DRAFT

Issuance Date

CERTIFIED MAIL 15-xxxE CAB
RETURN RECEIPT REQUESTED File No. 0008-13
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Mr. Mike McVey
Plant Manager
Puna Geothermal Venture
P.O. Box 30
Pahoa, Hawaii 96778

Dear Mr. McVey:

SUBJECT: Noncovered Source Permit (NSP) No. 0008-02-N
Application for Renewal No. 0008-13
Puna Geothermal Venture
41 MW (Nominal) Geothermal Power Plant, Wellfield, and Geothermal Exploratory/Developmental Wells
Located At: 14-3860 Kapoho-Pahoa Road, Pahoa, Hawaii
Date of Expiration: Issuance Date + 5 years

The subject noncovered source permit is issued in accordance with Hawaii Administrative Rules, Title 11, Chapter 60.1. The issuance of this permit is based on the plans, specifications, and information that you submitted as part of your renewal application dated September 11, 2014. This permit shall supersede NSP No. 0008-02-N issued on December 15, 2009, and amended on April 29, 2010, November 14, 2011, December 2, 2011, July 10, 2013, August 20, 2014, and December 31, 2014, in its entirety.

The noncovered source permit is issued subject to the conditions/requirements set forth in the following Attachments:

Attachment I:	Standard Conditions
Attachment IIA:	Special Conditions: Power Plant
Attachment IIB:	Special Conditions: Wellfield and Geothermal Exploratory/Developmental Wells
Attachment III:	Annual Fee Requirements
Attachment IV:	Annual Emissions Reporting Requirements

The following forms are enclosed for your use and submittal as required:

Annual Fee Form
Monitoring Report Form: Fuel Certification
Monitoring/Annual Emissions Report Form: Fuel Consumption

This permit, (a) shall not in any manner affect the title of the premises upon which the equipment is to be located, (b) does not release the permittee from any liability for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment, and (c) in no manner implies or suggests that the Department of Health, Clean Air Branch (herein after referred to as Department), or its officers, agents, or employees, assumes any liability, directly or indirectly, for any loss due to personal injury or property damage caused by, resulting from or arising out of the design, installation, maintenance, or operation of the equipment.

If you have any questions, please contact Mr. Darin Lum of the Clean Air Branch at (808) 586-4200.

Sincerely,

STUART YAMADA, P.E., CHIEF
Environmental Management Division

DL:dh

c: Ed Yamamoto, EHS –Hilo
CAB Monitoring Section

ATTACHMENT I: STANDARD CONDITIONS
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

This permit is granted in accordance with the Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control, and is subject to the following standard conditions:

1. This permit, or a copy thereof, shall be maintained at or near the source and shall be made available for inspection upon request. The permit shall not be willfully defaced, altered, forged, counterfeited, or falsified.

2. This permit is not transferable whether by operation of law or otherwise, from person to person, from place to place, or from one piece of equipment to another without the approval of the Department, except as provided in HAR, Section 11-60.1-69.

3. A request for transfer from person to person shall be made on forms furnished by the Department.

4. In the event of any changes in control or ownership of the facilities to be constructed or modified, this permit shall be binding on all subsequent owners and operators. The permittee shall notify the succeeding owner and operator of the existence of this permit and its conditions by letter.

5. The facility covered by this permit shall be constructed and operated in accordance with the application, and any information submitted as part of the application, for the Noncovered Source Permit. There shall be no deviation unless additional or revised plans are submitted to and approved by the Department.

6. This permit (a) does not release the permittee from compliance with other applicable statutes of the State of Hawaii, or with applicable local laws, regulations, or ordinances, and (b) shall not constitute, nor be construed to be an approval of the design of the noncovered source.

7. The permittee shall comply with all the terms and conditions of this permit. Any permit noncompliance constitutes a violation of HAR, Chapter 11-60.1 and is grounds for enforcement action; for permit termination, suspension, reopening, or amendment; or for denial of a permit renewal application.

8. If any term or condition of this permit becomes invalid as a result of a challenge to a portion of this permit, the other terms and conditions of this permit shall not be affected and shall remain valid.

9. The permittee shall not use as a defense in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the terms and conditions of this permit.

10. This permit may be terminated, suspended, reopened, or amended for cause pursuant to HAR, Sections 11-60.1-10 and 11-60.1-72, and HRS, Chapter 342B-27, after affording the permittee an opportunity for a hearing in accordance with HRS, Chapter 91.

