

DOCKETED

Docket Number:	79-AFC-04C
Project Title:	Compliance - Application for Certification of DWR Bottlerock Geothermal Project
TN #:	262314
Document Title:	Appendix 2 Compiled Part 3_Rev1
Description:	N/A
Filer:	John C Casteel
Organization:	Mayacma Geothermal LLC
Submitter Role:	Applicant
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C. Diesel fuel utilized shall be California Low Sulfur Diesel containing less than 15 ppmw sulfur.

D. If a vapor dominated resource is encountered and it is determined that emissions cannot be maintained pursuant to Parts A & B of LCAQMD Rule 421; or the APCO determines that the well on stand-by (bleed) status will violate the intent of LCAQMD Rule 602, then BRP shall with approval of the APCO, install and utilize additional abatement equipment as necessary to bring emissions into compliance. This may include, but is not limited to, immediate conversion to an injector, gas capping, down-hole plugging, and/or the complete closing in of any well in violation of LCAQMD Rules and Regulations.

E. BRP shall utilize the same particulate scrubbing system (or an equivalent system approved by the APCO) as that utilized in recent drilling projects as described in the permitting reviews and includes the following configuration: a) A multi-port 60 GPM or greater adjustable low pressure water injection system in the 13" inside diameter portion of the blooie line (non-constricting venturi) combined with at least 20,000 lbs/hr steam. The constricting venturi scrubber shall not be required when drilling in greater than 20,000 lbs/hr of steam, or when the pressure drop exceeds four (4) PSI across the venturi. Both constricting and non-constricting venturis shall be as submitted and reviewed by the LCAQMD; b) Particulate control equipment incorporating: a smooth expansion blooie line with low pressure injection treatment; an approximate eight foot (or greater length) section of rectangular ducting sized and smoothed to the cyclone inlet to allow expansion and laminar flow into the cyclone inlet; a cyclone inlet with a trajectory that avoids the outlet barrel; a smooth internal surface with all protrusions and pockets removed; a shortened outlet barrel to approximately 1.25 times the inlet height; and acceptable measurement devices to ensure flows and pressures are properly monitored; c) If during drilling the subject well, significant liquid, gas or particulate carry through occurs from the cyclone separator stack as a result of unusual circumstances or equipment failure, including but not limited to unexpected large steam or gas entries or water flashing down hole, BRP shall notify the LCAQMD immediately and in no case longer than one (1) hour, per Rule Section 510. Such occurrences shall be logged in the bound logbook and the emission and/or resulting evidence documented, to the extent possible, by photographs or video recording. BRP shall provide information on such events and forward such to the LCAQMD within 15 days of occurrence; and d) The APCO may modify these requirements based upon presentation of new information and selection of alternatives proven to be more effective.

F. BRP shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act (AB2588) as specified in Sections 44300 - 44394 of the California Health and Safety Code.

G. BRP shall apply for a Permit to Operate and prove compliance with these conditions within 180 days of commercial operation.

Condition 3: Notification

A. BRP shall notify the LCAQMD pursuant to Rule 510, upon breakdown and/or loss of emissions control from this drilling project.

B. In the event that emissions exceed the allowable limits contained in Condition 1, BRP shall notify the LCAQMD within one (1) hour and shall report: a) The cause of the exceed; b) The actions taken or proposed to minimize emissions and achieve compliance; and c) The estimate of emissions and duration of noncompliance.

C. BRP shall notify the LCAQMD at least twenty-four (24) hours prior to initiating the scheduled venting of any well or group of wells in the LCAQMD owned or operated by BRP. This notice shall also apply to scheduled installation of a liner while the well continues to produce steam. Unscheduled venting, necessary to prevent well damage, shall be reported as a breakdown pursuant to Rule 510. A written report shall be submitted to the LCAQMD, within three (3) days (72 hours) documenting: a) The need for venting; b) The duration of venting; c) Estimated steam flow and emissions; d) Muffler utilization; e) Abatement utilization; and f) The likelihood or need for future occurrences.

D. In the event that any emissions or the steam plume obscure visibility or create a hazard, BRP shall ensure that posting, warning or other necessary steps are made to ensure safe passage for the public.

E. BRP shall promptly notify the LCAQMD in writing should any incident of occupational concern take place where toxic air emissions occur and are allowed to disperse into the ambient air as a mitigation.

F. BRP shall provide a written report of any changes of the estimated amount of serpentine and crystalline silica material expected to be drilled during the air phase as early as practical. Upon completion of drilling, BRP shall provide a final report within sixty (60) days detailing any significant quantity of serpentine or crystalline silica material actually encountered during drilling.

Condition 4: Modification

A. BRP shall apply for and receive an Authority to Construct permit prior to the addition of different or new equipment not identified in this permit or covered in the permitting review. The Hearing Board, at a properly noticed public hearing, may grant deviation from these conditions.

Condition 5: Monitoring and Testing

A. BRP shall perform and forward to the LCAQMD the following characterization of hot water, steam particulates and/or gases emanating from the subject well within sixty (60) days after the completion of drilling. If the well is to be abandoned, no analyses will be necessary. a) STEAM CONDENSATE/TOTAL STEAM - Ammonium, Arsenic, Asbestos, Benzene, Bicarbonate and Carbonate, Boron, Bromides, Cadmium, Chlorides, Chromium, Fluorides, H₂S, Lead, Mercury, Nickel, Nitrates, pH, Silica, Selenium, Sulfates, Zinc, Total Dissolved Solids, Total Suspended Solids, Percent Non-Condensables, Steam Flow and Temperature. b) GAS PHASE - Ammonia, Benzene, Carbon Dioxide, H₂S, Methane, Non Methane Hydrocarbons, Mercury Vapor, and Radon 222 and daughters. c) STEAM PARTICULATE*: Arsenic, Boron, Cadmium, Chromium, Lead, Nickel, Total Sulfur (mass all in µg/Kg of steam); Asbestos (fibers/Kg of steam); NESHAP and AB 2588 air pollutants as requested. Tests can be performed utilizing the bleed of the subject well. A test protocol shall be submitted to the LCAQMD at least three (3) weeks before such sample collection and analytical testing is scheduled to occur and shall be approved by the APCO prior to actual source testing. If the well is promptly put into a no-vent state, these tests may be delayed upon request of BRP by concurrence of the APCO until such time as the well is placed on vent for 30 or more days. *Testing of this type shall consist at a minimum of an XRF analysis of suspended and/or dissolved solids.

B. In the event source testing is deemed necessary by the APCO, BRP shall be available within ten days after written notice, to open the well for a 4 to 8 hour duration.

C. If analyses performed as part of Condition 5-A suggests the need for further study, including air dispersion analysis, BRP will assist, perform, or finance such studies if deemed reasonable and necessary by the APCO.

D. BRP shall install and utilize an in-line continuous H₂S monitor or other appropriate equipment to ascertain the levels of this pollutant as a function of depth of drilling. Logging data and test results shall be immediately available to LCAQMD staff upon request at the drill site.

E. Upon request of the APCO, BRP shall perform any additional analytical work necessary to characterize potential emissions from this well prior to applying for a Permit to Operate.

F. If a hot water resource is discovered during the drilling of this well, BRP shall, prior to testing to determine the extent of the resource, submit a test plan to the LCAQMD detailing expected air pollutants and mitigating measures. The LCAQMD will either approve the submitted plan or recommend additional mitigating measures necessary, in writing, prior to actual testing. Total emissions from testing shall be limited to the amount specified in Condition 1.

G. The treatment and use of mud waters for reuse in air drilling is acceptable provided: a) Oils or other hydrocarbons contaminating any reclaimed mud waters are separated prior to use in blooie line treatment during air drilling; and b) The water is analyzed for and shown free of asbestos, and the analysis results are provided to the APCO within three (3) working days of finishing mud water treatment(s).

H. If the well is placed on long-term standby bleed, BRP shall test the well to determine the H₂S emissions within three (3) days, and retest the well no sooner than one (1) week, and no later than two (2) weeks after the first test, and thereafter upon a 10% or greater change of flow rate. If emissions are within 90% of the allowable H₂S limit, a program of additional testing may be required by the APCO. A written monthly report shall be forwarded to the LCAQMD updating the well status and the estimated emissions, upon request of the APCO.

I. At the request of the APCO, BRP shall fund, install and maintain an air quality monitoring site (H₂S, wind direction, wind speed and temperature) to assist the District in determining compliance with the H₂S Ambient Air Quality Standard (AAQS). Continued participation in the Geysers Air Monitoring Program or a similar monitoring program will continue to be required during and beyond the scope of this project.

J. If significant dust complaints are received BRP shall fund, install, and maintain a continuous Federal Equivalent Method Particulate Matter (PM) sampler within fifteen (15) days of request by the APCO.

K. BRP shall fund, install, and maintain, an H₂S air quality monitoring station during the active drilling phase, located between the rig and the property line nearest the closest downwind residence in order to monitor H₂S emissions associated with construction. This station shall include sufficient power and a port available for a PM monitor operated by LCAQMD or BRP if deemed necessary by the APCO. Upon written request, the APCO may approve the removal of the monitoring station provided significant impacts are not occurring. The H₂S air quality monitoring station shall be re-installed and operated should significant impacts reoccur.

Condition 6: Identification and Access

A. This permit shall be posted at the project site during the time the drill is on site, and be available for BRP and LCAQMD staff upon request.

B. BRP shall provide the LCAQMD, ARB and, Environmental Protection Agency staff entry and safe access to the project site/equipment for the purpose of inspection, source testing, and/or air monitoring activities.

This permit is based on the equipment and process submitted by BRP and considered in this Authority to Construct assessment. The permit issuance is based on the assumption that the operation of this source, as conditioned, will not result in a violation of LCAQMD Rules and Regulations nor contribute to an exceed of any state or federal AAQS.



PERMIT TO OPERATE

Lake County Air Quality Management District

2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # P/O 2014-09

By: *Douglas G. Gearhart*
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: II

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: Bottle Rock Power Plant
Location: Bottle Rock Power Steamfield Storage Yard
7557 High Valley Rd.
Cobb, CA 95426

Name and Equipment Description: Gasoline and/or Diesel Dispensing Facility

One (1) ConVault above ground split storage tank (500 gallons unleaded and 500 gallons diesel). Phase I vapor recovery: pressure/vacuum (P/V) vent (make Husky, model 5885), 11 ft. Phase II vapor recovery: One (1) diesel dispenser and one (1) unleaded dispenser (make Fillrite, model 305AST), two (2) nozzles (make Husky, model H5010), and two (2) hoses (make Dayco, model DL 509).

Permit Conditions

Condition 1: Emissions

- A. The Phase I vapor recovery system shall be properly connected and utilized during all storage tank filling operations.
- B. The Phase II vapor recovery system shall be properly connected and utilized during all vehicle fueling.
- C. Bottle Rock Power, LLC (BRP) shall maintain all equipment in good working order pursuant to manufacturer's guidelines and applicable California Air Resources Board (ARB) certification, and operate in a manner to prevent or minimize air emissions and gasoline leaks.
- D. BRP shall immediately correct any gasoline or vapor leak, and all equipment breakdowns shall be reported to the Lake County Air Quality Management District (LCAQMD) pursuant to Section 510, LCAQMD Rules and Regulations.

