (NAAQS) for the six criteria pollutants. California has adopted more stringent California ambient air quality standards (CAAQS) for most of the criteria air pollutants. In addition, California has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the meteorological conditions in the state, there is considerable difference between state and federal standards in California.

The AAQS are intended to protect the public health and welfare, and they incorporate an adequate margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including asthmatics, the very young, elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Under amendments to the federal CAA, U.S. Environmental Protection Agency (U.S. EPA) has classified air basins or portions thereof, as either “attainment” or “nonattainment” for each criteria

[2] Bay Area Air Quality Management District (BAAQMD). 2017. *California Environmental Quality Act Air Quality Guidelines*. May 2017.

air pollutant, based on whether the NAAQS have been achieved. The California CAA, which is patterned after the federal CAA, also requires areas to be designated as “attainment” or “nonattainment” for the CAAQS. Thus, areas in California have two sets of attainment / nonattainment designations: one set with respect to the NAAQS and one set with respect to the CAAQS. As shown in **Table AQ-2**, LCAB is “attainment” or “unclassified” with respect to the NAAQS and CAAQS.

California Air Resources Board

CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementation of the California CAA. CARB has primary responsibility in California to develop and implement air pollution control plans designed to achieve and maintain the NAAQS. Collectively, all regional air pollution control plans or air quality management plans to achieve the NAAQS throughout the state constitute the state implementation plan (SIP). As California’s air quality management agency, CARB regulates mobile emission sources and oversees the activities of county air pollution control districts and regional air quality management districts. CARB regulates local air quality indirectly by using state standards and vehicle emission standards, conducting research activities, and carrying out planning and coordinating activities. CARB also provides land use guidance, as it relates to air quality, including criteria for siting schools and other sensitive land uses.

Tanner Air Toxics Act & Air Toxics “Hot Spots” Information & Assessment Act

CARB’s statewide comprehensive air toxics program was established in 1983 with Assembly Bill (AB) 1807, the Toxic Air Contaminant Identification and Control Act (Tanner Air Toxics Act of 1983). AB 1807 created California's program to reduce exposure to air toxics and sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an airborne toxics control measure (ATCM) for sources that emit designated TACs. If there is a safe threshold for a substance at which there is no toxic effect, the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions.

CARB also administers the State’s mobile source emissions control program and oversees air quality programs established by state statute, such as AB 2588, the Air Toxics “Hot Spots” Information and Assessment Act of 1987. Under AB 2588, TAC emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment (HRA) and, if specific thresholds are exceeded, required to communicate the results to the public in the form of notices and public meetings. In September 1992, the "Hot Spots" Act was amended by Senate Bill (SB) 1731, which required facilities that pose a significant health risk to the community to reduce their risk through a risk management plan.

TABLE AQ-2 AMBIENT AIR QUALITY STANDARDS AND LCAB ATTAINMENT STATUS

Pollutant	Averaging Time	CAAQS	LCAB CAAQS Attainment Status	NAAQS	LCAB NAAQS Attainment Status	Major Pollutant Sources
Ozone	8 hour	0.070 ppm	Attainment	0.070 ppm	Unclassified/Attainment	Formed when ROG and NOx react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial/ industrial mobile equipment.
	1 hour	0.09 ppm	Attainment	---	N/A	
Carbon Monoxide (CO)	8 hour	9.0 ppm	Attainment	9 ppm	Unclassified/Attainment	Internal combustion engines, primarily gasoline-powered motor vehicles
	1 Hour	20 ppm	Attainment	35 ppm	Unclassified/Attainment	
Nitrogen Dioxide (NO_2)	Annual Average	0.030 ppm	Attainment	0.053 ppm	Unclassified/Attainment	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads
	1 Hour	0.18 ppm	Attainment	0.100 ppm	Unclassified/Attainment	
Sulfur Dioxide (SO_2)	Annual Average	---	N/A	0.030 ppm	Unclassified/Attainment	Fuel combustion, chemical plants, sulfur recovery plants and metal processing
	24 Hour	0.04 ppm	Attainment	0.14 ppm	Unclassified/Attainment	
	1 Hour	0.25 ppm	Attainment	0.075 ppm	Unclassified/Attainment	
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	Attainment	---	N/A	Dust- and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays)
	24 hour	50 $\mu g/m^3$	Attainment	150 $\mu g/m^3$	Unclassified/Attainment	
Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	Attainment	12 $\mu g/m^3$	Unclassified/Attainment	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; also, formed from photochemical reactions of other pollutants, including NOx, sulfur oxides, and organics.
	24 hour	---	N/A	35 $\mu g/m^3$	Unclassified/Attainment	
Lead	Calendar Quarter	---	N/A	1.5 $\mu g/m^3$	Unclassified/Attainment	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	30 Day Average	1.5 $\mu g/m^3$	Attainment	---	N/A	

NOTE: ppm = parts per million; and $\mu g/m^3$ = micrograms per cubic meter

SOURCE: CARB, 2019. Maps of State and Federal Area Designations. https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations, Accessed February 23, 2023.

Lake County Air Quality Management District

The LCAQMD attains and maintains county air quality conditions through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the LCAQMD includes adoption, and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. LCAQMD Rules and Regulations includes rules and regulations required and recommended for all projects. Project proponents are responsible for compliance with the adopted LCAQMD rules and regulations. A reproduction of the key LCAQMD rules and regulations which are applicable to construction and operation of the project may include but are not limited to the following:

LCAQMD Rules and Regulations, Chapter II Prohibitions and Standards

Article I-Visible Emissions: A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated as number 1 on the Ringelmann Chart, as published by the United States Bureau of Mines.

Article II-Particulate Matter Emissions: A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause to have a natural tendency to cause injury or damage to business or property.

Article III-Geothermal Operations

Section 421: Sulfur Emissions

A. A geothermal well operation may not emit total sulfur compounds expressed as hydrogen sulfide in excess of one hundred and fifty (150) ppm by weight unless:

1. The developer has installed an operable control system capable of achieving a seventy-five percent (75%) or greater reduction in hydrogen sulfide emission, or

2. The developer documents that it is engaged in an active program of research and development of technology for abating hydrogen sulfide emissions from geothermal well drilling acceptable to the Air Pollution Control Officer, and

3. The emissions from such operation do not cause the one-hour ambient air standard for hydrogen sulfide to be exceeded.

The Air Pollution Control Officer may waive the requirements of this Section 421 provided that the developer installs and maintains an approved hydrogen sulfide ambient air monitoring system in the prevailing downwind direction and provided that the ambient air standard is not exceeded. In no case may the Air Pollution Control Officer waive the requirements of this Section if total sulfur compounds expressed as hydrogen sulfide exceed one thousand (1,000) ppm by weight.

B. No geothermal well operation shall emit total sulfur expressed as hydrogen sulfide in excess of twenty-four (24) pounds/day during the lowest bleed rate consistent with keeping the well potentially productive unless monitoring evidence is being and has been collected and convinces the Air Pollution Control Officer that the incremental sulfur emissions by wells of various developers are not likely to cause a violation or make a measurable contribution to an existing violation of the ambient air standard.

Section 421.1: Geothermal Wells Particulate Emissions

A. All geothermal well operations shall abide by Rule 411 of the Rules and Regulations of the Air Quality Management District except that during the air drilling phase of the operation, the particulate emission rate may reach a level of one hundred (100) lbs/hr for a time period not to exceed sixteen (16) days.

B. In no case may the ambient particulate air standard be exceeded or caused to be exceeded during any phase of the geothermal well operation.

Section 421.2: Geothermal Power Plant Operations

A. Power Plants

1. All geothermal power plants for which an Authority to Construct permit is initially issued before January 1, 1981 shall emit no more than one hundred and seventy-five (175) grams of hydrogen sulfide per gross megawatt hour.

2. All geothermal power plants for which an Authority to Construct permit is initially issued on or after January 1, 1981 shall emit no more than fifty (50) grams of hydrogen sulfide per gross megawatt hour.

3. All geothermal power plants shall, by January 1, 1990, emit no more than fifty (50) grams of hydrogen sulfide per gross megawatt hour.

B. Steam Transmission Lines

1. Effective January 1, 1980, the allowable rate of hydrogen sulfide emissions from steam transmission lines during a power plant outage shall be as defined in the following graphics (Tables 2, 3A, and 3B of the regulation) for scheduled outages and unscheduled outages for all geothermal power plants and steam transmission lines operating in the LCAQMD. Time limitations are noted in minutes and begin when the generating unit is first off line, or venting of more than nine percent (9%) of normal, full, unabated steam flow of a unit occurs. Emission limitations to be reached by a noted time are given as the maximum allowable percent of full flow unabated hydrogen sulfide content of steam to the generating unit. In the event of an unscheduled outage, a decision as to the expected total time of the outage is to be made within ninety (90) minutes and entered into an appropriate log maintained at the site and readily accessible by the LCAQMD staff. For a scheduled outage, the expected down time shall be entered into this same log prior to initiating the outage. For the purposes of Section 421.2 B, two or more single generating unit power plants interconnected and capable on a continuous basis of shunting fifty percent (50%) of full steam flow of the larger of the units to other power plant(s) within thirty (30) minutes after initiation of an outage shall be considered a dual unit power plant.

This Regulation does not supersede or repeal any other rules or regulations of the LCAQMD and is intended to supplement other rules concerning the subject matter.