11. The filing of a request by the permittee for the termination, suspension, reopening, or amendment of this permit, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

12. This permit does not convey any property rights of any sort, or any exclusive privilege.

13. The permittee shall notify the Department in writing of the following dates:

    a. The anticipated date of initial start-up for each emission unit of a new source or modification not less than thirty (30) days or more than sixty (60) days prior to such date;
    b. The actual date of construction commencement within fifteen (15) days after such date; and
    c. The actual date of start-up within fifteen (15) days after such date.

14. The permittee shall furnish, in a timely manner, any information or records requested in writing by the Department to determine whether cause exists for terminating, suspending, reopening, or amending this permit, or to determine compliance with this permit. Upon request, the permittee shall also furnish to the Department copies of records required to be kept by the permittee. For information claimed to be confidential, the permittee shall furnish such records to the Department with a claim of confidentiality.

15. The permittee shall notify the Department in writing, of the intent to shut down air pollution control equipment for necessary scheduled maintenance at least twenty-four (24) hours prior to the planned shutdown. The submittal of this notice shall not be a defense to an enforcement action. The notice shall include the following:

    a. Identification of the specific equipment to be taken out of service, as well as its location and permit number;
    b. The expected length of time that the air pollution control equipment will be out of service;
    c. The nature and quantity of emissions of air pollutants likely to be emitted during the shutdown period;
    d. Measures such as the use of off-shift labor and equipment that will be taken to minimize the length of the shutdown period; and
    e. The reasons why it would be impossible or impractical to shut down the source operation during the maintenance period.

16. In the event any emission unit, air pollution control equipment, or related equipment malfunctions or breaks down in such a manner as to cause the emission of air pollutants in violation of Chapter 11-60.1 or this permit, the permittee shall immediately notify the Department of the malfunction or breakdown, unless the protection of personnel or public health or safety demands immediate attention to the malfunction or breakdown and makes such notification infeasible. In the latter case, the notice shall be provided as soon as practicable. Within five (5) working days of this initial notification, the permittee shall also submit, in writing, the following information:

a. Identification of each affected emission point and each emission limit exceeded;
b. Magnitude of the excess emissions;
c. Time and duration of the excess emissions;
d. Identity of the process or control equipment causing the excess emissions;
e. Cause and nature of the excess emissions;
f. Description of the steps taken to remedy the situation, prevent a recurrence, limit the excessive emissions, and assure that the breakdown does not interfere with the attainment and maintenance of the National Ambient Air Quality Standards and state ambient air quality standards;
g. Documentation that the equipment or process was at all times maintained and operated in a manner consistent with good practice for minimizing emissions; and
h. A statement that the excess emissions are not part of a recurring pattern indicative of inadequate design, operation, or maintenance.

The submittal of these notices shall not be a defense to an enforcement action.

17. The permittee may request confidential treatment of any records in accordance with HAR, Section 11-60.1-14.

18. This permit shall become invalid with respect to the authorized construction if construction is not commenced as follows:

    a. Construction shall be commenced within twelve (12) months after the permit takes effect, shall not be discontinued for a period of twelve (12) months or more, and shall be completed within a reasonable time.
    b. For phased construction projects, each phase shall commence construction within twelve (12) months of the projected and approved commencement dates in the permit. This provision shall be applicable only if the projected and approved commencement dates of each construction phase are defined in Attachment II, Special Conditions of this permit.

19. The Department may extend the time periods specified in Standard Condition No. 18 upon a satisfactory showing that an extension is justified. Requests for an extension shall be submitted in writing to the Department.

20. The permittee shall submit fees in accordance with HAR, Subchapter 6 of Chapter 11-60.1.

21. All certifications shall be in accordance with HAR, Section 11-60.1-4.

22. The permittee shall allow the Director of Health, the Regional Administrator for the U.S. EPA and/or an authorized representative, upon presentation of credentials or other documents required by law:

a. To enter the premises where a source is located or emission-related activity is conducted, or where records must be kept under the conditions of this permit and inspect at reasonable times all facilities, equipment, including monitoring and air pollution control equipment, practices, operations, or records covered under the terms and conditions of this permit and request copies of records or copy records required by this permit; and
b. To sample or monitor at reasonable times substances or parameters to assure compliance with this permit or applicable requirements of HAR, Chapter 11-60.1.