Condition 2: Administrative

- A. This permit has been issued for the purpose of on site fuel dispensing (no fuel sales), with annual use not to exceed 50,000 gallons.
- B. The Phase I vapor recovery system installed on the storage tank(s) shall meet the certification requirements of the ARB.
- C. The Phase II vapor recovery system shall be maintained to meet ARB certification requirements.
- D. All gasoline storage tanks shall have submerged drop tube/fill pipes terminating a maximum of 6" from the tank bottom.

(Conditions 2 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

This permit does not authorize the emission of air contaminants in excess of those allowed by the California Health and Safety Code or the Regulations of the Lake County Air Quality Management District. This permit cannot be considered permission to violate existing laws, ordinances, regulations, or statutes of other government agencies. The provisions of this Permit are severable. If any provision of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.

E. Properly gasketed caps shall be maintained on the product fill adapter and vapor adapter on all gasoline storage tanks.

F. BRP shall maintain hold open latches on all nozzles unless otherwise exempt.

G. BRP shall conspicuously post and maintain an approved "Air Toxic Risk" warning notice on each dispenser and maintain the warning signs in a good readable condition.

H. When a component is determined to be defective the equipment shall be immediately removed from use by BRP.

I. When a component is determined to be defective and the component is tagged "Out of Order", BRP shall not use or permit the use of the component until the component is properly repaired, replaced or adjusted and re-inspected, or authorized for use.

J. BRP shall comply with the requirements of the Air Toxic "Hot Spots" Information and Assessment Act as specified in Sections 44300-44394 of the California Health and Safety Code.

Condition 3: Records and Reporting

A. BRP shall provide the LCAQMD a written report of annual gasoline use within 15 days of request and annually by October 31st of each year.

Condition 4: Modification

A. BRP shall apply for and receive an Authority to Construct permit prior to the addition or alteration of any piping, dispenser(s), vapor recovery equipment, or tank(s). Equipment replacement for routine maintenance is allowed with LCAQMD concurrence.

B. If gasoline use exceeds 50,000 gallons for any one (1) year, BRP shall apply for and receive an Authority to Construct permit for the increase of use.

Condition 5: Monitoring

A. The herein permitted facility shall not cause a public nuisance nor make a measurable contribution to any Ambient Air Quality Standard exceed. Should the operation of this facility result in odor or health complaints, or be determined to be an unacceptable health risk, the LCAQMD may require under Sections 430 and 670, monitoring, testing, and mitigation by BRP to abate said condition.

Condition 6: Identification and Access

A. This permit shall be posted at the equipment site and be available for BRP's reference and LCAQMD staff inspection. The LCAQMD or its representative shall be given free access of entry for the purposes of monitoring, inspecting or collecting samples during normal business hours.



AUTHORITY TO CONSTRUCT

Lake County Air Quality Management District

2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # A/C 2010-14

By: *Douglas G. Gearhart*
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: Vb

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: Bottle Rock Facility
Location: Sections 5&6, T11N, R8W, MDB&M, Lake
County
Bottle Rock / Francisco Leasehold, Cobb Valley,
CA

Name and Equipment Description: Steam Transmission Line

One (1) geothermal fluid collection line, associated valving, condensate collection including re-injection line, and steam release abatement system with particulate and H₂S removal servicing the Bottle Rock Geothermal Power Plant and one (1) 2002 78hp John Deere Backhoe Loader EIN #MM5E57. Francisco Pad: one (1) 6,200 gallon vent tank, one (1) 1,500 gallon vent tank, one (1) TECO-Westinghouse (or equivalent) 20 hp electric motor, one (1) 500 gpm Gorman-Rupp (or equivalent) pump, Associated piping, instrumentation, and valves. Coleman Pad: one (1) 1,500 gallon vent tank, up to two (2) 20,000 gallon Baker tanks, one (1) TECO-Westinghouse (or equivalent) 20 hp electric motor, one (1) 500 gpm Gorman-Rupp (or equivalent) pump, associated piping, instrumentation, and valves. West Coleman Pad: one (1) 6,200 gallon vent tank, one (1) 1,500 gallon vent tank, associated piping, instrumentation, and valves.

Permit Conditions

Condition 1: Emissions

A. Condensate bleeds shall be opened and utilized only as necessary during cold start-up of the geothermal fluid transmission line. Other bleeds necessitated by continuous normal operation of this line shall total less than 0.3 lbs hydrogen sulfide (H₂S) per hour during any one hour. If necessary, abatement systems shall be installed and/or utilized to ensure fugitive H₂S emissions of less than 0.3 lbs/hr.

B. Abatement equipment to be utilized and available to prevent venting of air pollutants into the ambient air shall include an Emergency Stacking H₂S Abatement System* capable of treating 100% of the total steam flow delivered through the transmission line; a by-pass to the surface condenser of the serviced power plant and abatement to the same level of emissions as required of the power plant; and the ability to remotely and within minutes cut back steam flow to not more than 50% of full steam flow. All abatement facilities shall be used in series and individually as necessary to ensure that an emissions rate of not more than 5 lbs H₂S/hr is obtained.

* This abatement system is described in detail in a document entitled, Emergency Steam Stacking H₂S Abatement Study, Bottle Rock Steam Gathering System Final Report; February 1982, Job No. 52-3184-001 by Gibbs & Hill for MCR.

C. Dust emissions of three (3) minutes duration in any one (1) hour will be kept below 20% opacity by use of water, palliatives, or surfacing of roads, pads and parking areas during the construction and operation of condensate collection system modification.

D. In the event of generalized atmospheric conditions or localized dangerous contamination of such a nature as to constitute an emergency creating a danger to the health and welfare of the citizens of Lake County, the Lake County Air Quality Management District (LCAQMD) will take immediate action by requiring Bottle Rock Power, LLC (BRP) to reduce or discontinue air contaminant emissions immediately from fluid (steam) transmission lines. A hearing shall be held by the LCAQMD Hearing Board as soon as practical after such action has been taken to determine whether such reduction or discontinuance shall continue, and if so, under what conditions.

E. Steam stacking under normal operations shall be treated by the use of the turbine by-pass to power plant condenser and abated utilizing the power plant abatement system. A de-mister or water scrubber shall be used to ensure compliance with LCAQMD Rule 411 when venting directly downstream and utilizing the steam stacking emergency abatement system.

F. When the total accumulative emissions from this development project during construction reach the five (5) pounds per hour level, or public nuisance issues be validated, BRP shall, at the request of the Air Pollution Control Officer (APCO), assist in obtaining funding to install and maintain, or fund the LCAQMD to install and maintain, an air quality monitoring site (H₂S, wind direction, wind speed, temperature) to assist the LCAQMD in determining compliance and the validity of emission limitations as set forth in these conditions.

G. Regarding the turbine by-pass to main condenser power plant abatement system, BRP shall, to the extent possible, work to incorporate reliable and proven valves, noise attenuation of the valving, and desuperheating of by-passed steam/or account for in the design of the system, to maintain the ability to

(Conditions 1 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

This permit does not authorize the emission of air contaminants in excess of those allowed by the California Health and Safety Code or the Regulations of the Lake County Air Quality Management District. This permit cannot be considered permission to violate existing laws, ordinances, regulations, or statutes of other government agencies. The provisions of this Permit are severable. If any provision of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.

successfully by-pass 100% of the steam load.

H. BRP shall operate and maintain the Emergency Steam Stacking Abatement System as permitted and as subsequently modified. At a minimum the following shall be operated as needed: de-superheat failure alarm, adequate water source and injection rate to facilitate abatement of H₂S and aerosol/mist; emergency electric generator with sufficient power for the operation of all supply systems for water, chemicals, etc., and enable continuous operation of the system independent of service line power; mist eliminators with ~50% 4um, and 95% 8um cutoffs; ability to automatically initiate abatement upon a direct venting event; sized to treat up to 1,000,000 pounds of steam per hour; proper winterization by insulation, heating, etc., of the NaOH storage and delivery lines, water source and all other components necessary for operation adversely effected by freezing weather; mechanisms to ensure proper calibration and checks of the chemical delivery system; planned retrofit of a catalyst injection system should such be required to facilitate attainment of the specified emissions limitation; ability to treat 450 ppm H₂S steam at 500,000 lbs per hour for up to 100 hours without chemical delivery; and acoustical treatment of valves and piping to ensure system availability during stacking and compliance with use permit and occupational noise standards.

The above Emergency Stacking Abatement System shall be operationally perfected during the initial use phase. The mole ratio of H₂S in excess of five (5) lbs/hr to NaOH shall be 1.0 to 6.0 (H₂S:NaOH) and for H₂O₂ it shall be 1.0 to 4.0 (H₂S:H₂O₂). Ratios may be altered as determined consistent with obtaining the most efficient use of necessary chemicals while attaining the five (5) lbs H₂S/hr limitation. At the LCAQMD's request, BRP shall prepare and submit an abatement performance plan pursuant to LCAQMD Rule 655.

Condition 2: Administrative

A. This permit is for a single geothermal steam transmission line servicing a single 55 megawatt power plant and subsequent modification of the condensate collection system. The steam transmission line system shall be maintained in good working order and shall be available under all normal conditions of operation.

B. An abatement contingency plan will be prepared/updated and submitted to the LCAQMD within 180 days of issuance of this permit outlining those actions to be taken to reduce emissions to acceptable levels in the event of extended simultaneous outage (in excess of 90 min.) of the power plant and associated steam transmission line abatement equipment. The plan will include at a minimum: 1) How field operations staff will be made aware of and be prepared to implement the plan; 2) Methods to be utilized to reduce emissions; 3) How LCAQMD staff can be assured of and aided in determining compliance with the plan; and 4) How notification of such outage and reduction of emissions will occur.

C. These conditions are based on the assumption that this project as conditioned will not result in violation of LCAQMD Rules and Regulations. This permit is also subject to concurrence by the California Air Resources Board and the Environmental Protection Agency within thirty (30) days of receipt, and prior to becoming effective.

Condition 3: Records and Reporting

A. BRP shall notify the LCAQMD at least twenty-four (24) hours in advance of any scheduled venting of the pipeline or well facilities.

B. The APCO or his representative's approval shall be obtained prior to any cold start-up of the geothermal fluid transmission line which is expected to result in more than five (5) lbs H₂S/hr emissions. The APCO shall give his approval unless existing meteorological and/or prevailing air quality indicates poor air dispersion exists at the time. The APCO may cancel cold start-ups once initiated if, in his opinion, it becomes necessary.

C. BRP shall install a device capable of monitoring total steam flows to the plant, stacking muffler or other likely venting points, and will provide records and summary reports of gathered data to the LCAQMD after reasonable request for same. This information shall be held as confidential if allowed by law and so requested by BRP in writing per Section 533 of LCAQMD Rules and Regulations.

D. Within one hundred eighty (180) days after initial operation BRP shall submit to the LCAQMD an application for a Permit to Operate the pipeline system.

Condition 4: Modification

A. BRP shall submit an application for and receive an Authority to Construct prior to the commencement of construction in the event any further additions are proposed to the pipeline system.

B. Significant deviations from conditions of this permit can only be granted by the APCO after a public hearing or by Hearing Board action.

Condition 5: Monitoring and Testing

A. If the chemical analysis of ambient air indicates to the APCO that substantial change to existing conditions is resulting from operations of BRP's pipeline systems, and the APCO determines that this change would require further study to ascertain compliance, including air dispersion analysis, BRP will assist, perform, or assist in obtaining financing of such studies deemed reasonable and prudent by BRP and the APCO.