2. Effective January 1, 1985, hydrogen sulfide emissions shall be reduced to ten percent (10%) of unabated full steam flow within fifteen (15) minutes of initial outage. This applies to dual and single unit power plants whether a scheduled or unscheduled outage occurs.

Section 422: Geothermal Well Venting. No geothermal well operator shall intentionally exhaust into the atmosphere any well in excess of five (5) percent of full venting capacity without first notifying the Air Pollution Control Officer at least twenty-four (24) hours in advance of the proposed action, except:

A. Operations during the exploratory phase under an Authority to Construct.

B. When abatement equipment proven effective is used in removing air contaminants for which there is an ambient air standard.

C. In cases where wells are being vented full open for purposes of testing the chemical and/or physical properties of the effluent.

D. In cases where the Air Pollution Control Officer requests chemical or physical tests to be performed on the well contents.

TABLE 2 SCHEDULED POWER PLANT OUTAGES

	Outages Less Than 360 Minutes		Outages Greater Than 360 Minutes		
Elapsed Time (Minutes)	15	360	15	90	240
Dual Units with one Unit Operative	*10% within 15 minutes		*10% within 15 minutes and until startup is initiated		
Single Units Capable of Shunting 35% of Full Steam Flow	*35% within 15 minutes	Back On Line or Hydrogen Sulfide Reduced to 10% of Full Unabated Hydrogen Sulfide Steam Flow Until Startup is Initiated	*35% within 15 minutes		10% within 240 minutes & until startup is initiated
Single Units without the Capability to Shunt 35% of Full Steam Flow	*35% within 15 minutes		*35% within 15 minutes	10% within 90 minutes & until startup is initiated	
Dual Units with both Units Down Simultaneously & Capable of Shunting Full Steam Flow	*40% within 15 minutes		*40% within 15 minutes		10% within 240 minutes & until startup is initiated
Dual Units with Both Units Down Simultaneously & No Capability to Shunt Steam	*40% within 15 minutes		*40% within 15 minutes	10% within 90 minutes & until startup is initiated	

* The necessity for occasional venting in excess of limits specified under an upset in coordinating well throttling and power plant startup or shut down is acknowledged (refer to Article II, Section 510 of LCAQMD Rules and Regulations).

TABLE 3A UNSCHEDULED POWER PLANT OUTAGES

					Decision as entered in log < 420 minutes	
Elapsed Time (Minutes)	15	30	60	90	90	420
Dual Units with one Unit Operative	90%	50%	35%	10%	10% continued	Back on Line or Hydrogen Sulfide Reduced to 10% of Full Unabated Hydrogen Sulfide Steam Flow Rate Until Startup Initiated
Single Units Capable of Shunting 35% of Full Steam Flow	90%	50%	35%	Enter into Log Expected Duration of Outage	35% Continued as at 60 Minutes Until Startup Initiated	
Single Units without the Capability to Shunt 35% of Full Steam Flow	90%	50%	35%			
Dual Units with both Units Down Simultaneously & Capable of Shunting Full Steam Flow	90%	50%	40%			
Dual Units with Both Units Down Simultaneously & No Capability to Shunt Steam	90%	50%	40%			

* The necessity for occasional venting in excess of limits specified under an upset in coordinating well throttling and power plant startup or shut down is acknowledged (refer to Article II, Section 510 of LCAQMD Rules and Regulations).

TABLE 3B UNSCHEDULED POWER PLANT OUTAGES

No decision or decision as entered into log is greater than 420 minutes		
Elapsed Time (Minutes)	150	300
Dual Units with one Unit Operative	10% continued as at 90 minutes until startup is initiated	
Single Units Capable of Shunting 35% of Full Steam Flow	10% within 150 minutes and until startup is initiated	
Single Units without the Capability to Shunt 35% of Full Steam Flow	10% within 150 minutes and until startup is initiated	
Dual Units with both Units Down Simultaneously & Capable of Shunting Full Steam Flow	Continue at 60 minutes unabated Hydrogen Sulfide steam flow rate	10% within 300 minutes and until startup is initiated
Dual Units with Both Units Down Simultaneously & no Capability to Shunt Steam	10% within 150 minutes and until startup is initiated	

* The necessity for occasional venting in excess of limits specified under an upset in coordinating well throttling and power plant startup or shutdown is acknowledged (refer to Article II, Section 510 of LCAQMD Rules and Regulations)

Article IV-Other Emissions or Contaminants

Section 430: General No person shall discharge, or permit to be discharged from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to cause injury or damage or have natural tendency to cause injury or damage to business or property (Health and Safety Code Section 41700). This does not apply to odors emanating from agricultural operations in the growing of crops or raising of animals (Health and Safety Code Section 41705). Any discharge of air contaminants which will cause the ambient air quality to exceed those amounts listed in the Table of Standards, applicable state-wide, as shown in the California Administrative Code, Title 17, Section 70200, off premises shall be a violation of this Section. Section 70200 of the California Administrative Code is hereby adopted and made a part of this Regulation as though fully set forth herein.

Section 440: New Source Performance Standards (NSPS) All new sources of air contaminants or modifications to existing sources shall comply with the rules, standards, criteria and requirements of Part 60, Chapter 1, Title 40, Code of Federal Regulations (40 CFR 60), as herein last amended which are adopted by reference and made a part of these Rules and Regulations. For the purpose of this Rule, the word "Administrator" as used in these federal new source performance standards shall mean the Air Pollution Control Officer of the District. Category types subject to NSPS are as given in Table 4 of the regulation.

Section 450: National Emissions Standards for Hazardous Air Pollutants (NESHAPS) The provisions of Part(s) 61 and 63, Chapter 1, Title 40, Code of Federal Regulations as herein last amended are adopted by reference and made a part of these Rules and Regulations. For the purposes of this Rule, the word "Administrator" as used in these national emission standards for hazardous air pollutants shall mean the Air Pollution Control Officer of the District. Category types subject to NESHAPS are as given in Table 5 of the regulation. EPA approved State ATCM's shall be considered District enforceable in lieu of the applicable NESHAP.

Section 467: Asbestos Control Measure. The purpose of the rule is to control emissions of asbestos to the atmosphere and provide appropriate waste handling and disposal procedures. Part III – Demolition, Renovation, and Removal lists administrative requirements, demolition/renovation/removal procedures, waste disposal procedures, waste disposal sites, and monitoring and recordkeeping procedures for controlling asbestos emissions during demolition activities.

LCAQMD Rules and Regulations, Chapter IV, Permits

Article I-Authority to Construct

Section 600: A written Authority to Construct shall be required to construct, erect, alter or replace any equipment which may cause, potentially cause, reduce, control or eliminate the issuance of air contaminants. A single Authority to Construct may be issued for all components of an integrated system or process. Plans and specifications drawn in accordance with acceptable engineering practices shall be required before issuance of an Authority to Construct.

Section 608: Notwithstanding Sections 602, 604 and 605 C of the District's rules, the Air Pollution Control Officer shall issue an Authority to Construct or other required documents to

any geothermal power plant development project (power plants, production wells and geothermal fluid transmission lines) which meets the following prescriptive criteria and utilizes the best available control technology:

A. Power plants and geothermal fluid transmission lines must limit on a continuous basis the hydrogen sulfide emission rate to no more than five (5.0) pounds per hour (2.3 kilograms per hour) per one million (1,000,000) pounds per hour of steam flow received;

B. The proposed power plant must be located such that not more than one permitted geothermal power plant (within the District) is closer than six-tenths (0.6) mile and no populated areas (as defined in Chapter 21 of the Lake County Code, Article XXV, Section 21-73.6a(1)) are within one (1.0) mile of the proposed location;

C. Geothermal development wells must limit the hydrogen sulfide emission rate on a continuous basis during air drilling, clean-out, initial testing and reworking to no more than five (5.0) pounds per hour (2.3 kilograms per hour);

D. Wells on stand-by vent shall be located no closer than one half (0.5) mile from a populated area (as defined in Chapter 21 of the Lake County Code, Article XXV, Section 21-73.6a(1)), and emissions shall be no greater than an average of one (1) pound per hour per well based on the number of completed wells for the associated power plant's steamfield;

E. In the judgement of the Air Pollution Control Officer, the facility must be able to readily show compliance with all other rules and regulations limiting emissions of emittants other than hydrogen sulfide; and

F. No individual property owner or legal resident within a one (1) mile radius of the proposed power plant site or one half (0.5) mile from an associated drilling pad makes a request for a New Source Review of the Project under Chapter IV, Article I of the LCAQMD Rules and Regulations.

The LCAQMD shall make proper public notice and reasonable attempts to notify affected parties (in writing) of the intent to issue permits under Rule 608, thirty (30) days prior to such permits being issued. The notice shall include a statement that affected parties may request a detailed New Source Review of the proposed power plant. Permit issuance after the 30 days notice pursuant to this Rule shall be final.

Section 609: Geothermal Stacking Emissions. The power plant operator and the steam supplier shall jointly, or if the same entity singularly, develop a proposed written plan to limit geothermal steam stacking emissions (as defined in Section 227.5). The proposed plan incorporating the Best Available Control Technology, shall be submitted with the power plant Application for Certification or development project Authority to Construct(s) prior to the District considering the application(s) complete for District permitting or preparation of a Determination of Compliance purposes. The plan shall: (a) identify the specific technology(ies) proposed to control said emissions; and (b) provide operating procedures for the emissions control system(s), clearly specifying the respective duties of the power plant operator and steam supplier. Upon approval by the Air Pollution Control Officer, the plan shall be incorporated in the Authority to Construct(s), the Determination of Compliance and Permit(s) to Operate for the power plant and geothermal fluid transmission line.