23. Within thirty (30) days of the **permanent discontinuance of the construction, modification, relocation, or operation of a noncovered source covered by this permit,** the discontinuance shall be reported in writing to the Department by a responsible official of the source.

24. Application for permit renewal shall be submitted a minimum of sixty (60) days prior to the permit expiration on forms furnished by the Department.

25. **Any document (including reports) required to be submitted by this permit shall be certified as being true, accurate and complete by a responsible official in accordance with HAR, Sections 11-60.1-1 and 11-60.1-4, and shall be mailed to the following address:**

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
919 Ala Moana Boulevard, Room 203
Honolulu, HI 96814

26. To determine compliance with submittal deadlines for time-sensitive documents, the postmark date of the document shall be used. If the document was hand-delivered, the date received ("stamped") at the Clean Air Branch shall be used to determine the submittal date.

ATTACHMENT IIA: SPECIAL CONDITIONS
POWER PLANT
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

In addition to the Standard Conditions of the Noncovered Source Permit, the following emissions unit(s) is subject to the Special Conditions listed below.

Section A. Equipment Description

1. A forty-one (41) MW (Nominal) Geothermal Power Plant including the following equipment and associated appurtenances:

    a. Ten (10) integrated back pressure steam turbine and air cooled binary cycle turbine/generator modules. Ormat Energy Converter (OEC) or equivalent;
    b. Noncondensable gas (NCG) compressor units;
    c. Vapor Recovery Unit (VRU);
    d. Sulfa-Treat System (two (2) abatement reactor vessels);
    e. Emergency Steam Release Facility (ESRF):

        i. Rock Muffler(s); and
        ii. Sodium Hydroxide (NaOH) or equivalent chemical storage tank(s).

    f. Portable H_2S Abatement System;
    g. Two (2) Integrated Two Level Units (ITLU);
    h. Vapor Recovery Maintenance Unit (VRMU);
    i. No. 2 Vapor Recovery Maintenance Unit (VRMU); and
    j. Pressure Relief Valves (Turbine/Generator Modules PSEs and PSVs).

2. The permittee shall permanently attach an identification tag or nameplate on each piece of equipment which identifies the model number, serial number or ID number, and manufacturer. The identification tag or name plate shall be attached to the equipment in a conspicuous position.

Section B. Emission and Operational Limitations, and/or Standards

1. The permit conditions prescribed herein may at any time be revised by the Department to conform to any Federal or State promulgated air quality rules on geothermal facilities.

2. Fugitive pentane emissions from the turbine/generator modules shall not exceed 10,000 parts per million (ppm) from any seal, flange, valve or any other fugitive emission point. The permittee shall take immediate corrective actions upon identifying any pentane emissions in excess of 10,000 ppm when measured at the component interface.

3. The total pentane emissions from the facility shall not exceed 300 pounds per day calculated as a quarterly average. Pentane emissions are from fugitive sources and the VRU and/or the VRMU.

4. No major maintenance or overhaul resulting in the purging to the atmosphere of the turbine/generator modules shall be allowed without the operation of a VRU and/or the VRMU with a minimum recovery efficiency of 95.0 percent. During normal power plant operations, all purging of noncondensable gases to the atmosphere or the release of pentane from the turbine/generator modules to the atmosphere shall be directed through the VRU and/or the VRMU. The VRU and VRMU shall be maintained in accordance with the manufacturer's operational specifications (i.e., temperature, pressure, etc.).

5. The ESRF shall be maintained and be fully operational at all times. The ESRF shall have a design capacity of handling 100 percent of the total actual power plant steam flow.

6. The ESRF shall only be utilized under one or more of the following conditions:

    a. Failure of the electrical transmission line(s) out of the power plant or some incident that tripped all the steam turbine/generator modules;
    b. Complete upset of the geothermal fluid injection system;
    c. Pressure in the steam lines exceed safety design set points;
    d. Any upset situation which would otherwise result in a release of unabated steam to the atmosphere;
    e. Testing of the ESRF; or
    f. Maintenance performed on steam release valve NV4204.

7. The ESRF shall be equipped and maintained at all times with a minimum of 3000 gallons of sodium hydroxide. The chemical abatement system shall operate automatically when steam is released through the rock muffler(s). A minimum sodium hydroxide treatment mole ratio of four (4) to one (1) ($NaOH/H_2S$) shall be used.