B. BRP will perform or cause to be performed on a bi-annual basis, a source test for all components listed below upon written request by the LCAQMD. The LCAQMD will approve the sampling and chemical analytical techniques prior to planning for tests and be contacted forty-eight (48) hours prior to source testing in order to certify the analytical techniques.

STEAM CONDENSATE/TOTAL STEAM: Benzene, Ammonium (total), Arsenic, Bicarbonate and Carbonate, Sulfates, Chlorides, Nitrates, Calcium, Boron (total), Hydrogen Sulfide (total), Fluorides (total), Iron, Conductivity (mhos 25°C), Mercury (total), pH, Total dissolved solids, and Total suspended solids.

GAS PHASE: Benzene, Particulate in Steam (ug particulate/g of Steam, Arsenic, Lead, Cadmium, Total Sulfur, Boron), Mercury Vapor, Carbon Dioxide, Radon 222 and daughters, Methane, NonMethane Hydrocarbons, Carbon Dioxide, Other non-gases as indicated by condensate analysis NESHAPS pollutants as requested, Steamflow and Temperature.

C. Upon request of the APCO, BRP shall ensure that reliable H₂S monitoring equipment is installed, calibrated, operated and maintained, capable of measuring H₂S from stacked and delivered steam once every 24 hours. Records and summary reports of gathered monitoring data shall be provided to the LCAQMD upon request.

Condition 6: Identification and Access

A. If locks or secured gates are utilized to protect the project area, the LCAQMD will be provided keys or combinations and will have free access of entry and exit for District personnel or representatives for the purposes of monitoring and inspection.



PERMIT TO OPERATE

Lake County Air Quality Management District

2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # P/O 2010-04

By: Douglas G. Gearhart
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: IV

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: Bottle Rock Facility
Location: Sec 5, T11N, R8W, MDB&M Lake County
Francisco/Coleman Leasehold, Cobb Valley, CA

Name and Equipment Description: Steam Transmission Line Modifications

Three (3) gate valves on the Steam Transmission Line to provide full isolation of the Francisco Pad, West Coleman Pad, and Power Plant. Two (2) sets of steam wash nozzles, and associated pumps, valves, and piping, located upstream of the main steam separator. Variable speed chemical feed pumps on the emergency steam stacking emissions control system connected to the Distributed Control System.

Permit Conditions

Condition 1: These modifications were done to the previously existing geothermal fluid (steam) transmission pipeline, steam wash, and emergency steam stacking system servicing the Bottle Rock Power Plant; all other permits, associated conditions, and limitations are not modified. The pipeline shall be constructed and operated in a manner to not increase steam stacking during scheduled and unscheduled power generation or transmission line outages or during power plant startups and shutdowns of the unit. Equipment utilized and/or modified which is significantly different than that described in the permit application is subject to permit application and review.

Condition 2: Pipeline cleanout, testing and startup emissions shall be consistent with the submitted project application and minimized to the extent feasible. Bottle Rock Power, LLC (BRP) shall provide the Lake County Air Quality Management District (LCAQMD) seventy-two (72) hours advance notice of scheduled cleanout and testing operations and obtain prior Air Pollution Control Officer (APCO) approval for the date and time of emissions release or obtain a variance.

Condition 3: All drain water discharged shall be directed to the rich condensate collection and disposal line.

Condition 4: This permit does not modify or make less restrictive any emission limitation, reporting, and/or monitoring/testing requirements that presently exist for this facility.

Condition 5: BRP shall provide the LCAQMD, no less than thirty (30) days subsequent to installation of the herein authorized modification, with as-built drawings for the modification, including all steam or gas vent locations.

Condition 6: BRP shall provide safe access to sampling ports that enable representatives of the LCAQMD, California Air Resources Board, or Environmental Protection Agency to collect samples, as approved by the APCO, from the steam stacking muffler, condensate collection basins, or any point release of steam, gas, or emissions to the ambient air.

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

This permit does not authorize the emission of air contaminants in excess of those allowed by the California Health and Safety Code or the Regulations of the Lake County Air Quality Management District. This permit cannot be considered permission to violate existing laws, ordinances, regulations, or statutes of other government agencies. The provisions of this Permit are severable. If any provision of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.



AUTHORITY TO CONSTRUCT

Lake County Air Quality Management District
2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # A/C 90-001

By: *Douglas G. Gearhart*
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: IV

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: West Coleman Padsite
Location: 640m N of S, 150m W of E, Section 6, T11N,
R8W, MDB&M, Lake County
Bottle Rock / Francisco Leasehold, Cobb Valley,
CA

Name and Equipment Description: W. Coleman 1-6 Re-Drill

One (1) geothermal production well, associated valving, condensate and rock removal (catcher) and bleed muffler servicing the Bottle Rock Geothermal Power Plant.

Permit Conditions

Condition 1 Bottle Rock Power, LLC (BRP) shall operate the proposed abatement system to limit emissions during drilling, initial clean out, and testing to a rate of no more than five (5.0) pounds of hydrogen sulfide (H₂S) per hour. Should atmospheric conditions result in nuisance complaints or H₂S monitoring at the Glenbrook monitoring station exceed 15 ppb, BRP shall limit emissions to no more than two (2) pounds H₂S per hour at the request of the Lake County Air Quality Management District (LCAQMD). Detached plume opacity shall be controlled to a 10% opacity by the injection of no less than 60 GPM and excessive splash over or carry through of drift shall be prevented by properly sizing a cyclone scrubber or other acceptable method. Should the well drilling encounter the condition described as "pink or red plume" during the air drilling, initial cleanout, or testing of the herein permitted geothermal well(s), BRP shall act promptly to enter such information into the abatement log book required as part of the performance plan and shall notify the LCAQMD within one (1) hour after such entry is made. BRP shall have posted on site with the permit, phone numbers of the LCAQMD office (263-7000) or Air Pollution Control Officer (APCO) (391-3232) for contact should such incident occur. BRP shall promptly install an improved blooie line water injection/cyclonic separator for the efficient abatement of high loading of small sized particulate (e.g. 0.5 to 5.0 micron). Said system shall be capable of a water injection capacity of a minimum of (400) GPM with as long a residence/contact time as is practicable. Alternate technological approached as proposed by BRP and approved by the APCO shall be allowed and encouraged, including a reduction in drilling rate and misting down hole.

Condition 2 Road, pad, and yard dust for three (3) minutes or more duration in any one (1) hour shall be kept below Ringelmann 0.5 at all times by making use of watering, palliatives, oiling/chip seal, or surfacing of raods used regularly. BRP shall perform or have performed, at LCAQMD request and by a LCAQMD approved method, geological sampling of serpentine exposures of the pad site and/or access road and provide analysis of the asbestos content of the material prior to the construction. BRP shall surface or otherwise cover and maintain all areas identified as containing significant amounts of asbestos which are subject to vehicular wear.

Condition 3 BRP shall promptly notify the LCAQMD in writing should they learn of or encounter conditions where toxic air emissions of concern from an occupational standpoint occur and which are allowed to disperse into the ambient air as a mitigation. BRP shall install, maintain, and operate a gas alarm at a location and as approved by the APCO.

Condition 4 The BRP H₂S abatement plan on file with the LCAQMD is accepted contingent upon changes incorporated herein and shall be followed and implemented. Entries made into an onsite log book shall occur a minimum of four (4) times daily once abatement is initiated, and entries shall be made in ink and signed by a responsible person in a format acceptable to the LCAQMD. The abatement equipment, an abatement performance plan, and log book shall be onsite prior to air drilling. The LCAQMD shall be promptly informed as to the responsible onsite person and location of the log book. The official

(Conditions 4 through 14 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

This permit does not authorize the emission of air contaminants in excess of those allowed by the California Health and Safety Code or the Regulations of the Lake County Air Quality Management District. This permit cannot be considered permission to violate existing laws, ordinances, regulations, or statutes of other government agencies. The provisions of this Permit are severable. If any provision of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.

log book shall be maintained at one location, and copies and/or any information contained therein shall be provided to the LCAQMD upon request. The wet cyclone particulate scrubber used as part of the emissions control system shall be maintained in good working order and supplied with a minimum of 60 GPM water. A device acceptable to the LCAQMD to ensure this flow shall be installed upon request of the LCAQMD. Any failures of this abatement system(s) while air drilling shall be logged in the referenced log book. Initial chemical availability on site shall be a minimum of 500 gallons of both peroxide and caustic to allow for the abatement of unexpected upset conditions and subsequently shall be maintained at a quantity necessary for a 24 hour minimum supply based upon the most recent chemical use rate. During well flow testing these limits shall not apply, and planned complete consumption of chemicals is allowable.

Condition 5 If during air drilling, excessively high H₂S levels are encountered, BRP shall either a) Put into operation additional H₂S abatement capacity, or b) Cease operation and close in the well according to appropriate standards of operation. For the purposes of this permit, excessively high pockets of H₂S will mean pockets resulting in abated emissions greater than five (5.0) pounds of H₂S per hour or abated emissions levels in excess of 500 ppm volume.

Condition 6 BRP shall perform and forward to the LCAQMD the following characterization of hot water, steam, particulates, and/or gases emanating from the subject well(s) within sixty (60) days after completion of the initial geothermal drilling and testing.

STEAM CONDENSATE/TOTAL STEAM: Benzene, Ammonium (total)*, Arsenic*, Bicarbonate and Carbonate, Sulfates, Chlorides, Nitrates, Boron (total)*, Hydrogen Sulfide (total)*, Fluorides (total), Mercury (total), pH, Total Dissolved Solids, Total Suspended Solids, Percent Non-Condensables, and Steam Flow and Temperature*.

GAS PHASE: Benzene, Ammonia, Mercury Vapor, Radon 222 and Daughters, Methane, Non-Methane, Hydrocarbons, Carbon Dioxide, and NESHAPS pollutants as requested.

PARTICULATE IN STEAM: (ug particulate/g of Steam) Arsenic, Lead, Cadmium, Total Sulfur, Boron. Tests can be performed utilizing the bleed of the subject well(s) or during flow testing. Gas phase (non-condensables or steam diluted with air as appropriate to maintain gas phase and integrity of sample) tests are to be performed if wells are placed on long term standby bleed. The test protocol shall be submitted to the LCAQMD at least three (3) weeks before such sample collection and analytical testing is planned and shall be approved by the LCAQMD prior to actual source testing. If the well is produced immediately, the LCAQMD may delay required testing (specifically those items without an asterisk) until circumstances require a sustained bleed status of the well; this shall be at the LCAQMD's option and initiated by BRP's timely written request.

Condition 7 If chemical or particulate analysis performed as part of Condition 6 suggests the need for further study including air dispersion analysis, BRP will assist, perform, or finance such studies if deemed reasonable and necessary by the APCO.

Condition 8 BRP shall notify the LCAQMD at least twenty-four (24) hours prior to initiating the planned venting of the herein permitted geothermal well(s) is deemed necessary by the LCAQMD, BRP will be available within ten (10) days after written notice to open said well for a 4-8 hour duration.

Condition 9 If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative, will be given keys or combinations and have free access or entry for purposes of monitoring, inspecting, or collecting samples. If locks or combinations are periodically changed, BRP shall promptly forward new key(s) or combinations to the LCAQMD.