See Article I of the regulation for other sections related to Authority to Construct.

Article II-Permit to Operate

Section 610: A Permit to Operate may be required to operate any article, machine, equipment or other contrivance which causes or may cause the issuance of an air contaminant.

See Article II of the regulation for other sections related to Permit to Operate.

Article V-Source Emissions Testing

Section 655: Performance Plan. Compliance with the specified emission(s) limitation(s) resulting from these Rules and Regulations may be established through a protocol or performance plan acceptable to the District. The primary purpose of the performance plan is to facilitate a method of determining compliance, while recognizing that there are variations in process factors (e.g., steam quality) beyond the operator's control which affect emissions, and that continuous source emissions monitoring is not practicable.

See Article V of the regulation for other sections related to Performance Plans.

Lake County General Plan

The Lake County General Plan Health & Safety Element contains goals, policies, and implementation measures designed to protect the public health, safety, and welfare of the community. The Lake County General Plan Geothermal Resources Element establishes the goals, policies and implementation measures that will be used by the County regarding the promotion, protection, use, and education pertaining to geothermal resources that are present in the County. The following presents the policies relevant to air quality that are applicable to the project:

Policy HS-3.1: Monitoring of Point and Area Sources. New and existing point sources of air pollution should be monitored for compliance with County, State, and Federal air quality regulations and standards.

Policy HS-3.2: Best Available Air Pollution Control Technologies. The County shall require the use of the best available air pollution control technologies to maintain healthful air quality and high visibility standards, along with continuing compliance with State and Federal Ambient Air Quality Standards.

Policy HS-3.4: Paving or Treatment of Roadways for Reduced Air Emissions. As unpaved roads are a major source of the County's particulate emissions, the County should require that all new roads and driveways for new projects that are in close proximity to adjacent residences or the public be paved or treated to reduce dust generation where feasible. Unpaved roads, driveways and parking areas should be considered for surfacing improvements when permits are granted for expanded use.

Policy HS-3.10: Dust Suppression During Construction. The County shall require dust-suppression measures for grading activities, and asbestos dust hazard mitigation plans for projects located in Naturally Occurring Asbestos Areas.

Policy HS-3.11: Asbestos Inspection During Construction. The County shall require that all projects requiring a grading permit or a building permit that would result in earth disturbance, in areas likely to contain naturally occurring asbestos, utilize approved asbestos dust mitigation measures as required by the LCAQMD, CARB and the Lake County Community Development Department.

Policy GR-2.13: Air Quality Monitoring Programs. The County shall promote the continued use of air quality monitoring programs, such as The Geysers Air Monitoring Program, to develop and maintain the capacity to rapidly assess ambient air quality and detect air pollution events.

Policy GR-2.14: Best Available Control technology (BACT) Air Quality Measures for Geothermal Operations. Geothermal operations shall be planned and carried out using the BACT consistent with the requirements of the LCAQMD. Appropriate operating practices shall be used to minimize emissions, avoid vegetation damage and increased fog or haze conditions, prevent nuisance odors, and control dust.

Policy GR-2.15: Minimization of Air Emissions. Wherever practical, steamfields and power plants shall be intertied and equipped with automated supervisory control systems or other design measures to minimize air emissions during events initiated as a result of a forced outage, scheduled outage, startup, or curtailment. Steamfields shall only be connected and operated with power plants incorporating BACT as determined by the LCAQMD.

Policy GR-2.16: Retrofitting of Existing Power Plants to Reduce Environmental Impacts. The County shall strongly encourage the retrofitting of older power plants with the best reasonably available air pollution control technology and other technologies that can reduce overall environmental impacts.

GHG EMISSIONS SETTING

GHG EMISSIONS ENVIRONMENTAL SETTING

Global Climate Change

Climate is defined as the average statistics of weather, which include temperature, precipitation, and seasonal patterns such as storms and wind, in a particular region. Global climate change refers to the long term and irrevocable shift in these weather-related patterns. Using ice cores and geological records, baseline temperature and carbon dioxide (CO_2) data extends back to previous ice ages thousands of years ago. Over the last 10,000 years, the rate of temperature change has typically been incremental, with warming and cooling occurring over the course of thousands of years. However, scientists have observed an unprecedented increase in the rate of warming over the past 150 years, roughly coinciding with the global industrial revolution, which has resulted in substantial increases in GHG emissions into the atmosphere. The anticipated impacts of climate change in California range from water shortages to inundation from sea level rise. Transportation systems contribute to climate change primarily through the emissions of certain GHGs (CO_2, methane (CH_4), and nitrous oxide (N_2O)) from nonrenewable energy (primarily gasoline and diesel fuels) used to operate passenger, commercial and transit vehicles. Land use changes contribute to climate change through construction and operational use of electricity and natural gas, and waste production.

The Intergovernmental Panel on Climate Change (IPCC) has reached consensus that human-caused emissions of GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increases in global average surface temperature from 1951 to 2010 were caused by the anthropogenic increase in GHG concentrations and other anthropogenic forces together. The IPCC predicts that the global mean surface temperature increase by the end of the 21st century (2081– 2100) relative to 1986–2005, could range from 0.5 to 8.7 degrees Fahrenheit. Additionally, the IPCC projects that global mean sea level rise will continue during the 21st century, highly likely at a faster rate than observed from 1971 to 2010. For the period 2081–2100 relative to 1986–2005, the rise will likely range from 10 to 32 inches.[3]

Greenhouse Gases

Gases that trap heat in the atmosphere are referred to as GHGs because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHGs has been implicated as the driving force for global climate change. The six primary GHGs are:

- carbon dioxide (CO_2), emitted when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned;
- methane (CH_4), produced through the anaerobic decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, incomplete fossil fuel combustion, and water and wastewater treatment;
- nitrous oxide (N_2O), typically generated because of soil cultivation practices, particularly the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning;
- hydrofluorocarbons (HFCs), primarily used as refrigerants;
- perfluorocarbons (PFCs), originally introduced as alternatives to ozone depleting substances and typically emitted as by-products of industrial and manufacturing processes; and
- sulfur hexafluoride (SF_6), primarily used in electrical transmission and distribution.

Although there are other contributors to global climate change, these six GHGs are identified by the U.S. EPA as threatening the public health and welfare of current and future generations. GHGs have varying potential to trap heat in the atmosphere, known as global warming potential (GWP), and atmospheric lifetimes. GWP reflects how long GHGs remain in the atmosphere, on average, and how intensely they absorb energy. Gases with a higher GWP absorb more energy

[3] Intergovernmental Panel on Climate Change (IPCC). 2013. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. 2013.

per pound than gases with a lower GWP, and thus contribute more to warming Earth. For example, one ton of CH_4 has the same contribution to the greenhouse effect as approximately 28 tons of CO_2; hence, CH_4 has a 100-year GWP of 28 while CO_2 has a GWP of 1. GWP ranges from 1 (for CO_2) to 23,500 (for SF_6).

In emissions inventories, GHG emissions are typically reported in terms of pounds or metric tons of CO_2 equivalents (CO_2e). CO_2e are calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWP than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e.

Regional GHG Emissions Estimates

In 2021, the United States emitted about 5,594 million metric tons of CO_2e. Emissions increased from 2020 to 2021 by 6.8 percent (after accounting for sequestration from the land sector). The increase in total GHG emissions was driven largely by an increase in CO_2 emissions from fossil fuel combustion. In 2021, CO_2 emissions from fossil fuel combustion increased by 7.0 percent relative to the previous year. This increase in fossil fuel consumption emissions was due primarily to economic activity rebounding after the COVID-19 pandemic. GHG emissions in 2021 (after accounting for sequestration from the land sector) were 16.3 percent below 2005 levels.[4]

In 2020, California emitted approximately 369.2 million metric tons of CO_2e, about 35 million metric tons of CO_2e lower than 2019 levels and about 62 million metric tons of CO_2e below the 2020 GHG Limit of 431 million metric tons of CO_2e established by Assembly Bill (AB) 32. The 2019 to 2020 decrease in emissions is likely due in large part to the impacts of the COVID-19 pandemic. Economic recovery from the pandemic may result in emissions increases over the next few years. As such, the total 2020 reported emissions are likely an anomaly, and any near-term increases in annual emissions should be considered in the context of the pandemic. The transportation sector showed the largest decline in emissions of 27 million metric tons of CO_2e (16 percent) compared to 2019. This decrease was most likely from light duty vehicles after shelter-in-place orders were enacted in response to the COVID-19 pandemic. Industrial sector emissions dropped 7 million metric tons of CO_2e (9 percent) compared to 2019. The decrease is driven by lower emissions from both the refining sector and the oil and gas production sector. Electricity sector emissions remained at a similar level as in 2019 despite a 44 percent decrease in in-state hydropower generation (due to below average precipitation levels), which was more than compensated for by a 10 percent growth in in-state solar generation and cleaner imported electricity incentivized by California's clean energy policies.[5]

[4] U.S. Environmental Protection Agency, Draft *Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2021*, EPA 430-D-23-001. 2023.

[5] California Air Resources Board (CARB), California Greenhouse Gas Emissions for 2000 to 2020 Trends of Emissions and Other Indicators, October 26, 2022.