    Upon utilizing the ESRF, the permittee shall take immediate action to the extent practical to reduce the steam flow and perform the necessary corrective actions. The steam flow rate shall be reduced, as a minimum, to fifty (50) percent of full flow within four (4) hours after initiating the use of the ESRF.

8. In the event of any operational upset, equipment failure or malfunction which may allow an increase in the emissions of hydrogen sulfide, particulate matter or pentane, the permittee shall apply appropriate measures to control and minimize any air emissions and take immediate steps to correct the condition.

9. The combined emissions of hydrogen sulfide from the geothermal power plant and associated wellfield, including periods of operational upsets, equipment failure or malfunctions shall not cause or contribute to an exceedance of the hydrogen sulfide ambient level of ten (10) ppb on a twenty-four-hour (24-hour) rolling average or twenty-five (25) ppb

on a one-hour (1-hour) average at or beyond the project boundary. Should any of the air quality monitoring stations indicate a hydrogen sulfide ambient concentration greater than ten (10) ppb on a twenty-four-hour (24-hour) rolling average or twenty-five (25) ppb on a one-hour (1-hour) average, the permittee shall take immediate action terminating, within two (2) hours of the exceedance, all power plant activities not associated with normal power plant operations but contributing to hydrogen sulfide emissions. Following the reduction in power plant emissions, if the monitoring stations still indicate hydrogen sulfide ambient concentrations in excess of ten (10) ppb on a twenty-four-hour (24-hour) rolling average or twenty-five (25) ppb on a one-hour (1-hour) average, the permittee shall curtail the power plant operations, unless the permittee can conclusively show to the Department that the power plant operations and emissions are not contributing any impact to the monitoring site. If the hydrogen sulfide ambient concentration is below ten (10) ppb on a twenty-four-hour (24-hour) rolling average and twenty-five (25) ppb on a one-hour (1-hour) average after the power plant emissions have been reduced, the permittee shall maintain the emissions at this reduced level until such time the Department is assured that the resumption of full activity shall not result in another exceedance of the hydrogen sulfide ambient level of ten (10) ppb on a twenty-four-hour (24-hour) rolling average or twenty-five (25) ppb on a one-hour (1-hour) average.

10. During those periods of normal power plant and normal wellfield operations, the combined emissions of hydrogen sulfide from the geothermal power plant and associated wellfield shall not cause an increase in the hydrogen sulfide ambient concentration in excess of five (5) ppb (above background) on a one-hour (1-hour) average at or beyond the project boundary as monitored at any of the air quality monitoring stations and so identified in the monthly monitoring report. As used in this context, a normal power plant operation is a power plant which is operating without any pipeline cleanouts, upsets, equipment failure, malfunction or which is otherwise operating normally. A normal wellfield operation is a wellfield in which no well drilling, flow testing, or abated well cleanouts are occurring and where the completed well are not experiencing any equipment failure or malfunction and are either shut-in, being used as an injection well, or connected to a sound geothermal resource distribution system.

11. During periods of regularly scheduled maintenance, sodium hydroxide or an equivalent chemical shall be used to abate any hydrogen sulfide emissions. Chemicals equivalent to sodium hydroxide shall obtain prior written approval from the Department before use.

12. The unabated cleanout of a pipeline utilizing the geothermal steam is prohibited. If the geothermal steam is used in the pipeline cleanout, the geothermal steam shall be directed through the hydrogen sulfide abatement equipment. The permittee shall utilize a cyclonic muffler or other equivalent device designed to minimize particulate and brine aerosol emissions, and direct venting into the vertical direction. In no case shall any abated pipeline cleanout coincide with any abated well cleanout, well drilling which opens new hole, or well flow testing operations or commence if the ESRF is being utilized by the power plant. If emergency steam releases from the power plant occur during any pipeline cleanout, the pipeline cleanout operations shall be terminated as quickly as practical. Each pipeline cleanout shall not exceed twenty (20) minutes in duration and shall occur only in the daytime.

13. In the event of an equipment malfunction or upset condition which results in a situation where the geothermal injection well(s) are not capable of handling the total geothermal resource being utilized by the power plant, the power plant production and associated geothermal resource being used shall be immediately reduced according to the handling of the injection well(s) or completely shut down.

14. The Sulfa-Treat System shall be operated continuously to abate fugitive hydrogen sulfide emissions from the steam turbines. The Sulfa-Treat System shall be maintained and operated in accordance with the manufacturer's operational specifications.

15. The pressure relief valves for the turbine/generator modules shall be maintained and operated at all times in accordance with the manufacturer's operational specifications and design.