Condition 10 Once a well is placed on standby bleed status, it shall be tested to determine H₂S emissions within three (3) days, and retested no sooner than one (1) week, and no less than two (2) weeks after the first test, and thereafter upon a 10 percent or greater change of flowrate. If the emissions limit allowed by LCAQMD regulation is approached, a program of additional testing may be required. A written brief monthly report shall be forwarded to the LCAQMD updating and clearly stating well status and estimated emissions of each well for the steamfield upon request to the LCAQMD.

Condition 11 BRP shall connect said development well the the BRP steamfield transmission line within sixty (60) days of completion of the subject well(s). Should compliance with this condition not be achieved, the APCO may require that regular emissions testing be instituted, and if necessary, reduced bleed emissions limitations than otherwise required herein. Under proven extenuating circumstances, exceptions to this condition can be allowed by the APCO.

Condition 12 BRP shall participate in the Geysers Air Monitoring Program or a similar air monitoring program, approved by the LCAQMD, in an equitable fashion with other developers to assist the LCAQMD in determining the compliance and validity of conditions set forth herein.

Condition 13 These conditions are for the herein listed geothermal development well. BRP agrees that this permit does not establish a precedent for issuing of future permits to BRP.

Condition 14 Should it be necessary to vent the well(s) located on the West Coleman pad site for a period of more than two weeks, additional reduction in emissions and/or drainage air monitoring for H₂S and meteorology may be required to be installed and operated as approved by the APCO if emissions are shown to contribute to nuisance complaints or an exceed of the Ambient Air Quality Standard (AAQS). All reasonable costs of emissions reduction, installation, and operation of said station shall be the responsibility of BRP for duration of the venting.

The above fourteen (14) conditions are based on the assumption that this project as conditioned, will not result in violation of the LCAQMD Rules and Regulations nor cause or contribute to an exceed of any AAQS. This permit is also subject to concurrence by the California Air Resources Board and the Environmental Protection Agency within thirty (30) days of receipt.



AUTHORITY TO CONSTRUCT

Permit # A/C 2005-46

Lake County Air Quality Management District
2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

By: *Douglas G. Gearhart*
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: IV

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: West Coleman Padsite
Location: West Coleman 2-6, located on Bottle Rock West Coleman Padsite (1155m So. & 134.9m W of the NE Corner Section 6, T11N, R8W, MDB&M, Lake County, N 397,334 E 1,797,546)

Name and Equipment Description: W. Coleman 2-6 Re-Drill

Geothermal drilling rig and accessories (NCPA Rig #1), Four electrical generators (CAT D-398TA 750 HP diesel engines PERP Registered), three air compressors (Cummins QSK19-C700 700 HP turbocharged diesel-powered air compressors PERP Registered), one down hole misting pump; hydrogen sulfide abatement system utilizing high pressure injection of NaOH and H₂O₂; and particulate control equipment consisting of misting down hole, constricting and non constricting venturi contactors, low pressure water spray, expanding blooie line, properly sized, smoothed, tangential wet cyclone, properly designed drop or hopper, water treatment and management systems, necessary metering and measuring devices and associated equipment.

Permit Conditions

Condition 1: Emissions

- A. Bottle Rock Power, LLC (BRP) shall limit hydrogen sulfide (H₂S) emissions during drilling, clean out, and testing to no more than five (5) pounds of H₂S per hour and no more than twenty-four (24) pounds per day during all other phases of this project. During verifiable breakdown and for any hot-liner runs, Rule 510 and procedures shall apply. In the event of atmospheric conditions (e.g., drainage, limited mixing, fumigation, downwash, etc.) that result in complaints and concern in receptor areas from high levels of H₂S, BRP agrees to reduce the H₂S emission limit to two (2) pounds of H₂S using abatement plan at the request of the Air Pollution Control Officer (APCO). Certain exceptions to the H₂S emission limitations may be allowed by the APCO, in writing, for resource testing if such tests are 12 hours or less in duration and coincide with acceptable meteorological conditions verified by the APCO to ensure good dispersion.
- B. If excessively high H₂S levels are encountered during drilling, BRP will either: 1) Place into operation additional H₂S abatement capacity, or 2) Cease operation and close in the well according to appropriate standards of operation. For the purposes of this permit, excessively high levels of H₂S means abated emissions greater than five (5) pounds of H₂S per hour or abated emission levels in excess of 500 ppmv.
- C. Visible emissions shall not exceed the values listed below for more than three (3) minutes in any one (1) hour: • Ringelmann 0.5 (10% opacity) for detached plume at the cyclone; • Ringelmann 0.5 (10% opacity) for combustion emissions of engine exhaust; and • Ringelmann 1 (20% opacity) for road and pad dust emissions.
- D. On commencement of air drilling in significant serpentine, the well logger shall obtain bulk samples that shall be analyzed for asbestos content using TEM, SEM or PLM (California Air Resources Board [ARB] Method 435 Procedures). For the purpose of defining a significant serpentine deposit during geothermal air drilling: "Significant Serpentine" shall mean; drill cutting samples from two consecutive ten-foot interval-drilling sections identified as having 10% or greater serpentine or other asbestos-containing rock. The Lake County Air Quality Management District (LCAQMD) shall be promptly notified by phone at 263-7000, provided samples of the drilled material, and unless otherwise agreed upon in writing, notified of the bulk asbestos analysis results within ten working days of sampling.
- E. During drilling in significant serpentine visible emissions shall not exceed Ringelmann 0.25 (5% opacity) for detached plume at the cyclone. BRP shall: 1) Increase down hole misting; 2) Increase water loading at the venturi; 3) Reduce the drilling rate; 4) Use wetting agents; and/or 5) Implement additional solids filtration of working water. Such additional effort shall continue until drilling is clear of significant serpentine/asbestos.

Condition 2: Administrative

- A. This permit has been issued as a modification to include cleanout, forking or deepening of the well as described in the application and permit review. This permit does not establish a precedent for the issuance of additional permits.
- B. The submitted BRP (Tecton) H₂S abatement plan approved by the APCO shall be implemented and followed, and is incorporated herein by reference. Logbook entries shall be made a minimum of four (4) times daily while drilling on air or in steam.
- C. Diesel fuel utilized shall be California Low Sulfur Diesel containing less than 15ppmw sulfur.
- D. If a vapor-dominated resource is encountered and it is determined that emissions cannot be maintained pursuant to Parts A & B of LCAQMD Rule 421; or the APCO determines that the well on stand-by (bleed) status will violate the intent of LCAQMD Rule 602 or the associated steamfield permit, then BRP shall, with approval of the APCO, install and utilize additional abatement equipment as necessary to bring emissions into compliance. This may include, but is not limited to, immediate conversion to an injector, gas capping, down-hole plugging, and/or the complete closing in of any well in violation of LCAQMD Rules and Regulations.
- E. BRP shall utilize the particulate scrubbing system as substantially described in the permitting review and includes the following configuration: 1) A smooth expansion blooie line with low-pressure constricting and non-constricting interchangeable venturis with water injection for venturi contact/scrubbing. The non-constricting venturi

(Conditions 2 through 6 are continued on the back of this card)

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located in the smallest diameter portion of the blooie line (non-constricting venturi 12"-15") for use when flow of at least 20,000 lbs/hr air/steam, and an interchangeable converging venturi scrubber when drilling in less than 20,000 lbs/hr of steam and/or pressure drop does not exceed 4 PSI across the converging to diverging section. The constricting venturi may be removed for problematic operations when concurred with by the LCAQMD, such as well plug drill out or flow testing. Venturis shall utilize a multi-port 60 GPM or greater adjustable low-pressure water injection system as described in the permit review. 2) An approximate eight foot section of rectangular ducting that is smoothed internally and matched to the cyclone inlet size to allow laminar flow into the cyclone inlet. 3) A properly sized cyclone separator with a tangential inlet flush with the top of the body and a flow trajectory that avoids striking the outlet barrel. The cyclone shall have a smoothed internal surface with all protrusions and pockets removed. An outlet barrel approximately 1.25 (preferred) to 1.45 times the inlet height with adequate cone clearance; and a 18"-21" open drop arrangement at the terminus of a full 'cone', or alternatively a drop hopper that separates liquid and gas then dropping into a water jet venturi or other recirculating pump system for cuttings removal. 4) Acceptable measurement devices to ensure flows and pressure are properly monitored. The APCO may modify the cyclone drop out requirements based upon presentation of new information and selection of alternatives proven to be effective.

F. If during drilling the subject well, significant liquid, gas or particulate carry through occurs from the cyclone separator stack as a result of unusual circumstances or equipment failure, including but not limited to unexpected large steam or gas entries or water flashing down hole, BRP shall notify the LCAQMD immediately and in no case more than one (1) hour, per Rule Section 510. Such occurrences shall be logged in the bound abatement logbook and the emission and or resulting evidence documented, to the extent possible, by photographs or video recording. BRP shall provide information on such events and forward such to the LCAQMD.

G. BRP shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act (AB2588) as specified in Sections 44300 - 44394 of the California Health and Safety Code.

Condition 3: Notification

A. BRP shall notify the LCAQMD pursuant to Rule 510, upon breakdown and/or loss of emissions control from this drilling project.

B. In the event that emissions exceed the allowable limits contained in Condition 1, BRP shall notify the LCAQMD within one (1) hour and shall report: a) The cause of the exceed; b) The actions taken or proposed to minimize emissions and achieve compliance; and c) the estimate of emissions and duration of noncompliance.

C. BRP shall notify the LCAQMD at least twenty-four (24) hours prior to initiating the scheduled venting of any well or group of wells in the LCAQMD. This notice shall also apply to scheduled installation of a liner while the well continues to produce steam. Unscheduled venting, necessary to prevent well damage, shall be reported as a breakdown pursuant to Rule 510. A written report shall be submitted to the LCAQMD, within three (3) days (72 hours) documenting: a) The need for venting; b) The duration of venting; c) Estimated steam flow and emissions; d) Cyclone or other equipment utilized; e) Abatement systems utilized; and f) The likelihood or need for future occurrences.

D. BRP shall promptly notify the LCAQMD in writing should any incident of occupational concern take place where toxic air emissions occur and are allowed to disperse into the ambient air as mitigation.

E. BRP shall provide a written report of any changes of the estimated amount of serpentine and crystalline silica material expected to be drilled during the air phase as early as practical. Upon completion of drilling, BRP shall provide a final report within sixty (60) days detailing any significant quantity of serpentine (or crystalline silica) material actually encountered during drilling.

Condition 4: Modification/Additions

A. BRP shall apply for and receive an Authority to Construct (A/C) modification permit prior to the addition of different or new equipment not identified in the application, this permit or covered in the permitting review. The LCAQMD Hearing Board, at a properly noticed public hearing, may grant a variance from these conditions.