GHG EMISSIONS REGULATORY SETTING

Federal

The U.S. Supreme Court in Massachusetts et al. v. Environmental Protection Agency et al. ([2007] 549 U.S. 05-1120) held that the U.S. EPA has the authority to regulate motor-vehicle GHG emissions under the federal Clean Air Act. The U.S. EPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines and requires annual reporting of emissions. In 2012, the U.S. EPA issued a Final Rule that establishes the GHG permitting thresholds that determine when Clean Air Act permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

In 2014, the U.S. Supreme Court in Utility Air Regulatory Group v. EPA (134 S. Ct. 2427 [2014]) held that the U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of BACT.

Greenhouse Gas Emissions and Fuel Efficiency

In September 2011, U.S. EPA, in coordination with the National Highway Traffic Safety Administration (NHTSA), adopted fuel consumption and CO_2 emission standards to reduce GHG emissions of heavy-duty vehicles. These Phase 1 federal standards apply to model year 2014 and newer heavy-duty trucks, tractors, pick-up trucks, vans, and vocational vehicles. The category of specialized vocational vehicles includes delivery trucks, emergency vehicles, and refuse trucks such as the “packer” garbage collection trucks used to transport solid waste to transfer stations and landfills. The Phase 1 regulations do not include standards regarding the trailers pulled by these vehicles for improving aerodynamics and fuel efficiency.

In 2016, working together with NHTSA and CARB, U.S. EPA implemented the next phase of federal GHG emissions and fuel-efficiency standards for medium- and heavy-duty vehicles and associated trailers. These federal Phase 2 standards build on the improvements in engine and vehicle efficiency required by the Phase 1 emission standards and aim to achieve further GHG reductions for 2018 and later model year heavy-duty vehicles. The progressively more stringent federal Phase 2 standards are more technology-driven than the Phase 1 standards, in that they require manufacturers to improve existing technologies or develop new technologies for heavy-duty trucks, tractors, and vocational vehicles to achieve the stricter standards. The Phase 2 federal standards were jointly adopted by the U.S. EPA and NHTSA on October 25, 2016. California subsequently enacted its own Phase 2 standards for GHG emissions, which are discussed in further detail below.

State

Assembly Bill 1493

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, the U.S. EPA granted the waiver of Clean Air Act preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Pavley I regulates model years from 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" regulates model years from 2017 to 2025. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs, and would provide major reductions in GHG emissions.

Executive Order S-3-05

Governor Schwarzenegger established Executive Order S-3-05 in 2005, in recognition of California's vulnerability to the effects of climate change. Executive Order S-3-05 set forth a series of target dates by which statewide emissions of GHG would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The executive order directed the Secretary of the California EPA (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary will also submit biannual reports to the governor and California Legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the Secretary of CalEPA created the California Climate Action Team, made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of California businesses, local governments, and communities and through state incentive and regulatory programs.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 required that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction is accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from

stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions to ensure that businesses and consumers are not unfairly affected by the reductions. Using these criteria to reduce statewide GHG emissions to 1990 levels by 2020 would represent an approximate 25 to 30 percent reduction in current emissions levels. However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions. Under AB 32, CARB must adopt regulations to achieve reductions in GHG to meet the 1990 emissions cap by 2020.

Climate Change Scoping Plan

AB 32 required CARB to develop a Scoping Plan that describes the approach California will take to reduce GHG to achieve the goal of reducing emissions to 1990 levels by 2020. The Scoping Plan was first approved by CARB in 2008 and must be updated every five years. The initial AB 32 Scoping Plan contains the main strategies California will use to reduce the GHGs that cause climate change. The initial Scoping Plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade system, and an AB 32 program implementation fee regulation to fund the program. In August 2011, the initial Scoping Plan was approved by CARB.

The 2013 Scoping Plan Update builds upon the initial Scoping Plan with new strategies and recommendations. The 2013 Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The 2013 Update defines CARB climate change priorities for the next five years and sets the groundwork to reach California's long-term climate goals set forth in Executive Orders S-3-05 and B-16-2012. The 2013 Update highlights California progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial Scoping Plan. In the 2013 Update, nine key focus areas were identified (energy, transportation, agriculture, water, waste management, and natural and working lands), along with short-lived climate pollutants, green buildings, and the cap-and-trade program.

On May 22, 2014, the First Update to the Climate Change Scoping Plan was approved by the Board, along with the finalized environmental documents. On November 30, 2017, the Second Update to the Climate Change Scoping Plan was approved by the CARB. On December 15, 2022, the CARB adopted its Final 2022 Scoping Plan for Achieving Carbon Neutrality (Final Scoping Plan). Consistent with this statutory direction, the Final Scoping Plan, which was released on November 16, 2022, lays out how California can reduce anthropogenic GHG emissions by 85%

below 1990 levels and achieve carbon neutrality by 2045. In the Final Scoping Plan, CARB acknowledges that meeting these new ambitious targets will require decarbonizing the electricity sector on a rapid — but technically feasible — timescale. Decarbonizing the electricity sector depends on both increasing energy efficiency and deploying renewable and zero carbon resources, including solar, wind, energy storage, geothermal, biomass, and hydroelectric power on a massive scale and at an unprecedented pace. Overall, the Final Scoping Plan further strengthens the state's commitments to take bold actions to address the climate crisis. CARB states that the Final Scoping Plan represents the most aggressive approach to reach carbon neutrality in the world.[6]

Low Carbon Fuel Standard

Under the Climate Change Scoping Plan, the CARB identified the low carbon fuel standard (LCFS) as one of the nine discrete early action measures to reduce California's GHG emissions. The LCFS is designed to decrease the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits.

In 2018, the CARB approved amendments to the regulation, which included strengthening and smoothing the carbon intensity benchmarks through 2030 in-line with California's 2030 GHG emission reduction target enacted through SB 32, adding new crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector.

The LCFS standards are expressed in terms of the "carbon intensity" (CI) of gasoline and diesel fuel and their respective substitutes. The program is based on the principle that each fuel has "life cycle" GHG emissions and the life cycle assessment examines the GHG emissions associated with the production, transportation, and use of a given fuel. The life cycle assessment includes direct emissions associated with producing, transporting, and using the fuels, as well as significant indirect effects on GHG emissions, such as changes in land use for some biofuels. The carbon intensity scores assessed for each fuel are compared to a declining CI benchmark for each year. Low carbon fuels below the benchmark generate credits, while fuels above the CI benchmark generate deficits. Credits and deficits are denominated in metric tons of GHG emissions. Providers of transportation fuels must demonstrate that the mix of fuels they supply for use in California meets the LCFS carbon intensity standards, or benchmarks, for each annual compliance period. A deficit generator meets its compliance obligation by ensuring that the credits it earns or otherwise acquires from another party is equal to, or greater than, the deficits it has incurred.

Senate Bill 97

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Resources Agency (Resources Agency) adopted

[6] Latham & Watkins LLP, *CARB Adopts Final 2022 Scoping Plan*, December 19, 2022.

amendments to the State *CEQA Guidelines* for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and climate change impacts.

Senate Bill 375

SB 375, signed in August 2008, enhances the State's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. In addition, SB 375 directs each of the State's 18 major Metropolitan Planning Organizations (MPOs) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035.

Executive Order No. B-30-15

On April 29, 2015, Executive Order No. B-30-15 was issued to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Executive Order No. B-30-15 sets a new, interim, 2030 reduction goal intended to provide a smooth transition to the existing ultimate 2050 reduction goal set by Executive Order No. S-3-05 (signed by Governor Schwarzenegger in June 2005). It is designed so State agencies do not fall behind the pace of reductions necessary to reach the existing 2050 reduction goal. Executive Order No. B-30-15 orders "All State agencies with jurisdiction over sources of GHG emissions shall implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 targets." The Executive Order also states that "CARB shall update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent."

Senate Bill 32

On September 8, 2016, the governor signed Senate Bill 32 (SB 32) into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies and policies, such as SB 350 and SB 1383 (see below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally-appropriate quantitative thresholds consistent with a statewide per capita goal of 6 metric tons of CO_2e by 2030 and 2 metric tons of CO_2e by 2050. As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the State.

Executive Order B-55-18

On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

Assembly Bill 1279

Assembly Bill 1279 requires the state to achieve net zero GHG emissions as soon as possible, but no later than 2045, and achieve and maintain net negative GHG emissions thereafter. The bill also requires California to reduce statewide GHG emissions by 85 percent compared to 1990 levels, and directs the CARB to work with relevant state agencies to achieve these goals

Senate Bill 100

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the state's Renewables Portfolio Standard Program, which was last updated by SB X 1-2 in 2011. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

Senate Bill 1020

Senate Bill 1020 builds on the Senate Bill 100 commitment to achieve 100 percent zero-carbon electricity by 2045. SB 1020 sets new benchmarks of 90 percent clean energy by 2035 and 95 percent clean energy by 2040. The new law also requires all state agencies to use 100 percent renewable energy and zero-carbon resources to serve their own facilities by 2035.

Assembly Bill 341

In 2011, the legislature established a 75 percent statewide solid waste recycling rate goal by 2020 with its passage of AB 341 (Chesbro, Chapter 476, Statutes of 2011). AB 341 directed CalRecycle to develop a strategy to achieve this 75 percent recycling goal. In response, CalRecycle developed the 75 Percent Strategy which includes five strategies and three additional focus areas for its pursuit to achieve the recycling goal. Strategies include moving organics out of the landfill; expanding the recycling/manufacturing infrastructure; exploring new models for state and local funding of materials management program; promoting state procurement of postconsumer recycled content products; and promoting extended producer responsibility. CalRecycle has provided updates to this strategy along with supporting documentation as recently as 2017, which tracks progress towards this goal and summarizes co-benefits from implementation of the 75 Percent Strategy.