Section C. Monitoring and Recordkeeping

1. Monitoring for fugitive pentane shall be conducted in accordance with Method 21 of 40 Code of Federal Regulations (CFR) Part 60, Appendix A, including monitoring at the component interface. The permittee shall perform monitoring on all fugitive pentane emission points, as a minimum, on a **monthly basis**. The permittee shall keep on file at the facility a monitoring plan showing the locations in the facility where fugitive pentane emissions are monitored.

2. Records shall be maintained on all incidents resulting in the release of pentane to the atmosphere; including the purging of noncondensable gases from the turbine/generator modules; the maintenance and overhaul of the turbine/generator modules, VRU, and VRMU; equipment malfunctions; usage of the VRU and VRMU with hours of operation; and all fugitive emission measurements greater than 10,000 ppm and the corrective measures taken. Records shall include the date and time of each incident, the estimated amount of pentane emitted from each incident, the date and quantity of pentane received from the supplier, and the corresponding pentane tank level readings before and after receipt of the pentane from the supplier. The total pentane emissions from the facility shall be recorded on a **quarterly basis** to calculate the average daily emissions.

3. The permittee shall operate and maintain a minimum of three (3) meteorological monitoring stations, three (3) ambient air quality monitoring stations for hydrogen sulfide and one (1) PM_{10} monitor. The three (3) ambient air quality monitoring stations shall be operated at all times, except during periods of maintenance, repair, or quality assurance/quality control procedures, and unforeseen events beyond the control of the permittee, including, but not limited to, the following: acts of nature, acts of war or terrorism, or equipment failure. Only one (1) of the ambient air quality monitoring stations shall be taken out of service for maintenance, repair, or quality assurance/quality control procedures at any one time. The PM_{10} monitor shall only be operated during drilling

operations, flow testing, and well cleanouts. The permittee shall maintain a file of all measurements

collected from and performed on the ambient air monitoring stations, including the monitoring system performance evaluations; calibration checks; and adjustments and maintenance performed on the system or devices. The measured data shall meet U.S. EPA capture requirements and quality assurance guidelines. As a minimum, a quality assurance check shall be conducted on each monitoring station every other day.

The three (3) ambient air quality monitoring stations shall be equipped with emergency backup generators in the event of power outages to the monitoring stations. The emergency backup generators shall have the capability to supply emergency power to the ambient air quality monitoring stations to ensure that the ambient air quality monitoring stations have power to operate at all times. The permittee shall also maintain a spare hydrogen sulfide analyzer for the ambient air quality monitoring stations.

4. At the discretion of the Department, the permittee may at any time be required to install, operate, and maintain additional ambient air quality and meteorological monitoring stations, but only after due notice to the permittee on the reasons for the proposed change and providing the permittee an opportunity to respond within **seven (7) working days**.

5. The Department may at any time with reasonable cause, request the permittee to measure and record the hydrogen sulfide and pentane emissions at any specified point source location in the power plant.

6. Leak Inspections for Hydrogen Sulfide

   The permittee shall perform daily leak inspections of all steam, brine, and noncondensable gas piping for hydrogen sulfide. For the daily leak inspections, detection methods incorporating sight, sound, smell, and an instrument are acceptable. When a leak is detected, an instrument which continuously monitors hydrogen sulfide levels must be used to determine if the leak is at levels above the OSHA threshold of ten (10) ppm at a distance of one (1) meter. For all leaks with readings above these levels, an initial attempt to secure or repair the leak shall be made as soon as possible, not to exceed twelve (12) hours. For all leaks below these levels, an attempt to secure the leak shall be made as soon as possible not to exceed twelve (12) hours or repair of the leak shall be made in a timely manner not to exceed thirty (30) days, unless circumstances dictate a longer timetable, i.e., procurement of necessary materials, contractors, equipment, shipping issues, etc.

   A log entry shall be made in the Central Station Control (CSC) operations logbook and shall be signed by the permittee at the completion of each inspection. Each detection of a hydrogen sulfide leak shall be recorded in the CSC operations log book. The permittee shall record for each leak that is detected the following information:

a. The equipment type and identification number;
b. The nature of the leak (i.e., vapor or liquid) and the method of detection (i.e., sight, sound, smell, or instrument). If an instrument is used to detect a leak, the hydrogen sulfide level;
c. The date/time the leak was detected and the date of each attempt to repair the leak;
d. Repair methods applied in each attempt to repair the leak; and
e. The date/time of successful repair of the leak.