Condition 5: Monitoring and Testing

A. BRP shall perform and forward to the LCAQMD the following characterization of hot water, steam particulates and/or gases emanating from the subject well within sixty (60) days after the completion of drilling. If the well is to be abandoned, no analyses will be necessary. a) STEAM CONDENSATE/TOTAL STEAM - Ammonium, Arsenic, Asbestos, Benzene, Bicarbonate and Carbonate, Boron, Bromides, Cadmium, Chlorides, Chromium, Fluorides, Hydrogen Sulfide, Lead, Mercury, Nickel, Nitrates, pH, Silica, Selenium, Sulfates, Zinc, Total Dissolved Solids, Total Suspended Solids, Percent Non-Condensables, Steam Flow and Temperature. b) GAS PHASE - Ammonia, Benzene, Carbon Dioxide, Hydrogen Sulfide, Methane, Non-Methane Hydrocarbons, Mercury Vapor, and Radon 222 and Daughters. c) STEAM PARTICULATE*: Arsenic, Boron, Cadmium, Chromium, Lead, Nickel, Total Sulfur (mass all in $\mu\text{g/Kg}$ of steam); Asbestos (fibers/Kg of steam); NESHAP and AB 2588 air pollutants as requested. Tests can be performed utilizing the bleed of the subject well. A test protocol shall be submitted to the LCAQMD at least three (3) weeks before such sample collection and analytical testing is scheduled to occur and shall be approved by the APCO prior to actual source testing. If the well is promptly closed in to a no-vent state, these tests may be delayed upon request of BRP by concurrence of the APCO until such time as the well is produced to the steamline, or placed on vent for 30 or more days, or upon written request of the APCO. *Testing of this type shall consist at a minimum of an XRF analysis of suspended and/or dissolved solids.

B. In the event source testing is deemed necessary by the APCO, BRP shall be available within ten days after written notice, to open the well for 4 to 8 hour duration.

C. If analyses performed as part of Condition 5-A suggests the need for further study, including air dispersion analysis, BRP will assist, perform, or finance such studies if deemed reasonable and necessary by the APCO.

D. BRP shall install and utilize an in-line continuous H₂S monitor or other appropriate equipment to ascertain the levels of this pollutant as a function of depth of drilling. Logging data and test results shall be immediately available to LCAQMD staff upon request at the drill site.

E. Upon request of the APCO, BRP shall perform any additional analytical work necessary to characterize potential emissions from this well prior to applying for a Permit to Operate.

F. If a hot water resource is discovered during the drilling of this well, BRP shall, prior to testing to determine the extent of the resource, submit a test plan to the LCAQMD detailing expected air pollutants and mitigating measures. The LCAQMD will either approve the submitted plan or recommend additional mitigating measures necessary, in writing, prior to actual testing. Total emissions from testing shall be limited to the amount specified in Condition 1.

G. The treatment and use of mud waters for reuse in air drilling is acceptable provided: a) Oils or other hydrocarbons contaminating any reclaimed mud waters are separated prior to use in blooie line treatment during air drilling; and b) The water is analyzed for and shown free of asbestos, and the analysis results are provided to the APCO within three (3) working days of finishing mud water treatment(s).

H. If the well is placed on extended standby bleed, BRP shall test the well to determine the H₂S emissions within three (3) days, and retest the well no sooner than one (1) week, and no later than two (2) weeks after the first test, and thereafter upon a 10% or greater change of flow rate. If emissions are within 90% of the allowable H₂S limit, a program of additional testing may be required by the APCO. A written monthly report shall be forwarded to the LCAQMD updating the well status and the estimated emissions, upon request of the APCO.

I. BRP shall participate in or proportionately fund an air monitoring program to assist the LCAQMD in a continued determination of compliance. In the event of considerable public complaints, the LCAQMD may require additional monitoring, testing and studies to characterize said condition and possible mitigation (Section 430 and 670). Participation in a cooperative monitoring effort, such as Geysers Air Monitoring Program, approved by the APCO shall fulfill this requirement.

Condition 6: Identification and Access

A. This permit shall be posted at the project site during the time the drilling equipment is on site, and be available for BRP and LCAQMD staff upon request. If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative, will be given free access of entry for the purposes of monitoring or inspecting.

B. BRP shall provide the LCAQMD, ARB, and Environmental Protection Agency staff entry and safe access to the project site/equipment for the purpose of inspection, source testing, and or air monitoring activities.

This permit is based on the equipment and process submitted by BRP and considered in the A/C assessment. The permit issuance is based on the assumption that the operation of this source, as conditioned, will not result in a violation of LCAQMD Rules and Regulations nor contribute to an exceed of any state or federal Ambient Air Quality Standard.



AUTHORITY TO CONSTRUCT

Lake County Air Quality Management District

2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # A/C 2005-47

By: *Douglas G. Gearhart*
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: IV

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: West Coleman Padsite
Location: West Coleman 3-6, located on Bottle Rock West Coleman Padsite (1155m So. & 134.9m W of the NE Corner Section 6, T11N, R8W, MDB&M, Lake County, N 397,334 E 1,797,546)

Name and Equipment Description: W. Coleman 3-6 Re-Drill

Geothermal drilling rig and accessories (NCPA Rig #1), Four electrical generators (CAT D-398TA 750 HP diesel engines PERP Registered), three air compressors (Cummins QSK19-C700 700 HP turbocharged diesel-powered air compressors PERP Registered), one down hole misting pump; hydrogen sulfide abatement system utilizing high pressure injection of NaOH and H₂O₂; and particulate control equipment consisting of misting down hole, constricting and non constricting venturi contactors, low pressure water spray, expanding blooie line, properly sized, smoothed, tangential wet cyclone, properly designed drop or hopper, water treatment and management systems, necessary metering and measuring devices and associated equipment.

Permit Conditions

Condition 1: Emissions

- A. Bottle Rock Power, LLC (BRP) shall limit hydrogen sulfide (H₂S) emissions during drilling, clean out, and testing to no more than five (5) pounds of H₂S per hour and no more than twenty-four (24) pounds per day during all other phases of this project. During verifiable breakdown and for any hot-liner runs, Rule 510 and procedures shall apply. In the event of atmospheric conditions (e.g., drainage, limited mixing, fumigation, downwash, etc.) that result in complaints and concern in receptor areas from high levels of H₂S, BRP agrees to reduce the H₂S emission limit to two (2) pounds of H₂S using abatement plan at the request of the Air Pollution Control Officer (APCO). Certain exceptions to the H₂S emission limitations may be allowed by the APCO, in writing, for resource testing if such tests are 12 hours or less in duration and coincide with acceptable meteorological conditions verified by the APCO to ensure good dispersion.
- B. If excessively high H₂S levels are encountered during drilling, BRP will either: 1) Place into operation additional H₂S abatement capacity, or 2) Cease operation and close in the well according to appropriate standards of operation. For the purposes of this permit, excessively high levels of H₂S means abated emissions greater than five (5) pounds of H₂S per hour or abated emission levels in excess of 500 ppmv.
- C. Visible emissions shall not exceed the values listed below for more than three (3) minutes in any one (1) hour: • Ringelmann 0.5 (10% opacity) for detached plume at the cyclone; • Ringelmann 0.5 (10% opacity) for combustion emissions of engine exhaust; and • Ringelmann 1 (20% opacity) for road and pad dust emissions.
- D. On commencement of air drilling in significant serpentine, the well logger shall obtain bulk samples that shall be analyzed for asbestos content using TEM, SEM or PLM (California Air Resources Board [ARB] Method 435 Procedures). For the purpose of defining a significant serpentine deposit during geothermal air drilling: "Significant Serpentine" shall mean; drill cutting samples from two consecutive ten-foot interval-drilling sections identified as having 10% or greater serpentine or other asbestos-containing rock. The Lake County Air Quality Management District (LCAQMD) shall be promptly notified by phone at 263-7000, provided samples of the drilled material, and unless otherwise agreed upon in writing, notified of the bulk asbestos analysis results within ten working days of sampling.
- E. During drilling in significant serpentine visible emissions shall not exceed Ringelmann 0.25 (5% opacity) for detached plume at the cyclone. BRP shall: 1) Increase down hole misting; 2) Increase water loading at the venturi; 3) Reduce the drilling rate; 4) Use wetting agents; and/or 5) Implement additional solids filtration of working water. Such additional effort shall continue until drilling is clear of significant serpentine/asbestos.

Condition 2: Administrative

- A. This permit has been issued as a modification to include cleanout, forking or deepening of the well as described in the application and permit review. This permit does not establish a precedent for the issuance of additional permits.
- B. The submitted BRP (Tecton) H₂S abatement plan approved by the APCO shall be implemented and followed, and is incorporated herein by reference. Logbook entries shall be made a minimum of four (4) times daily while drilling on air or in steam.
- C. Diesel fuel utilized shall be California Low Sulfur Diesel containing less than 15ppmw sulfur.
- D. If a vapor-dominated resource is encountered and it is determined that emissions cannot be maintained pursuant to Parts A & B of LCAQMD Rule 421; or the APCO determines that the well on stand-by (bleed) status will violate the intent of LCAQMD Rule 602 or the associated steamfield permit, then BRP shall, with approval of the APCO, install and utilize additional abatement equipment as necessary to bring emissions into compliance. This may include, but is not limited to, immediate conversion to an injector, gas capping, down-hole plugging, and/or the complete closing in of any well in violation of LCAQMD Rules and Regulations.
- E. BRP shall utilize the particulate scrubbing system as substantially described in the permitting review and includes the following configuration: 1) A smooth expansion blooie line with low-pressure constricting and non-constricting interchangeable venturis with water injection for venturi contact/scrubbing. The non-constricting venturi

(Conditions 2 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

This permit does not authorize the emission of air contaminants in excess of those allowed by the California Health and Safety Code or the Regulations of the Lake County Air Quality Management District. This permit cannot be considered permission to violate existing laws, ordinances, regulations, or statutes of other government agencies. The provisions of this Permit are severable. If any provision of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.

located in the smallest diameter portion of the blooie line (non-constricting venturi 12"-15") for use when flow of at least 20,000 lbs/hr air/steam, and an interchangeable converging venturi scrubber when drilling in less than 20,000 lbs/hr of steam and/or pressure drop does not exceed 4 PSI across the converging to diverging section. The constricting venturi may be removed for problematic operations when concurred with by the LCAQMD, such as well plug drill out or flow testing. Venturis shall utilize a multi-port 60 GPM or greater adjustable low-pressure water injection system as described in the permit review. 2) An approximate eight foot section of rectangular ducting that is smoothed internally and matched to the cyclone inlet size to allow laminar flow into the cyclone inlet. 3) A properly sized cyclone separator with a tangential inlet flush with the top of the body and a flow trajectory that avoids striking the outlet barrel. The cyclone shall have a smoothed internal surface with all protrusions and pockets removed. An outlet barrel approximately 1.25 (preferred) to 1.45 times the inlet height with adequate cone clearance; and a 18"-21" open drop arrangement at the terminus of a full 'cone', or alternatively a drop hopper that separates liquid and gas then dropping into a water jet venturi or other recirculating pump system for cuttings removal. 4) Acceptable measurement devices to ensure flows and pressure are properly monitored. The APCO may modify the cyclone drop out requirements based upon presentation of new information and selection of alternatives proven to be effective.

F. If during drilling the subject well, significant liquid, gas or particulate carry through occurs from the cyclone separator stack as a result of unusual circumstances or equipment failure, including but not limited to unexpected large steam or gas entries or water flashing down hole, BRP shall notify the LCAQMD immediately and in no case more than one (1) hour, per Rule Section 510. Such occurrences shall be logged in the bound abatement logbook and the emission and/or resulting evidence documented, to the extent possible, by photographs or video recording. BRP shall provide information on such events and forward such to the LCAQMD.

G. BRP shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act (AB2588) as specified in Sections 44300 - 44394 of the California Health and Safety Code.

Condition 3: Notification

A. BRP shall notify the LCAQMD pursuant to Rule 510, upon breakdown and/or loss of emissions control from this drilling project.