Senate Bill 1383

Adopted in September 2016, SB 1383 requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

SB 1383 also requires the California Department of Resources Recycling and Recovery (CalRecycle), in consultation with the CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

California Phase 2 Standards Medium- and Heavy-Duty Engines and Vehicles

After the U.S. EPA enacted its Phase 2 Standards for medium- and heavy-duty engines, as discussed in the federal regulatory setting above, California enacted its own Phase 2 standards for GHG emissions that align closely with the federal Phase 2 standards except for minor differences. California's Phase 2 standards were officially approved by CARB in February 2018, with the California Office of Administrative Law giving its final approval in February 2019. The California Phase 2 standards became effective April 1, 2019. Reductions in GHGs from California's Phase 2 standards are recognized in CARB's 2017 Scoping Plan.

ATTACHMENT A – Construction Emissions

Mayacma Geothermal Project

Construction Air Quality Assumptions and Calculations

October 2024

Air Emission Calculation Methodology

Construction emissions were estimated for off-road equipment, on-road trucks for material delivery and equipment hauling, and worker commute trips with the California Emissions Estimator Model[1] (CalEEMod) Version 2022.1. The CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects. The model quantifies direct emissions from construction and operational activities (including off-road equipment and on-road vehicle use), as well as indirect emissions, such as GHG emissions from energy use, solid waste disposal, and water use/wastewater disposal.

The CalEEMod construction emissions inventory includes an estimation of criteria pollutant emissions such as carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOC) as reactive organic gases (ROG), particulate matter less than 10 micrometers (coarse or PM_{10}), and particulate matter less than 2.5 micrometers (fine or $PM_{2.5}$), as well as GHG emissions. CalEEMod also estimates GHG emissions including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), and CO_2 equivalent (CO_2e) emissions.[2]

Construction Emissions Assumptions

It is anticipated that construction would commence in May 2025 and would require approximately 8 months. An average of 5 to 25 workers would be on site daily depending upon the given construction phase. Construction would be conducted 7am to 7 pm, Monday through Saturday. Approximately 1,248 haul truck trips are expected to occur during project construction. Approximately 354 vendor truck trips would also occur during project construction. **Table 1: Construction Schedule** presents the construction schedule by phase. **Table 2: Construction Vehicle Trips By Phase** presents the worker, vendor, and haul truck trips by phase and the corresponding trip lengths assumed.

[1] California Air Pollution Control Officers Association (CAPCOA). 2022. *California Emissions Estimator Model User's Guide Version 2022.1.* April 2022. http://www.caleemod.com/

[2] The unit "CO_2e" represents an amount of a GHG whose atmospheric impact has been standardized to that of one unit mass of CO_2, based on the global warming potential (GWP) of the gas.

Table 1: Construction Schedule

Construction Phase Description	Start	End	Working Days
Well Plug Removal and Clean Out	05/01/2025	06/04/2025	30
Well Testing	08/15/2025	10/06/2025	45
Staging and Mobilization	05/01/2025	05/06/2025	5
Foundation Construction	05/09/2025	06/26/2025	42
Process Installation	07/07/2025	11/22/2025	120
Water Well Construction	06/27/2025	07/02/2025	5

Table 2: Average Daily Construction Vehicle Trips (One-Way Trips) By Phase

Construction Phase Description	Worker Trips	Vendor Trips	Haul Truck Trips	Worker Trip Length	Vendor Trip Length	Haul Truck Trip Length
Well Plug Removal and Clean Out	30	10	3	50.0	20.0	20.0
Well Testing	10	10	1	50.0	20.0	20.0
Staging and Mobilization	8	0	4	50.0	N/A	20.0
Foundation Construction	20	2	4	50.0	20.0	20.0
Process Installation[1]	50	2	13	50.0	100.0[1]	100.0[1]
Water Well Construction	2	2	1	50.0	20.0	20.0

Note:

1. Process Equipment Installation assumes specialized equipment would be imported from the Port of Oakland.

Table 3: Well Plug Removal and Clean Out Construction Equipment Assumptions presents the construction equipment assumptions for Well Plug Removal and Clean Out. **Table 4: Foundation Construction Equipment Assumptions** presents the construction equipment assumptions for Foundation Construction. **Table 5: Process Installation Construction Equipment Assumptions** presents the construction equipment assumptions for Process Installation. **Table 6: Water Well Drilling Construction Equipment Assumptions** presents the construction equipment assumptions for Water Well Drilling. No equipment usage would be required for staging and mobilization, equipment and materials would only be delivered to the site. No heavy equipment is assumed to be required for well testing.

Table 3: Well Plug Removal and Clean Out Construction Equipment Assumptions

Equipment Type	Amount	Daily Usage (hours)	Horsepower	Load Factor
Drill Rig Diesel Engine	2	24	83	0.50
Forklift	1	12	82	0.20
Generator	1	24	14	0.74
Light Tower	2	12	6	0.82
Water Truck	1	4	376	0.38

Table 4: Foundation Construction Equipment Assumptions

Equipment Type	Amount	Daily Usage (hours)	Horsepower	Load Factor
Concrete Pump Truck (Off Highway Truck)	1	8	376	0.38
Pier Drilling Rig	1	4	83	0.50
Skid Steer Loader	1	4	71	0.37

Table 5: Process Installation Construction Equipment Assumptions

Equipment Type	Amount	Daily Usage (hours)	Horsepower	Load Factor
Aerial Lift	2	4	46	0.31
Crane	2	4	367	0.29
Forklift	1	4	82	0.20
Telehandler	1	4	82	0.20
Tractors/Loaders/Backhoes	1	4	84	0.37
Welders	2	8	46	0.45

Table 6: Water Well Drilling Construction Equipment Assumptions

Equipment Type	Amount	Daily Usage (hours)	Horsepower	Load Factor
Drilling Rig	1	8	83	0.50
Support Truck	1	8	376	0.38

Significance Thresholds

The project site is located within the Lake County Air Basin (LCAB) and is under the jurisdiction of the Lake County Air Quality Management District (LCAQMD). Lake County is currently designated as attainment or unclassified for all federal and state ambient air quality standards. As the LCAQMD does not have an attainment plan or recommended thresholds of significance for use in CEQA, LCAQMD refers to the Bay Area Air Quality Management District (BAAQMD)'s CEQA Guidelines to evaluate a project's potential air quality impacts. According to BAAQMD's CEQA Guidelines, the project would result in a significant impact to air quality if it would result in average daily construction exhaust emissions of 54 pounds per day of ROG, NO_x, or $PM_{2.5}$ or 82 pounds per day of PM_{10}. BAAQMD considers fugitive dust emissions to be significant unless best management practices (BMPs) for fugitive dust emissions are implemented. BAAQMD has not adopted a GHG emissions significance threshold because GHG emissions from construction represent a very small portion of a project's lifetime GHG emissions.[3]

Emissions Inventory

The BAAQMD CEQA Air Quality Guidelines recommend quantification of construction-related exhaust emissions and comparison of those emissions to significance thresholds. **Table 7: Average Daily Construction Emissions (Pounds)** provides the estimated short-term construction emissions that would be associated with the project and compares those emissions to the BAAQMD's thresholds of

[3] BAAQMD. CEQA Thresholds and Guidelines Update. Frequently Asked Questions, 4. Will There be a Threshold for Construction-Related Emissions? https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines

significance for construction exhaust emissions. All construction-related air quality emissions would be below the BAAQMD significance thresholds.

Table 7: Average Daily Construction Emissions (Pounds)

Source	ROG	NOx	PM_{10}[1]	$PM_{2.5}$[1]
Average Daily Construction	0.76	7.85	0.19	0.17
Significance Threshold	54	54	82	54
Threshold Exceeded?	No	No	No	No

Note: The BAAQMD construction significance thresholds for PM_{10} and $PM_{2.5}$ apply to exhaust emissions only.

As noted previously, the BAAQMD considers fugitive dust emissions impacts to be significant unless BMPs for fugitive dust are implemented. Therefore, the following basic construction mitigation measures recommended for all proposed projects from BAAQMD's CEQA Guidelines shall be implemented during project construction:

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- A publicly visible sign shall be posted with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action with 48 hours. The LCAQMD's phone number shall also be visible to ensure compliance with applicable regulations.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

GHG Emissions and Energy Use

Project construction would generate approximately 665 metric tons of CO_2e. Using standard fuel conversion rates, project construction would require approximately 64,500 gallons of diesel fuel and 15,900 gallons of gasoline.[4]

[4] U.S. Energy Information Administration, Carbon Dioxide Emissions Coefficients, February 2, 2016. https://www.eia.gov/environment/emissions/co2_vol_mass.php

Attachments

CalEEMod Version 2022.1 Emissions Output

- Mayacma Construction Detailed Report (30 pages)

Mayacma Construction Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Mayacma Construction
Construction Start Date	5/1/2025
Lead Agency	CEC
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.20
Precipitation (days)	50.2
Location	38.83481251053499, -122.7682921663577
County	Lake
City	Unincorporated
Air District	Lake County AQMD
Air Basin	Lake County
TAZ	243
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.28