7. If the duration of the steam release from the ESRF is greater than fifteen (15) minutes, the permittee shall monitor the perimeter of the facility and the ESRF using portable hydrogen sulfide analyzers. Records shall be maintained and include the following:

    a. Dates, times, and locations of hydrogen sulfide concentration readings; and
    b. Hydrogen sulfide concentration readings in ppbv.

8. The following data shall be recorded during periods in which the hydrogen sulfide abatement system is operating at the ESRF:

    a. The dates and operating times of the ESRF;
    b. The injection rate of sodium hydroxide;
    c. The quantity of sodium hydroxide remaining in the abatement equipment storage tanks;
    d. The total quantity of hydrogen sulfide emissions released (abated), in pounds;
    e. The initial and final steam flow rates; and
    f. The reason for using the ESRF.

9. If any of the pressure relief valves for the turbine/generator modules has a malfunction, the permittee shall monitor the perimeter of the facility using portable hydrogen sulfide analyzers. Records shall be maintained and include the following:

    a. Dates, times, and locations of hydrogen sulfide concentration readings; and
    b. Hydrogen sulfide concentration readings in ppbv.

10. All records shall be true, accurate and maintained in a permanent form suitable for inspection, retained for a minimum of **three (3) years** following the date of such records, and made available to the Department or their representatives upon request.

Section D. Reporting and Notification Requirements

1. The ambient air quality monitoring stations shall be equipped with an alarm or acceptable equivalent system that is designed to page and notify the permittee or a government agency on a twenty-four-hour (24-hour) basis of ambient hydrogen sulfide concentrations in excess of ten (10) ppb on a twenty-four-hour (24-hour) average and twenty-five (25) ppb on a one-hour (1-hour) average. The permittee shall immediately notify the Department and the Hilo District Health Office of any exceedance above ten (10) ppb on a twenty-four-hour (24-hour) rolling average and twenty-five (25) ppb on a one-hour (1-hour) average.

One (1) copy of the air quality monitoring and meteorological data files shall be submitted on an **annual** basis to the Department. The data files shall be in ASCII format that can be utilized by a personal computer for ready extraction of data.

The verified air quality monitoring and meteorological data shall be summarized and submitted **monthly** in writing to the Department. The monthly data report shall also include a *monthly summary* with the following information: highest value, the date/time the highest value occurred, monthly average, data recovery (%), number of exceedances, date the exceedance occurred, and the corrective actions taken. Additional information on the monitoring stations and on the data collected shall be submitted upon request by the Department. Both the annual data file and monthly summary shall be submitted to the Department within **sixty (60) days** following the end of each respective time period. The permittee shall provide computer access for the ambient air quality monitoring stations through telecommunication lines to the Department. The computer access shall allow the downloading of the current and the previous twenty-four-hour (24-hour) raw hydrogen sulfide ambient air quality and meteorological data.

2. The permittee shall submit a written report to the Department within **five (5) working days** of the occurrence of Special Condition No. B.9 of Attachment IIA. The report shall include the date, time and duration of the exceedance(s), the status of all project operations during the exceedance, the estimated project emissions and any other emission sources that may have contributed to the exceedance, and all corrective measures and actions taken to reduce project emissions to a minimum. Compliance with this notification provision shall not excuse or otherwise constitute a defense for any violation(s) of this permit, law, rule or order.

3. The permittee shall immediately notify the Department of any operational upsets, equipment failure or malfunction which results in the emission of hydrogen sulfide, particulate matter or pentane in violation of HAR, Chapter 11-60.1 or this permit. In addition, a written report shall be submitted to the Department within **five (5) working days** of occurrence. The report shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial failure, the estimated resultant emissions, time and duration of the event, and the methods utilized to restore normal operations. Compliance with this notification provision shall not excuse or otherwise constitute a defense for any violation(s) of this permit, law, rule or order which results from the operational upset, equipment failure, or malfunction.

4. Prior to any abated pipeline cleanout utilizing geothermal steam, the Department must be informed in writing, a minimum of **two (2) working days** prior to commencement and so concur. The public shall be notified a minimum of twenty-four-hours (24-hours) in advance

   by notices in the newspapers of general circulation in Hawaii County. In addition, the permittee shall make a reasonable effort to notify all residents living within 3,500 feet of the permittee's property boundary a minimum of twenty-four-hours (24-hours) in advance of any abated pipeline cleanout utilizing geothermal steam.