B. In the event that emissions exceed the allowable limits contained in Condition 1, BRP shall notify the LCAQMD within one (1) hour and shall report: a) The cause of the exceed; b) The actions taken or proposed to minimize emissions and achieve compliance; and c) the estimate of emissions and duration of noncompliance.

C. BRP shall notify the LCAQMD at least twenty-four (24) hours prior to initiating the scheduled venting of any well or group of wells in the LCAQMD. This notice shall also apply to scheduled installation of a liner while the well continues to produce steam. Unscheduled venting, necessary to prevent well damage, shall be reported as a breakdown pursuant to Rule 510. A written report shall be submitted to the LCAQMD, within three (3) days (72 hours) documenting: a) The need for venting; b) The duration of venting; c) Estimated steam flow and emissions; d) Cyclone or other equipment utilized; e) Abatement systems utilized; and f) The likelihood or need for future occurrences.

D. BRP shall promptly notify the LCAQMD in writing should any incident of occupational concern take place where toxic air emissions occur and are allowed to disperse into the ambient air as mitigation.

E. BRP shall provide a written report of any changes of the estimated amount of serpentine and crystalline silica material expected to be drilled during the air phase as early as practical. Upon completion of drilling, BRP shall provide a final report within sixty (60) days detailing any significant quantity of serpentine (or crystalline silica) material actually encountered during drilling.

Condition 4: Modification/Additions

A. BRP shall apply for and receive an Authority to Construct (A/C) modification permit prior to the addition of different or new equipment not identified in the application, this permit or covered in the permitting review. The LCAQMD Hearing Board, at a properly noticed public hearing, may grant a variance from these conditions.

Condition 5: Monitoring and Testing

A. BRP shall perform and forward to the LCAQMD the following characterization of hot water, steam particulates and/or gases emanating from the subject well within sixty (60) days after the completion of drilling. If the well is to be abandoned, no analyses will be necessary. a) STEAM CONDENSATE/TOTAL STEAM - Ammonium, Arsenic, Asbestos, Benzene, Bicarbonate and Carbonate, Boron, Bromides, Cadmium, Chlorides, Chromium, Fluorides, Hydrogen Sulfide, Lead, Mercury, Nickel, Nitrates, pH, Silica, Selenium, Sulfates, Zinc, Total Dissolved Solids, Total Suspended Solids, Percent Non-Condensables, Steam Flow and Temperature. b) GAS PHASE - Ammonia, Benzene, Carbon Dioxide, Hydrogen Sulfide, Methane, Non-Methane Hydrocarbons, Mercury Vapor, and Radon 222 and Daughters. c) STEAM PARTICULATE*: Arsenic, Boron, Cadmium, Chromium, Lead, Nickel, Total Sulfur (mass all in $\mu\text{g/Kg}$ of steam); Asbestos (fibers/Kg of steam); NESHAP and AB 2588 air pollutants as requested. Tests can be performed utilizing the bleed of the subject well. A test protocol shall be submitted to the LCAQMD at least three (3) weeks before such sample collection and analytical testing is scheduled to occur and shall be approved by the APCO prior to actual source testing. If the well is promptly closed in to a no-vent state, these tests may be delayed upon request of BRP by concurrence of the APCO until such time as the well is produced to the steamline, or placed on vent for 30 or more days, or upon written request of the APCO. *Testing of this type shall consist at a minimum of an XRF analysis of suspended and/or dissolved solids.

B. In the event source testing is deemed necessary by the APCO, BRP shall be available within ten days after written notice, to open the well for 4 to 8 hour duration.

C. If analyses performed as part of Condition 5-A suggests the need for further study, including air dispersion analysis, BRP will assist, perform, or finance such studies if deemed reasonable and necessary by the APCO.

D. BRP shall install and utilize an in-line continuous H₂S monitor or other appropriate equipment to ascertain the levels of this pollutant as a function of depth of drilling. Logging data and test results shall be immediately available to LCAQMD staff upon request at the drill site.

E. Upon request of the APCO, BRP shall perform any additional analytical work necessary to characterize potential emissions from this well prior to applying for a Permit to Operate.

F. If a hot water resource is discovered during the drilling of this well, BRP shall, prior to testing to determine the extent of the resource, submit a test plan to the LCAQMD detailing expected air pollutants and mitigating measures. The LCAQMD will either approve the submitted plan or recommend additional mitigating measures necessary, in writing, prior to actual testing. Total emissions from testing shall be limited to the amount specified in Condition 1.

G. The treatment and use of mud waters for reuse in air drilling is acceptable provided: a) Oils or other hydrocarbons contaminating any reclaimed mud waters are separated prior to use in blooie line treatment during air drilling; and b) The water is analyzed for and shown free of asbestos, and the analysis results are provided to the APCO within three (3) working days of finishing mud water treatment(s).

H. If the well is placed on extended standby bleed, BRP shall test the well to determine the H₂S emissions within three (3) days, and retest the well no sooner than one (1) week, and no later than two (2) weeks after the first test, and thereafter upon a 10% or greater change of flow rate. If emissions are within 90% of the allowable H₂S limit, a program of additional testing may be required by the APCO. A written monthly report shall be forwarded to the LCAQMD updating the well status and the estimated emissions, upon request of the APCO.

I. BRP shall participate in or proportionately fund an air monitoring program to assist the LCAQMD in a continued determination of compliance. In the event of considerable public complaints, the LCAQMD may require additional monitoring, testing and studies to characterize said condition and possible mitigation (Section 430 and 670). Participation in a cooperative monitoring effort, such as Geysers Air Monitoring Program, approved by the APCO shall fulfill this requirement.

Condition 6: Identification and Access

A. This permit shall be posted at the project site during the time the drilling equipment is on site, and be available for BRP and LCAQMD staff upon request. If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative, will be given free access of entry for the purposes of monitoring or inspecting.

B. BRP shall provide the LCAQMD, ARB, and Environmental Protection Agency staff entry and safe access to the project site/equipment for the purpose of inspection, source testing, and/or air monitoring activities.

This permit is based on the equipment and process submitted by BRP and considered in the A/C assessment. The permit issuance is based on the assumption that the operation of this source, as conditioned, will not result in a violation of LCAQMD Rules and Regulations nor contribute to an exceed of any state or federal Ambient Air Quality Standard.



AUTHORITY TO CONSTRUCT

Lake County Air Quality Management District

2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # A/C 2005-45

By: Douglas G. Gearhart
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: IV

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: West Coleman Padsite
Location: West Coleman 4-6, located on Bottle Rock West Coleman Padsite (1155m So. & 134.9m W of the NE Corner Section 6, T11N, R8W, MDB&M, Lake County, N 397,334 E 1,797,546)

Name and Equipment Description: W. Coleman 4-6 Re-Drill

Geothermal drilling rig and accessories (NCPA Rig #1), Four electrical generators (CAT D-398TA 750 HP diesel engines PERP Registered), three air compressors (Cummins QSK19-C700 700 HP turbocharged diesel-powered air compressors PERP Registered), one down hole misting pump; hydrogen sulfide abatement system utilizing high pressure injection of NaOH and H₂O₂; and particulate control equipment consisting of misting down hole, constricting and non constricting venturi contactors, low pressure water spray, expanding blooie line, properly sized, smoothed, tangential wet cyclone, properly designed drop or hopper, water treatment and management systems, necessary metering and measuring devices and associated equipment.

Permit Conditions

Condition 1: Emissions

- A. Bottle Rock Power, LLC (BRP) shall limit hydrogen sulfide (H₂S) emissions during drilling, clean out, and testing to no more than five (5) pounds of H₂S per hour and no more than twenty-four (24) pounds per day during all other phases of this project. During verifiable breakdown and for any hot-liner runs, Rule 510 and procedures shall apply. In the event of atmospheric conditions (e.g., drainage, limited mixing, fumigation, downwash, etc.) that result in complaints and concern in receptor areas from high levels of H₂S, BRP agrees to reduce the H₂S emission limit to two (2) pounds of H₂S using abatement plan at the request of the Air Pollution Control Officer (APCO). Certain exceptions to the H₂S emission limitations may be allowed by the APCO, in writing, for resource testing if such tests are 12 hours or less in duration and coincide with acceptable meteorological conditions verified by the APCO to ensure good dispersion.
- B. If excessively high H₂S levels are encountered during drilling, BRP will either: 1) Place into operation additional H₂S abatement capacity, or 2) Cease operation and close in the well according to appropriate standards of operation. For the purposes of this permit, excessively high levels of H₂S means abated emissions greater than five (5) pounds of H₂S per hour or abated emission levels in excess of 500 ppmv.
- C. Visible emissions shall not exceed the values listed below for more than three (3) minutes in any one (1) hour: • Ringelmann 0.5 (10% opacity) for detached plume at the cyclone; • Ringelmann 0.5 (10% opacity) for combustion emissions of engine exhaust; and • Ringelmann 1 (20% opacity) for road and pad dust emissions.
- D. On commencement of air drilling in significant serpentine, the well logger shall obtain bulk samples that shall be analyzed for asbestos content using TEM, SEM or PLM (California Air Resources Board [ARB] Method 435 Procedures). For the purpose of defining a significant serpentine deposit during geothermal air drilling: "Significant Serpentine" shall mean; drill cutting samples from two consecutive ten-foot interval-drilling sections identified as having 10% or greater serpentine or other asbestos-containing rock. The Lake County Air Quality Management District (LCAQMD) shall be promptly notified by phone at 263-7000, provided samples of the drilled material, and unless otherwise agreed upon in writing, notified of the bulk asbestos analysis results within ten working days of sampling.
- E. During drilling in significant serpentine visible emissions shall not exceed Ringelmann 0.25 (5% opacity) for detached plume at the cyclone. BRP shall: 1) Increase down hole misting; 2) Increase water loading at the venturi; 3) Reduce the drilling rate; 4) Use wetting agents; and/or 5) Implement additional solids filtration of working water. Such additional effort shall continue until drilling is clear of significant serpentine/asbestos.

Condition 2: Administrative

- A. This permit has been issued as a modification to include cleanout, forking or deepening of the well as described in the application and permit review. This permit does not establish a precedent for the issuance of additional permits.
- B. The submitted BRP (Tecton) H₂S abatement plan approved by the APCO shall be implemented and followed, and is incorporated herein by reference. Logbook entries shall be made a minimum of four (4) times daily while drilling on air or in steam.
- C. Diesel fuel utilized shall be California Low Sulfur Diesel containing less than 15ppmw sulfur.
- D. If a vapor-dominated resource is encountered and it is determined that emissions cannot be maintained pursuant to Parts A & B of LCAQMD Rule 421; or the APCO determines that the well on stand-by (bleed) status will violate the intent of LCAQMD Rule 602 or the associated steamfield permit, then BRP shall, with approval of the APCO, install and utilize additional abatement equipment as necessary to bring emissions into compliance. This may include, but is not limited to, immediate conversion to an injector, gas capping, down-hole plugging, and/or the complete closing in of any well in violation of LCAQMD Rules and Regulations.
- E. BRP shall utilize the particulate scrubbing system as substantially described in the permitting review and includes the following configuration: 1) A smooth expansion blooie line with low-pressure constricting and non-constricting interchangeable venturis with water injection for venturi contact/scrubbing. The non-constricting venturi

(Conditions 2 through 6 are continued on the back of this card)

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located in the smallest diameter portion of the blooie line (non-constricting venturi 12"-15") for use when flow of at least 20,000 lbs/hr air/steam, and an interchangeable converging venturi scrubber when drilling in less than 20,000 lbs/hr of steam and/or pressure drop does not exceed 4 PSI across the converging to diverging section. The constricting venturi may be removed for problematic operations when concurred with by the LCAQMD, such as well plug drill out or flow testing. Venturis shall utilize a multi-port 60 GPM or greater adjustable low-pressure water injection system as described in the permit review. 2) An approximate eight foot section of rectangular ducting that is smoothed internally and matched to the cyclone inlet size to allow laminar flow into the cyclone inlet. 3) A properly sized cyclone separator with a tangential inlet flush with the top of the body and a flow trajectory that avoids striking the outlet barrel. The cyclone shall have a smoothed internal surface with all protrusions and pockets removed. An outlet barrel approximately 1.25 (preferred) to 1.45 times the inlet height with adequate cone clearance; and a 18"-21" open drop arrangement at the terminus of a full 'cone', or alternatively a drop hopper that separates liquid and gas then dropping into a water jet venturi or other recirculating pump system for cuttings removal. 4) Acceptable measurement devices to ensure flows and pressure are properly monitored. The APCO may modify the cyclone drop out requirements based upon presentation of new information and selection of alternatives proven to be effective.