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Heavy Industry	14.0	1000sqft	7.00	14,131	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.06	2.56	20.4	40.0	0.09	0.62	3.65	4.05	0.57	0.92	1.30	—	10,229	10,229	0.28	1.00	22.4	10,552
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.09	1.76	18.4	26.2	0.09	0.40	3.65	4.05	0.38	0.92	1.30	—	10,165	10,165	0.16	1.00	0.58	10,466
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.93	0.76	7.85	11.0	0.03	0.19	1.26	1.44	0.17	0.32	0.49	—	3,914	3,914	0.08	0.33	3.35	4,018
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.17	0.14	1.43	2.01	0.01	0.03	0.23	0.26	0.03	0.06	0.09	—	648	648	0.01	0.06	0.55	665

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.06	2.56	20.4	40.0	0.09	0.62	3.65	4.05	0.57	0.92	1.30	—	10,229	10,229	0.28	1.00	22.4	10,552

Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	2.09	1.76	18.4	26.2	0.09	0.40	3.65	4.05	0.38	0.92	1.30	—	10,165	10,165	0.16	1.00	0.58	10,466
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.93	0.76	7.85	11.0	0.03	0.19	1.26	1.44	0.17	0.32	0.49	—	3,914	3,914	0.08	0.33	3.35	4,018
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.17	0.14	1.43	2.01	0.01	0.03	0.23	0.26	0.03	0.06	0.09	—	648	648	0.01	0.06	0.55	665

3. Construction Emissions Details

3.1. Well Plug Removal & Cleanout (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.68	1.40	13.6	19.8	0.04	0.47	—	0.47	0.43	—	0.43	—	3,649	3,649	0.15	0.03	—	3,662
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	0.14	0.12	1.12	1.63	< 0.005	0.04	—	0.04	0.04	—	0.04	—	300	300	0.01	< 0.005	—	301
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.20	0.30	< 0.005	0.01	—	0.01	0.01	—	0.01	—	49.7	49.7	< 0.005	< 0.005	—	49.8
Demolition	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.42	0.35	0.59	8.95	0.00	0.00	1.06	1.06	0.00	0.25	0.25	—	1,197	1,197	0.04	0.04	5.11	1,214
Vendor	0.03	0.02	0.96	0.24	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	639	639	< 0.005	0.09	1.71	667
Hauling	0.01	0.01	0.35	0.04	< 0.005	< 0.005	0.05	0.06	< 0.005	0.02	0.02	—	218	218	< 0.005	0.03	0.40	228
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.06	0.60	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	92.4	92.4	< 0.005	< 0.005	0.18	93.6
Vendor	< 0.005	< 0.005	0.08	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	52.5	52.5	< 0.005	0.01	0.06	54.7
Hauling	< 0.005	< 0.005	0.03	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	17.9	17.9	< 0.005	< 0.005	0.01	18.7
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.11	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	0.03	15.5
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.69	8.69	< 0.005	< 0.005	0.01	9.06

Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.96	2.96	< 0.005	< 0.005	< 0.005	3.10

3.3. Staging & Mobilization (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.09	0.16	2.39	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	319	319	0.01	0.01	1.36	324
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	0.01	0.47	0.05	< 0.005	0.01	0.07	0.08	0.01	0.02	0.03	—	290	290	< 0.005	0.04	0.53	304
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	4.11	4.11	< 0.005	< 0.005	0.01	4.16
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.97	3.97	< 0.005	< 0.005	< 0.005	4.16
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.68	0.68	< 0.005	< 0.005	< 0.005	0.69
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.66	0.66	< 0.005	< 0.005	< 0.005	0.69

3.5. Water Well Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.66	0.55	4.01	5.34	0.02	0.13	—	0.13	0.12	—	0.12	—	1,715	1,715	0.07	0.01	—	1,720

Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	23.5	23.5	< 0.005	< 0.005	—	23.6
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.89	3.89	< 0.005	< 0.005	—	3.90
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—

Architect Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.04	0.60	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	79.8	79.8	< 0.005	< 0.005	0.34	80.9
Vendor	0.01	< 0.005	0.19	0.05	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.34	133
Hauling	< 0.005	< 0.005	0.12	0.01	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	72.5	72.5	< 0.005	0.01	0.13	76.0
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.03	1.03	< 0.005	< 0.005	< 0.005	1.04
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.75	1.75	< 0.005	< 0.005	< 0.005	1.82
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.99	0.99	< 0.005	< 0.005	< 0.005	1.04
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.17	0.17	< 0.005	< 0.005	< 0.005	0.17
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.29	0.29	< 0.005	< 0.005	< 0.005	0.30
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.16	0.16	< 0.005	< 0.005	< 0.005	0.17

3.7. Process Installation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	1.09	0.91	8.36	9.20	0.02	0.30	—	0.30	0.27	—	0.27	—	1,851	1,851	0.08	0.02	—	1,857
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	1.09	0.91	8.36	9.20	0.02	0.30	—	0.30	0.27	—	0.27	—	1,851	1,851	0.08	0.02	—	1,857
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.36	0.30	2.75	3.02	0.01	0.10	—	0.10	0.09	—	0.09	—	608	608	0.02	< 0.005	—	610
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.07	0.05	0.50	0.55	< 0.005	0.02	—	0.02	0.02	—	0.02	—	101	101	< 0.005	< 0.005	—	101
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.70	0.58	0.99	14.9	0.00	0.00	1.77	1.77	0.00	0.41	0.41	—	1,995	1,995	0.07	0.06	8.51	2,023
Vendor	0.02	0.02	0.87	0.19	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	631	631	< 0.005	0.09	1.71	659
Hauling	0.09	0.09	6.82	0.44	0.06	0.09	1.18	1.26	0.09	0.33	0.42	—	4,642	4,642	< 0.005	0.72	8.65	4,865

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.71	0.59	0.99	13.4	0.00	0.00	1.77	1.77	0.00	0.41	0.41	—	1,942	1,942	0.07	0.06	0.22	1,962
Vendor	0.02	0.02	0.88	0.19	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	631	631	< 0.005	0.09	0.04	657
Hauling	0.09	0.09	6.85	0.45	0.06	0.09	1.18	1.26	0.09	0.33	0.42	—	4,643	4,643	< 0.005	0.72	0.22	4,857
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.17	0.38	3.97	0.00	0.00	0.56	0.56	0.00	0.13	0.13	—	616	616	0.02	0.02	1.20	624
Vendor	0.01	0.01	0.30	0.06	< 0.005	< 0.005	0.05	0.06	< 0.005	0.01	0.02	—	207	207	< 0.005	0.03	0.24	216
Hauling	0.03	0.03	2.33	0.15	0.02	0.03	0.38	0.41	0.03	0.11	0.13	—	1,526	1,526	< 0.005	0.24	1.23	1,598
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.03	0.07	0.72	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	102	102	< 0.005	< 0.005	0.20	103
Vendor	< 0.005	< 0.005	0.05	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	34.3	34.3	< 0.005	< 0.005	0.04	35.8
Hauling	0.01	0.01	0.42	0.03	< 0.005	0.01	0.07	0.07	0.01	0.02	0.02	—	253	253	< 0.005	0.04	0.20	265

3.9. Foundation Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.63	0.53	3.81	4.90	0.02	0.13	—	0.13	0.12	—	0.12	—	1,646	1,646	0.07	0.01	—	1,651
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.06	0.44	0.56	< 0.005	0.01	—	0.01	0.01	—	0.01	—	189	189	0.01	< 0.005	—	190
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.08	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	31.4	31.4	< 0.005	< 0.005	—	31.5
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.28	0.23	0.40	5.96	0.00	0.00	0.71	0.71	0.00	0.17	0.17	—	798	798	0.03	0.02	3.40	809
Vendor	0.01	< 0.005	0.19	0.05	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	128	128	< 0.005	0.02	0.34	133
Hauling	0.01	0.01	0.47	0.05	< 0.005	0.01	0.07	0.08	0.01	0.02	0.03	—	290	290	< 0.005	0.04	0.53	304
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.02	0.05	0.56	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	86.3	86.3	< 0.005	< 0.005	0.17	87.3
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	14.7	14.7	< 0.005	< 0.005	0.02	15.3

Hauling	< 0.005	< 0.005	0.06	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	33.4	33.4	< 0.005	0.01	0.03	34.9
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	< 0.005	0.01	0.10	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	14.3	14.3	< 0.005	< 0.005	0.03	14.5
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.43	2.43	< 0.005	< 0.005	< 0.005	2.54
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.53	5.53	< 0.005	< 0.005	< 0.005	5.79

3.11. Well Testing (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.20	2.98	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	399	399	0.01	0.01	1.70	405

Vendor	0.03	0.02	0.96	0.24	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	639	639	< 0.005	0.09	1.71	667
Hauling	< 0.005	< 0.005	0.12	0.01	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	72.5	72.5	< 0.005	0.01	0.13	76.0
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.14	0.12	0.20	2.69	0.00	0.00	0.35	0.35	0.00	0.08	0.08	—	388	388	0.01	0.01	0.04	392
Vendor	0.03	0.02	0.97	0.24	< 0.005	0.01	0.17	0.18	0.01	0.05	0.06	—	639	639	< 0.005	0.09	0.04	665
Hauling	< 0.005	< 0.005	0.12	0.01	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	72.5	72.5	< 0.005	0.01	< 0.005	75.9
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.03	0.30	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	46.2	46.2	< 0.005	< 0.005	0.09	46.8
Vendor	< 0.005	< 0.005	0.12	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	78.7	78.7	< 0.005	0.01	0.09	82.1
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	8.94	8.94	< 0.005	< 0.005	0.01	9.36
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	0.01	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.65	7.65	< 0.005	< 0.005	0.01	7.75
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.0	13.0	< 0.005	< 0.005	0.02	13.6
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.48	1.48	< 0.005	< 0.005	< 0.005	1.55