5. The records and any supporting information required in Attachment IIA, Special Condition No. C.2, including any assumptions and calculations used to determine the amount of pentane emissions and descriptions of pentane transfers shall be submitted to the Department on a **quarterly** basis. These records shall be submitted to the Department within **thirty (30) days** following the end of each quarter.

6. Notification and reporting pertaining to the following events shall be done in accordance with Attachment I, Standard Condition Nos. 15, 16, and 23, respectively.

    a. *Intent to shut down air pollution control equipment for necessary scheduled maintenance;*
    b. *Emissions of air pollutants in violation of HAR, Chapter 11-60.1 or this permit; and*
    c. *Permanent discontinuance of construction, modification, relocation, or operation of the facility covered by this permit.*

7. The permittee shall notify the Department immediately in the event the ESRF has operated more than fifteen (15) minutes in duration in accordance with Special Condition No. C.7 of Attachment IIA.

8. The permittee shall immediately notify the Department of an unforeseen event beyond the control of the permittee that affects the operation of the three (3) ambient air quality monitoring stations specified in Special Condition No. C.3 of Attachment IIA, unless the protection of personnel or public health or safety demands immediate attention and makes such notification infeasible. In the latter case, the notice shall be provided as soon as practicable.

Section E. Testing Requirements

1. Prior to the commencement of any abated pipeline cleanout utilizing the geothermal steam, the permittee shall submit to, and receive the approval of, the Department a sampling and testing protocol, identifying the analytical procedures and methodologies to be used and the constituents to be measured, which shall seek to physically and chemically characterize the particulate and aerosol emissions and corresponding ambient concentrations from these operations. Each collected sample shall be submitted to a qualified laboratory for analyses within **five (5) working days** after the sample is collected. The permittee shall submit a copy of the results of the analyses to the Department within **five (5) working days** after receiving the results from the qualified laboratory. The Department may at any time require the permittee to analyze for additional constituents or perform more frequent testing.

Section F. Agency Notification

Any document (including reports) required to be submitted by this permit shall be done in accordance with Attachment I, Standard Condition No. 25.

ATTACHMENT IIB: SPECIAL CONDITIONS
WELLFIELD AND GEOTHERMAL EXPLORATORY/DEVELOPMENTAL WELLS
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

In addition to the Standard Conditions of the Noncovered Source Permit, the following emissions unit(s) is subject to the Special Conditions listed below:

Section A. Equipment Description.

1. This permit encompasses the following equipment and related appurtenances:

    a. Pad A Wellfield: Production Wells KS-9, KS-10, and KS-16, Injection Wells KS-1A, KS-11, and KS-13, and associated equipment;
    b. Pad B Wellfield: Injection Well KS-15, and associated equipment;
    c. Pad E Wellfield: Production Wells KS-5, KS-6, KS-14, and KS-17, Injection Well KS-3, and associated equipment;
    d. Fourteen (14) Geothermal Exploratory/Developmental Wells;
    e. Drilling rig no. 1 (Rig 51):

        i. Three (3) 877 hp diesel engine drives, Waukesha model L5792, serial nos. 363805, 363806, and 363807 (nonroad engines);
        ii. Two (2) 435 hp diesel engine generators, Caterpillar model D353, serial nos. 46B09273 and 46B09281 (nonroad engines); and
        iii. One (1) 800 hp diesel engine for Top Drive unit, Caterpillar model C27, serial no. RAM00139 (nonroad engine).

    f. Drilling rig no. 2 (Geodrill Rig 4):

        i. One (1) 470 hp rig drive diesel engine, Caterpillar model C-13, serial no. LEE19127 (nonroad engine);
        ii. One (1) 284 hp diesel engine generator, John Deere model 6068HF485, serial no. PE6068L039306 (nonroad engine); and
        iii. One (1) 630 hp mud pump diesel engine, Caterpillar model C-18 DITA, serial no. WJH00848 (nonroad engine).

    g. Portable H_2S Abatement System;
    h. Pressure Relief Valves (Production and Injection Wells PSEs and PSVs).

2. The permittee shall permanently attach an identification tag or nameplate on each piece of equipment which identifies the model number, serial number or I.D. number, and manufacturer. The identification tag or name plate shall be attached to the equipment in a conspicuous position.

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Section B. Emission and Operational Limitations, and/or Standards.