F. If during drilling the subject well, significant liquid, gas or particulate carry through occurs from the cyclone separator stack as a result of unusual circumstances or equipment failure, including but not limited to unexpected large steam or gas entries or water flashing down hole, BRP shall notify the LCAQMD immediately and in no case more than one (1) hour, per Rule Section 510. Such occurrences shall be logged in the bound abatement logbook and the emission and/or resulting evidence documented, to the extent possible, by photographs or video recording. BRP shall provide information on such events and forward such to the LCAQMD.

G. BRP shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act (AB2588) as specified in Sections 44300 - 44394 of the California Health and Safety Code.

Condition 3: Notification

A. BRP shall notify the LCAQMD pursuant to Rule 510, upon breakdown and/or loss of emissions control from this drilling project.

B. In the event that emissions exceed the allowable limits contained in Condition 1, BRP shall notify the LCAQMD within one (1) hour and shall report: a) The cause of the exceed; b) The actions taken or proposed to minimize emissions and achieve compliance; and c) the estimate of emissions and duration of noncompliance.

C. BRP shall notify the LCAQMD at least twenty-four (24) hours prior to initiating the scheduled venting of any well or group of wells in the LCAQMD. This notice shall also apply to scheduled installation of a liner while the well continues to produce steam. Unscheduled venting, necessary to prevent well damage, shall be reported as a breakdown pursuant to Rule 510. A written report shall be submitted to the LCAQMD, within three (3) days (72 hours) documenting: a) The need for venting; b) The duration of venting; c) Estimated steam flow and emissions; d) Cyclone or other equipment utilized; e) Abatement systems utilized; and f) The likelihood or need for future occurrences.

D. BRP shall promptly notify the LCAQMD in writing should any incident of occupational concern take place where toxic air emissions occur and are allowed to disperse into the ambient air as mitigation.

E. BRP shall provide a written report of any changes of the estimated amount of serpentine and crystalline silica material expected to be drilled during the air phase as early as practical. Upon completion of drilling, BRP shall provide a final report within sixty (60) days detailing any significant quantity of serpentine (or crystalline silica) material actually encountered during drilling.

Condition 4: Modification/Additions

A. BRP shall apply for and receive an Authority to Construct (A/C) modification permit prior to the addition of different or new equipment not identified in the application, this permit or covered in the permitting review. The LCAQMD Hearing Board, at a properly noticed public hearing, may grant a variance from these conditions.

Condition 5: Monitoring and Testing

A. BRP shall perform and forward to the LCAQMD the following characterization of hot water, steam particulates and/or gases emanating from the subject well within sixty (60) days after the completion of drilling. If the well is to be abandoned, no analyses will be necessary. a) STEAM CONDENSATE/TOTAL STEAM - Ammonium, Arsenic, Asbestos, Benzene, Bicarbonate and Carbonate, Boron, Bromides, Cadmium, Chlorides, Chromium, Fluorides, Hydrogen Sulfide, Lead, Mercury, Nickel, Nitrates, pH, Silica, Selenium, Sulfates, Zinc, Total Dissolved Solids, Total Suspended Solids, Percent Non-Condensables, Steam Flow and Temperature. b) GAS PHASE - Ammonia, Benzene, Carbon Dioxide, Hydrogen Sulfide, Methane, Non-Methane Hydrocarbons, Mercury Vapor, and Radon 222 and Daughters. c) STEAM PARTICULATE*: Arsenic, Boron, Cadmium, Chromium, Lead, Nickel, Total Sulfur (mass all in $\mu\text{g/Kg}$ of steam); Asbestos (fibers/Kg of steam); NESHAP and AB 2588 air pollutants as requested. Tests can be performed utilizing the bleed of the subject well. A test protocol shall be submitted to the LCAQMD at least three (3) weeks before such sample collection and analytical testing is scheduled to occur and shall be approved by the APCO prior to actual source testing. If the well is promptly closed in to a no-vent state, these tests may be delayed upon request of BRP by concurrence of the APCO until such time as the well is produced to the steamline, or placed on vent for 30 or more days, or upon written request of the APCO. *Testing of this type shall consist at a minimum of an XRF analysis of suspended and/or dissolved solids.

B. In the event source testing is deemed necessary by the APCO, BRP shall be available within ten days after written notice, to open the well for 4 to 8 hour duration.

C. If analyses performed as part of Condition 5-A suggests the need for further study, including air dispersion analysis, BRP will assist, perform, or finance such studies if deemed reasonable and necessary by the APCO.

D. BRP shall install and utilize an in-line continuous H₂S monitor or other appropriate equipment to ascertain the levels of this pollutant as a function of depth of drilling. Logging data and test results shall be immediately available to LCAQMD staff upon request at the drill site.

E. Upon request of the APCO, BRP shall perform any additional analytical work necessary to characterize potential emissions from this well prior to applying for a Permit to Operate.

F. If a hot water resource is discovered during the drilling of this well, BRP shall, prior to testing to determine the extent of the resource, submit a test plan to the LCAQMD detailing expected air pollutants and mitigating measures. The LCAQMD will either approve the submitted plan or recommend additional mitigating measures necessary, in writing, prior to actual testing. Total emissions from testing shall be limited to the amount specified in Condition 1.

G. The treatment and use of mud waters for reuse in air drilling is acceptable provided: a) Oils or other hydrocarbons contaminating any reclaimed mud waters are separated prior to use in blooie line treatment during air drilling; and b) The water is analyzed for and shown free of asbestos, and the analysis results are provided to the APCO within three (3) working days of finishing mud water treatment(s).

H. If the well is placed on extended standby bleed, BRP shall test the well to determine the H₂S emissions within three (3) days, and retest the well no sooner than one (1) week, and no later than two (2) weeks after the first test, and thereafter upon a 10% or greater change of flow rate. If emissions are within 90% of the allowable H₂S limit, a program of additional testing may be required by the APCO. A written monthly report shall be forwarded to the LCAQMD updating the well status and the estimated emissions, upon request of the APCO.

I. BRP shall participate in or proportionately fund an air monitoring program to assist the LCAQMD in a continued determination of compliance. In the event of considerable public complaints, the LCAQMD may require additional monitoring, testing and studies to characterize said condition and possible mitigation (Section 430 and 670). Participation in a cooperative monitoring effort, such as Geysers Air Monitoring Program, approved by the APCO shall fulfill this requirement.

Condition 6: Identification and Access

A. This permit shall be posted at the project site during the time the drilling equipment is on site, and be available for BRP and LCAQMD staff upon request. If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative, will be given free access of entry for the purposes of monitoring or inspecting.

B. BRP shall provide the LCAQMD, ARB, and Environmental Protection Agency staff entry and safe access to the project site/equipment for the purpose of inspection, source testing, and/or air monitoring activities.

This permit is based on the equipment and process submitted by BRP and considered in the A/C assessment. The permit issuance is based on the assumption that the operation of this source, as conditioned, will not result in a violation of LCAQMD Rules and Regulations nor contribute to an exceed of any state or federal Ambient Air Quality Standard.



AUTHORITY TO CONSTRUCT

Lake County Air Quality Management District

2617 S. Main Street, Lakeport, CA 95453 (707) 263-7000, Fax (707) 263-0421

Permit # A/C 2005-48

By: Douglas G. Gearhart
Douglas G. Gearhart, APCO

Type of Issuance: Renewal Issuance Date: 10/31/2024 Valid through: 10/31/2025 Category: IV

Operations under this permit must be conducted in compliance with all specifications and data included with the application under which this permit was issued. Equipment must be properly maintained and kept in good condition at all times. Post this permit or a facsimile (with conditions) in a conspicuous location on or near the equipment.

Contact: Ms. Susan Petty
Owner: Bottle Rock Power, LLC
Mailing: c/o AltaRock Energy, Inc.
Address: P.O. Box 31205
Seattle, WA 98103-8099

Facility: West Coleman Padsite
Location: West Coleman 5-6, located on Bottle Rock West Coleman Padsite (1155m So. & 134.9m W of the NE Corner Section 6, T11N, R8W, MDB&M, Lake County, N 397,334 E 1,797,546)

Name and Equipment Description: W. Coleman 5-6 Re-Drill

Geothermal drilling rig and accessories (NCPA Rig #1), Four electrical generators (CAT D-398TA 750 HP diesel engines PERP Registered), three air compressors (Cummins QSK19-C700 700 HP turbocharged diesel-powered air compressors PERP Registered), one down hole misting pump; hydrogen sulfide abatement system utilizing high pressure injection of NaOH and H₂O₂; and particulate control equipment consisting of misting down hole, constricting and non constricting venturi contactors, low pressure water spray, expanding blooie line, properly sized, smoothed, tangential wet cyclone, properly designed drop or hopper, water treatment and management systems, necessary metering and measuring devices and associated equipment.

Permit Conditions

Condition 1: Emissions

- A. Bottle Rock Power, LLC (BRP) shall limit hydrogen sulfide (H₂S) emissions during drilling, clean out, and testing to no more than five (5) pounds of H₂S per hour and no more than twenty-four (24) pounds per day during all other phases of this project. During verifiable breakdown and for any hot-liner runs, Rule 510 and procedures shall apply. In the event of atmospheric conditions (e.g., drainage, limited mixing, fumigation, downwash, etc.) that result in complaints and concern in receptor areas from high levels of H₂S, BRP agrees to reduce the H₂S emission limit to two (2) pounds of H₂S using abatement plan at the request of the Air Pollution Control Officer (APCO). Certain exceptions to the H₂S emission limitations may be allowed by the APCO, in writing, for resource testing if such tests are 12 hours or less in duration and coincide with acceptable meteorological conditions verified by the APCO to ensure good dispersion.
- B. If excessively high H₂S levels are encountered during drilling, BRP will either: 1) Place into operation additional H₂S abatement capacity, or 2) Cease operation and close in the well according to appropriate standards of operation. For the purposes of this permit, excessively high levels of H₂S means abated emissions greater than five (5) pounds of H₂S per hour or abated emission levels in excess of 500 ppmv.
- C. Visible emissions shall not exceed the values listed below for more than three (3) minutes in any one (1) hour: • Ringelmann 0.5 (10% opacity) for detached plume at the cyclone; • Ringelmann 0.5 (10% opacity) for combustion emissions of engine exhaust; and • Ringelmann 1 (20% opacity) for road and pad dust emissions.
- D. On commencement of air drilling in significant serpentine, the well logger shall obtain bulk samples that shall be analyzed for asbestos content using TEM, SEM or PLM (California Air Resources Board [ARB] Method 435 Procedures). For the purpose of defining a significant serpentine deposit during geothermal air drilling: "Significant Serpentine" shall mean; drill cutting samples from two consecutive ten-foot interval-drilling sections identified as having 10% or greater serpentine or other asbestos-containing rock. The Lake County Air Quality Management District (LCAQMD) shall be promptly notified by phone at 263-7000, provided samples of the drilled material, and unless otherwise agreed upon in writing, notified of the bulk asbestos analysis results within ten working days of sampling.
- E. During drilling in significant serpentine visible emissions shall not exceed Ringelmann 0.25 (5% opacity) for detached plume at the cyclone. BRP shall: 1) Increase down hole misting; 2) Increase water loading at the venturi; 3) Reduce the drilling rate; 4) Use wetting agents; and/or 5) Implement additional solids filtration of working water. Such additional effort shall continue until drilling is clear of significant serpentine/asbestos.