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Well Plug Removal & Cleanout	Demolition	5/1/2025	6/4/2025	6.00	30.0	—
Staging & Mobilization	Site Preparation	5/1/2025	5/6/2025	6.00	5.00	—
Water Well Construction	Grading	6/27/2025	7/2/2025	6.00	5.00	—
Process Installation	Building Construction	7/07/2025	11/22/2025	6.00	120	—
Foundation Construction	Paving	5/09/2025	6/26/2025	6.00	42.0	—
Well Testing	Trenching	8/15/2025	10/6/2025	6.00	45.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Well Plug Removal & Cleanout	Bore/Drill Rigs	Diesel	Average	2.00	24.0	83.0	0.50
Well Plug Removal & Cleanout	Forklifts	Diesel	Average	1.00	12.0	82.0	0.20
Well Plug Removal & Cleanout	Generator Sets	Diesel	Average	1.00	24.0	14.0	0.74
Well Plug Removal & Cleanout	Signal Boards	Diesel	Average	2.00	12.0	6.00	0.82
Well Plug Removal & Cleanout	Off-Highway Trucks	Diesel	Average	1.00	4.00	376	0.38
Water Well Construction	Bore/Drill Rigs	Diesel	Average	1.00	8.00	83.0	0.50
Water Well Construction	Off-Highway Trucks	Diesel	Average	1.00	8.00	376	0.38
Process Installation	Aerial Lifts	Diesel	Average	2.00	4.00	46.0	0.31
Process Installation	Cranes	Diesel	Average	2.00	4.00	367	0.29

Process Installation	Forklifts	Diesel	Average	2.00	4.00	82.0	0.20
Process Installation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	4.00	84.0	0.37
Process Installation	Welders	Diesel	Average	2.00	8.00	46.0	0.45
Foundation Construction	Bore/Drill Rigs	Diesel	Average	1.00	4.00	83.0	0.50
Foundation Construction	Off-Highway Trucks	Diesel	Average	1.00	8.00	376	0.38
Foundation Construction	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Well Plug Removal & Cleanout	—	—	—	—
Well Plug Removal & Cleanout	Worker	30.0	50.0	LDA,LDT1,LDT2
Well Plug Removal & Cleanout	Vendor	10.0	20.0	HHDT,MHDT
Well Plug Removal & Cleanout	Hauling	3.00	20.0	HHDT
Well Plug Removal & Cleanout	Onsite truck	—	—	HHDT
Staging & Mobilization	—	—	—	—
Staging & Mobilization	Worker	8.00	50.0	LDA,LDT1,LDT2
Staging & Mobilization	Vendor	—	20.0	HHDT,MHDT
Staging & Mobilization	Hauling	4.00	20.0	HHDT
Staging & Mobilization	Onsite truck	—	—	HHDT
Well Testing	—	—	—	—
Well Testing	Worker	10.0	50.0	LDA,LDT1,LDT2
Well Testing	Vendor	10.0	20.0	HHDT,MHDT
Well Testing	Hauling	1.00	20.0	HHDT
Well Testing	Onsite truck	—	—	HHDT

Process Installation	—	—	—	—
Process Installation	Worker	50.0	50.0	LDA,LDT1,LDT2
Process Installation	Vendor	2.00	100	HHDT,MHDT
Process Installation	Hauling	13.0	100	HHDT
Process Installation	Onsite truck	—	—	HHDT
Foundation Construction	—	—	—	—
Foundation Construction	Worker	20.0	50.0	LDA,LDT1,LDT2
Foundation Construction	Vendor	2.00	20.0	HHDT,MHDT
Foundation Construction	Hauling	4.00	20.0	HHDT
Foundation Construction	Onsite truck	—	—	HHDT
Water Well Construction	—	—	—	—
Water Well Construction	Worker	2.00	50.0	LDA,LDT1,LDT2
Water Well Construction	Vendor	2.00	20.0	HHDT,MHDT
Water Well Construction	Hauling	1.00	20.0	HHDT
Water Well Construction	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Water Well Construction	0.00	0.00	0.00	0.00	—

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
Well Plug Removal & Cleanout	0.00	0.00	0.00	—	—
Staging & Mobilization	—	—	0.00	0.00	—
Water Well Construction	—	—	0.00	0.00	—
Foundation Construction	0.00	0.00	0.00	0.00	0.00

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Heavy Industry	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	204	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	17.6	annual days of extreme heat
Extreme Precipitation	23.1	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	39.1	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A

Extreme Precipitation	3	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	3	1	1	3
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	16.8
AQ-PM	0.12
AQ-DPM	2.31
Drinking Water	49.6
Lead Risk Housing	33.7
Pesticides	50.9
Toxic Releases	0.11
Traffic	4.34
Effect Indicators	—
CleanUp Sites	18.7
Groundwater	36.8
Haz Waste Facilities/Generators	16.6
Impaired Water Bodies	23.9
Solid Waste	42.3
Sensitive Population	—
Asthma	51.6
Cardio-vascular	44.5
Low Birth Weights	48.5
Socioeconomic Factor Indicators	—
Education	13.1
Housing	44.5
Linguistic	0.00

Poverty	54.0
Unemployment	—

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	43.00012832
Employed	4.606698319
Median HI	40.07442577
Education	—
Bachelor's or higher	64.96856153
High school enrollment	100
Preschool enrollment	84.08828436
Transportation	—
Auto Access	74.57975106
Active commuting	41.98639805
Social	—
2-parent households	35.81419222
Voting	58.64237136
Neighborhood	—
Alcohol availability	91.99281406
Park access	19.45335558
Retail density	2.271269088
Supermarket access	29.47517002
Tree canopy	99.0632619
Housing	—
Homeownership	80.55947645

Housing habitability	69.5110997
Low-inc homeowner severe housing cost burden	61.85037854
Low-inc renter severe housing cost burden	30.14243552
Uncrowded housing	62.10701912
Health Outcomes	—
Insured adults	21.95560118
Arthritis	0.0
Asthma ER Admissions	63.1
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	25.5
Cognitively Disabled	24.2
Physically Disabled	21.7
Heart Attack ER Admissions	63.6
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0

Climate Change Exposures	—
Wildfire Risk	88.7
SLR Inundation Area	0.0
Children	93.4
Elderly	6.0
English Speaking	98.1
Foreign-born	5.4
Outdoor Workers	20.8
Climate Change Adaptive Capacity	—
Impervious Surface Cover	99.9
Traffic Density	1.6
Traffic Access	0.0
Other Indices	—
Hardship	56.0
Other Decision Support	—
2016 Voting	52.5

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	15.0
Healthy Places Index Score for Project Location (b)	49.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Land Use	Two 6,700 SF ORC enclosures and one 731 SF control building
Construction: Construction Phases	PTA PD 2024
Construction: Off-Road Equipment	PTA PD 2024
Construction: Trips and VMT	PTA PD 2024
Construction: On-Road Fugitive Dust	PTA PD 2024
Construction: Architectural Coatings	No Coating

ATTACHMENT B – Operational Emissions

Mayacma Geothermal Process Emissions

622 lbs/hr NCG at Outlet	2 outlets =	1244	lb/hr	564.78	kg/hr
Operational Hours Per Year		8322	(95% of the time operational)	Assumes Methane GWP of 28 for Metric Tons/Year Emissions	

GHGs	kg/hr	lbs/hr	tons/hr	tons/day	tons/year	metric tons/year
CO2	494.85	1090.96	0.55	13.09	4539.48	4118.15
Methane	17.25	38.02	0.02	0.46	158.21	4018.69
CO2e						**8137 metric tons of CO2e**

	Pollutant	kg/hr	lbs/hr	lbs/day	tons/day	tons/year				
	H2S	27.84	61.38	1473.13	0.74	255.40	Uncontrolled			
stretford	H2S	0.31	0.68	16.35	0.01	2.83	Controlled	98.89%	Abatement	LCAPCD, DOC, DWR/Bottle Rock Geothermal Power Plant, 1980.
reactive catalyst	H2S	0.01	0.02	0.38	0.00	0.07	Controlled	99.97%	Abatement	Abatement Percentage Based on Purification Solutions, 2022.

Pollutant	kg/hr	lbs/hr	lbs/day	tons/day	tons/year
NH3	6.64	14.64	351.44	0.18	60.93

Note: The remaining gas is made up of nitrogen and hydrogen.

Historical Chemisty Database (Sep 2007 - Dec 2014)

Dry Gas Gases	Average Volume %	Molar Mass	Weight	Average Weight %	Flow Rate lb/hr	Flow Rate tons/year	Flow Rate Metric Tons
Carbon Dioxide	64.00	44.01	28.17	0.877	1090.96	4539.480	4118.149
Hydrogen Sulfide	4.65	34.08	1.58	0.049	61.38	255.404	231.698
Ammonia	2.22	17.03	0.38	0.012	14.64	60.932	55.276
Nitrogen	2.09	28.01	0.59	0.018	22.67	94.348	85.591
Methane	6.12	16.04	0.98	0.031	38.02	158.209	143.525
Hydrogen	20.86	2.02	0.42	0.013	16.32	67.911	61.608
			32.12	1	1244		
			AMW				

Mayacma Geothermal Net GHG Emissions

9.58 MW gross (total not reducing for parasitic load) and 7.5 MW net (to the grid) or 62,415 MWh/year assuming 95% capacity factor.