Condition 2: Administrative

- A. This permit has been issued as a modification to include cleanout, forking or deepening of the well as described in the application and permit review. This permit does not establish a precedent for the issuance of additional permits.
- B. The submitted BRP (Tecton) H₂S abatement plan approved by the APCO shall be implemented and followed, and is incorporated herein by reference. Logbook entries shall be made a minimum of four (4) times daily while drilling on air or in steam.
- C. Diesel fuel utilized shall be California Low Sulfur Diesel containing less than 15ppmw sulfur.
- D. If a vapor-dominated resource is encountered and it is determined that emissions cannot be maintained pursuant to Parts A & B of LCAQMD Rule 421; or the APCO determines that the well on stand-by (bleed) status will violate the intent of LCAQMD Rule 602 or the associated steamfield permit, then BRP shall, with approval of the APCO, install and utilize additional abatement equipment as necessary to bring emissions into compliance. This may include, but is not limited to, immediate conversion to an injector, gas capping, down-hole plugging, and/or the complete closing in of any well in violation of LCAQMD Rules and Regulations.
- E. BRP shall utilize the particulate scrubbing system as substantially described in the permitting review and includes the following configuration: 1) A smooth expansion blooie line with low-pressure constricting and non-constricting interchangeable venturis with water injection for venturi contact/scrubbing. The non-constricting venturi

(Conditions 2 through 6 are continued on the back of this card)

THIS PERMIT BECOMES VOID UPON CHANGE OF OWNERSHIP OR LOCATION

This permit does not authorize the emission of air contaminants in excess of those allowed by the California Health and Safety Code or the Regulations of the Lake County Air Quality Management District. This permit cannot be considered permission to violate existing laws, ordinances, regulations, or statutes of other government agencies. The provisions of this Permit are severable. If any provision of this Permit is held invalid, the remainder of this Permit shall not be affected thereby.

located in the smallest diameter portion of the blooie line (non-constricting venturi 12"-15") for use when flow of at least 20,000 lbs/hr air/steam, and an interchangeable converging venturi scrubber when drilling in less than 20,000 lbs/hr of steam and/or pressure drop does not exceed 4 PSI across the converging to diverging section. The constricting venturi may be removed for problematic operations when concurred with by the LCAQMD, such as well plug drill out or flow testing. Venturis shall utilize a multi-port 60 GPM or greater adjustable low-pressure water injection system as described in the permit review. 2) An approximate eight foot section of rectangular ducting that is smoothed internally and matched to the cyclone inlet size to allow laminar flow into the cyclone inlet. 3) A properly sized cyclone separator with a tangential inlet flush with the top of the body and a flow trajectory that avoids striking the outlet barrel. The cyclone shall have a smoothed internal surface with all protrusions and pockets removed. An outlet barrel approximately 1.25 (preferred) to 1.45 times the inlet height with adequate cone clearance; and a 18"-21" open drop arrangement at the terminus of a full 'cone', or alternatively a drop hopper that separates liquid and gas then dropping into a water jet venturi or other recirculating pump system for cuttings removal. 4) Acceptable measurement devices to ensure flows and pressure are properly monitored. The APCO may modify the cyclone drop out requirements based upon presentation of new information and selection of alternatives proven to be effective.

F. If during drilling the subject well, significant liquid, gas or particulate carry through occurs from the cyclone separator stack as a result of unusual circumstances or equipment failure, including but not limited to unexpected large steam or gas entries or water flashing down hole, BRP shall notify the LCAQMD immediately and in no case more than one (1) hour, per Rule Section 510. Such occurrences shall be logged in the bound abatement logbook and the emission and or resulting evidence documented, to the extent possible, by photographs or video recording. BRP shall provide information on such events and forward such to the LCAQMD.

G. BRP shall comply with the requirements of the Air Toxics "Hot Spots" Information and Assessment Act (AB2588) as specified in Sections 44300 - 44394 of the California Health and Safety Code.

Condition 3: Notification

A. BRP shall notify the LCAQMD pursuant to Rule 510, upon breakdown and/or loss of emissions control from this drilling project.

B. In the event that emissions exceed the allowable limits contained in Condition 1, BRP shall notify the LCAQMD within one (1) hour and shall report: a) The cause of the exceed; b) The actions taken or proposed to minimize emissions and achieve compliance; and c) the estimate of emissions and duration of noncompliance.

C. BRP shall notify the LCAQMD at least twenty-four (24) hours prior to initiating the scheduled venting of any well or group of wells in the LCAQMD. This notice shall also apply to scheduled installation of a liner while the well continues to produce steam. Unscheduled venting, necessary to prevent well damage, shall be reported as a breakdown pursuant to Rule 510. A written report shall be submitted to the LCAQMD, within three (3) days (72 hours) documenting: a) The need for venting; b) The duration of venting; c) Estimated steam flow and emissions; d) Cyclone or other equipment utilized; e) Abatement systems utilized; and f) The likelihood or need for future occurrences.

D. BRP shall promptly notify the LCAQMD in writing should any incident of occupational concern take place where toxic air emissions occur and are allowed to disperse into the ambient air as mitigation.

E. BRP shall provide a written report of any changes of the estimated amount of serpentine and crystalline silica material expected to be drilled during the air phase as early as practical. Upon completion of drilling, BRP shall provide a final report within sixty (60) days detailing any significant quantity of serpentine (or crystalline silica) material actually encountered during drilling.

Condition 4: Modification/Additions

A. BRP shall apply for and receive an Authority to Construct (A/C) modification permit prior to the addition of different or new equipment not identified in the application, this permit or covered in the permitting review. The LCAQMD Hearing Board, at a properly noticed public hearing, may grant a variance from these conditions.

Condition 5: Monitoring and Testing

A. BRP shall perform and forward to the LCAQMD the following characterization of hot water, steam particulates and/or gases emanating from the subject well within sixty (60) days after the completion of drilling. If the well is to be abandoned, no analyses will be necessary. a) STEAM CONDENSATE/TOTAL STEAM - Ammonium, Arsenic, Asbestos, Benzene, Bicarbonate and Carbonate, Boron, Bromides, Cadmium, Chlorides, Chromium, Fluorides, Hydrogen Sulfide, Lead, Mercury, Nickel, Nitrates, pH, Silica, Selenium, Sulfates, Zinc, Total Dissolved Solids, Total Suspended Solids, Percent Non-Condensables, Steam Flow and Temperature. b) GAS PHASE - Ammonia, Benzene, Carbon Dioxide, Hydrogen Sulfide, Methane, Non-Methane Hydrocarbons, Mercury Vapor, and Radon 222 and Daughters. c) STEAM PARTICULATE*: Arsenic, Boron, Cadmium, Chromium, Lead, Nickel, Total Sulfur (mass all in µg/Kg of steam); Asbestos (fibers/Kg of steam); NESHAP and AB 2588 air pollutants as requested. Tests can be performed utilizing the bleed of the subject well. A test protocol shall be submitted to the LCAQMD at least three (3) weeks before such sample collection and analytical testing is scheduled to occur and shall be approved by the APCO prior to actual source testing. If the well is promptly closed in to a no-vent state, these tests may be delayed upon request of BRP by concurrence of the APCO until such time as the well is produced to the steamline, or placed on vent for 30 or more days, or upon written request of the APCO. *Testing of this type shall consist at a minimum of an XRF analysis of suspended and/or dissolved solids.

B. In the event source testing is deemed necessary by the APCO, BRP shall be available within ten days after written notice, to open the well for 4 to 8 hour duration.

C. If analyses performed as part of Condition 5-A suggests the need for further study, including air dispersion analysis, BRP will assist, perform, or finance such studies if deemed reasonable and necessary by the APCO.

D. BRP shall install and utilize an in-line continuous H2S monitor or other appropriate equipment to ascertain the levels of this pollutant as a function of depth of drilling. Logging data and test results shall be immediately available to LCAQMD staff upon request at the drill site.

E. Upon request of the APCO, BRP shall perform any additional analytical work necessary to characterize potential emissions from this well prior to applying for a Permit to Operate.

F. If a hot water resource is discovered during the drilling of this well, BRP shall, prior to testing to determine the extent of the resource, submit a test plan to the LCAQMD detailing expected air pollutants and mitigating measures. The LCAQMD will either approve the submitted plan or recommend additional mitigating measures necessary, in writing, prior to actual testing. Total emissions from testing shall be limited to the amount specified in Condition 1.

G. The treatment and use of mud waters for reuse in air drilling is acceptable provided: a) Oils or other hydrocarbons contaminating any reclaimed mud waters are separated prior to use in blooie line treatment during air drilling; and b) The water is analyzed for and shown free of asbestos, and the analysis results are provided to the APCO within three (3) working days of finishing mud water treatment(s).

H. If the well is placed on extended standby bleed, BRP shall test the well to determine the H2S emissions within three (3) days, and retest the well no sooner than one (1) week, and no later than two (2) weeks after the first test, and thereafter upon a 10% or greater change of flow rate. If emissions are within 90% of the allowable H2S limit, a program of additional testing may be required by the APCO. A written monthly report shall be forwarded to the LCAQMD updating the well status and the estimated emissions, upon request of the APCO.

I. BRP shall participate in or proportionately fund an air monitoring program to assist the LCAQMD in a continued determination of compliance. In the event of considerable public complaints, the LCAQMD may require additional monitoring, testing and studies to characterize said condition and possible mitigation (Section 430 and 670). Participation in a cooperative monitoring effort, such as Geysers Air Monitoring Program, approved by the APCO shall fulfill this requirement.

Condition 6: Identification and Access

A. This permit shall be posted at the project site during the time the drilling equipment is on site, and be available for BRP and LCAQMD staff upon request. If locks or unmanned gates are used to secure the project area, the LCAQMD or its representative, will be given free access of entry for the purposes of monitoring or inspecting.

B. BRP shall provide the LCAQMD, ARB, and Environmental Protection Agency staff entry and safe access to the project site/equipment for the purpose of inspection, source testing, and or air monitoring activities.

This permit is based on the equipment and process submitted by BRP and considered in the A/C assessment. The permit issuance is based on the assumption that the operation of this source, as conditioned, will not result in a violation of LCAQMD Rules and Regulations nor contribute to an exceed of any state or federal Ambient Air Quality Standard.

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