Source	CO2 emissions (g/kWh)
Amended BRPP	66
Geothermal California Average	107
Geothermal US Average	122
Natural Gas	480
Oil	660
Coal	900

Note: CO2 emissions only, does not take into account other GHGs

Source: Energy Sector Management Assistance Program, Greenhouse Gases From Geothermal Production, April 2016.

Amended BRPP

Source	CO2e (metric tons/year)
Geothermal Process	8,137
Mobile Sources	40
	8,177

Existing 55 MW BRPP Speculative Emissions

Assume 50 MW Net

50 MW X 8322 hours/year = 416100 MWh/year

107 g/kWh = .107 metric tons/MWh

44,523 metric tons of CO2/year

Mayacma Operation Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Mayacma Operation
Operational Year	2026
Lead Agency	CEC
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.20
Precipitation (days)	50.2
Location	38.834883075233535, -122.7685430411081
County	Lake
City	Unincorporated
Air District	Lake County AQMD
Air Basin	Lake County
TAZ	243
EDFZ	2
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric
App Version	2022.1.1.28

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Heavy Industry	1.00	1000sqft	0.02	1,000	0.00	—	—	—

General Heavy Industry	1.00	1000sqft	0.02	1,000	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.09	0.08	0.06	1.17	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	0.00	256	256	< 0.005	0.01	1.09	259
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.09	0.08	0.06	1.05	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	0.00	249	249	< 0.005	0.01	0.03	251
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.09	0.08	0.07	0.94	< 0.005	< 0.005	0.27	0.27	< 0.005	0.07	0.07	0.00	240	240	< 0.005	0.01	0.47	242
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.02	0.01	0.01	0.17	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.01	0.00	39.7	39.7	< 0.005	< 0.005	0.08	40.1

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.05	0.04	0.06	1.17	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	—	256	256	< 0.005	0.01	1.09	259
Area	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.09	0.08	0.06	1.17	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	0.00	256	256	< 0.005	0.01	1.09	259
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.05	0.04	0.06	1.05	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	—	249	249	< 0.005	0.01	0.03	251
Area	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.09	0.08	0.06	1.05	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	0.00	249	249	< 0.005	0.01	0.03	251
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.04	0.04	0.07	0.94	< 0.005	< 0.005	0.27	0.27	< 0.005	0.07	0.07	—	240	240	< 0.005	0.01	0.47	242
Area	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.09	0.08	0.07	0.94	< 0.005	< 0.005	0.27	0.27	< 0.005	0.07	0.07	0.00	240	240	< 0.005	0.01	0.47	242
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.01	0.17	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.01	—	39.7	39.7	< 0.005	< 0.005	0.08	40.1
Area	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.02	0.01	0.01	0.17	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.01	0.00	39.7	39.7	< 0.005	< 0.005	0.08	40.1

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.05	0.04	0.06	1.17	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	—	256	256	< 0.005	0.01	1.09	259
Total	0.05	0.04	0.06	1.17	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	—	256	256	< 0.005	0.01	1.09	259
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.05	0.04	0.06	1.05	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	—	249	249	< 0.005	0.01	0.03	251
Total	0.05	0.04	0.06	1.05	< 0.005	< 0.005	0.28	0.28	< 0.005	0.07	0.07	—	249	249	< 0.005	0.01	0.03	251
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	0.01	0.01	0.01	0.17	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.01	—	39.7	39.7	< 0.005	< 0.005	0.08	40.1
Total	0.01	0.01	0.01	0.17	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.01	—	39.7	39.7	< 0.005	< 0.005	0.08	40.1

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Heavy Industry	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
General Heavy Industry	8.00	8.00	8.00	2,920	400	400	400	146,000
General Heavy Industry	4.00	4.00	4.00	1,460	80.0	80.0	80.0	29,200

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	3,000	1,000	—

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	0.00

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Heavy Industry	0.00	0.00
General Heavy Industry	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Heavy Industry	0.00	—
General Heavy Industry	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	17.6	annual days of extreme heat
Extreme Precipitation	23.1	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	39.1	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	3	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	3	1	1	3
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	16.8

AQ-PM	0.12
AQ-DPM	2.31
Drinking Water	49.6
Lead Risk Housing	33.7
Pesticides	50.9
Toxic Releases	0.11
Traffic	4.34
Effect Indicators	—
CleanUp Sites	18.7
Groundwater	36.8
Haz Waste Facilities/Generators	16.6
Impaired Water Bodies	23.9
Solid Waste	42.3
Sensitive Population	—
Asthma	51.6
Cardio-vascular	44.5
Low Birth Weights	48.5
Socioeconomic Factor Indicators	—
Education	13.1
Housing	44.5
Linguistic	0.00
Poverty	54.0
Unemployment	—

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—

Above Poverty	43.00012832
Employed	4.606698319
Median HI	40.07442577
Education	—
Bachelor's or higher	64.96856153
High school enrollment	100
Preschool enrollment	84.08828436
Transportation	—
Auto Access	74.57975106
Active commuting	41.98639805
Social	—
2-parent households	35.81419222
Voting	58.64237136
Neighborhood	—
Alcohol availability	91.99281406
Park access	19.45335558
Retail density	2.271269088
Supermarket access	29.47517002
Tree canopy	99.0632619
Housing	—
Homeownership	80.55947645
Housing habitability	69.5110997
Low-inc homeowner severe housing cost burden	61.85037854
Low-inc renter severe housing cost burden	30.14243552
Uncrowded housing	62.10701912
Health Outcomes	—
Insured adults	21.95560118
Arthritis	0.0

Asthma ER Admissions	63.1
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	25.5
Cognitively Disabled	24.2
Physically Disabled	21.7
Heart Attack ER Admissions	63.6
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	19.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	88.7
SLR Inundation Area	0.0
Children	93.4
Elderly	6.0
English Speaking	98.1
Foreign-born	5.4

Outdoor Workers	20.8
Climate Change Adaptive Capacity	—
Impervious Surface Cover	99.9
Traffic Density	1.6
Traffic Access	0.0
Other Indices	—
Hardship	56.0
Other Decision Support	—
2016 Voting	52.5

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	15.0
Healthy Places Index Score for Project Location (b)	49.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Operations: Vehicle Data	4 employees per day, 50 miles per trip one way trip 1 vendor and 1 haul truck trip per day, 20 miles per one way trip
Operations: Fleet Mix	employee trips assumed to be automobiles truck trips assumed to be half heavy and half medium duty trucks
Operations: Architectural Coatings	no coating
Operations: Landscape Equipment	no landscaping
Operations: Energy Use	mobile sources only
Operations: Water and Waste Water	mobile sources only
Operations: Solid Waste	mobile sources only
Operations: Refrigerants	mobile sources only
Operations: Road Dust	All roads paved

Appendix C – Biological Resources Technical Report

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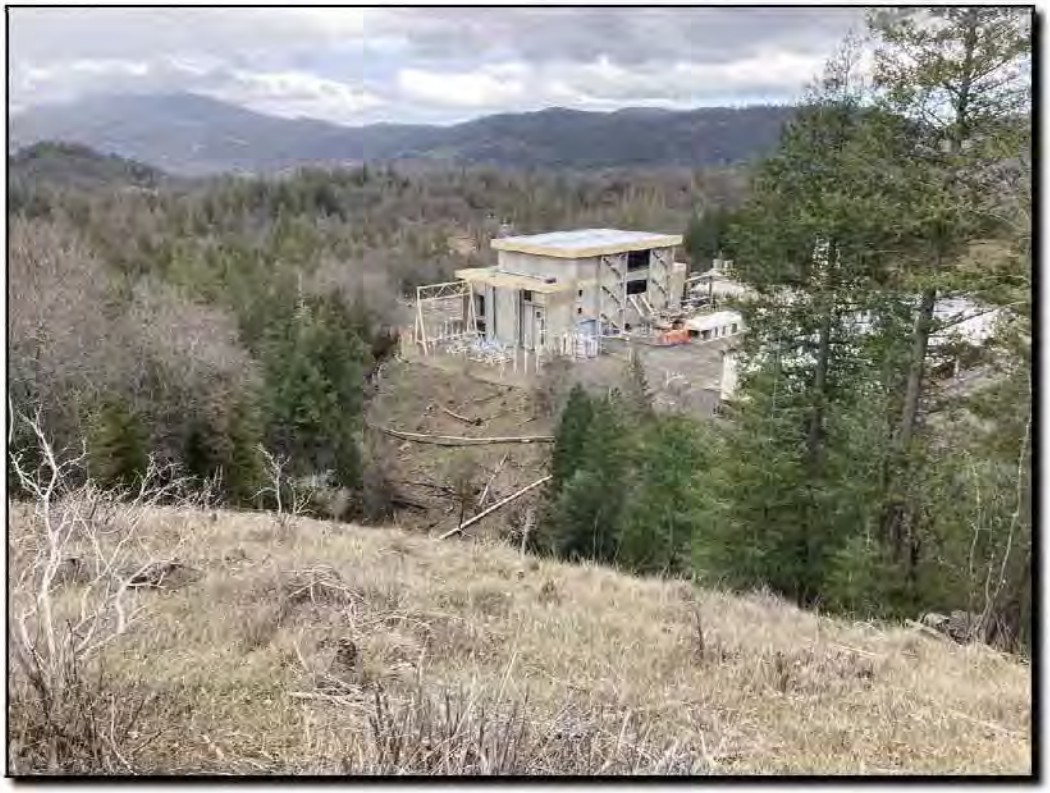
Biological Evaluation Report



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