1. The permit conditions prescribed herein may at any time be revised by the Department to conform to any Federal or State promulgated air quality rules on geothermal facilities.

2. The construction of fourteen (14) geothermal exploratory/developmental wells are to be drilled in TMK: 1-4-01:2, 1-4-01:3, 1-4-01:58, and 1-4-0119, Kilauea Lower East Rift Zone, Puna, Hawaii.

3. This permit does not authorize any of the geothermal exploratory/developmental wells to be connected to and become part of a distribution system which supplies geothermal resource to a power plant or facility, or any well to be used as an injection well for the geothermal resource unless the permittee has obtained all other applicable federal, state, or local operating permits.

4. No geothermal exploratory/developmental wells (i.e., wellhead cellar) shall be located within six hundred (600) feet of the property boundary. If any federal, state or county permit or order stipulates a distance greater than six hundred (600) feet in which no geothermal wells (i.e., wellhead cellars) can be located, the greater distance shall so apply.

5. The reworking of any geothermal well covered under this NSP is prohibited, unless prior written approval is obtained from the Department. "Reworking" is meant to include recompletion of a well; deepening or redrilling (side-tracking) of a well; or other repairs, maintenance or modifications below the casing head. Such activities commonly involve a drilling rig. If the reworking of any geothermal well is considered necessary, the permittee shall submit a written request to the Department which shall include, as a minimum, a justification for the reworking, procedures and equipment involved, hydrogen sulfide abatement procedures and the estimated emissions. The approval for the reworking of any geothermal well does not relieve the permittee from compliance with all applicable conditions of this NSP, including all provisions related to well drilling, flow testing, and abated well cleanout.

6. Unless prior written approval is obtained from the Department, each geothermal well shall be shut-in or otherwise prevented from discharging to the atmosphere in accordance with appropriate standards of operation and maintenance and at no time be placed on continuous or standby bleed status at the wellhead or anywhere in the distribution pipeline upon completion of flow testing operations. If the release of any accumulated wellhead gas or any other geothermal fluid is considered necessary, the permittee must submit a written request to the Department which shall include, as a minimum, a justification for the required release, estimated duration of the release, estimated amount of hydrogen sulfide emissions, and a description of the abatement system. The release of any accumulated wellhead gas or any other geothermal fluid shall be directed through a hydrogen sulfide abatement system prior to being discharged to the atmosphere. If a request to release any accumulated wellhead gas or any other geothermal fluid is approved by the Department, the approval may be subject to further conditions.

7. Flaring of excess hydrogen sulfide gas from the completed wells is prohibited without the approval of the Department. If flaring of the excess gas is considered necessary, the permittee must submit a written request to the Department which shall include as a minimum the proposed date, time and approximate duration of the flaring episode, the current and expected well head pressure, the estimated hydrogen sulfide concentration in the well gas, the estimated emission rates for hydrogen sulfide and sulfur dioxide, an air quality impact analysis for sulfur dioxide, the probable cause of excess gas buildup, and an assessment of any abatement alternatives.

   If a request to flare excess gas is approved as necessary by the Department, the approval may be subject to specified conditions. These conditions may include, but are not limited to, provisions requiring the permittee to install, operate, and maintain sulfur dioxide ambient monitors and to submit to the Department after the flaring event a report on the times flaring actually occurred, the sulfur dioxide emissions determined through either direct or indirect measurements, and any problems encountered during the flaring process.

8. Hydrogen sulfide abatement equipment with a minimum of three thousand (3,000) gallons of sodium hydroxide or an equivalent chemical shall be on the property prior to the initiation of drilling, abated well cleanout and flow testing operations. Chemical storage tanks shall be maintained with sodium hydroxide or an equivalent chemical at all times with no less than a three (3) day operating supply. Chemicals equivalent to sodium hydroxide shall obtain prior written approval from the Department before use.

9. During well drilling, flow testing and abated well cleanout operations, the permittee shall utilize hydrogen sulfide abatement equipment. The hydrogen sulfide abatement equipment shall consist of a cyclonic muffler or other equivalent device designed to minimize particulate and brine aerosol emissions, and direct venting into a vertical direction. A minimum sodium hydroxide treatment mole ratio of four (4) to one (1) ($NaOH/H_2S$) will be used initially and the abatement efficiency monitored. The optimum mole ratios will be determined during the hydrogen sulfide abatement operations. A specific chemical treatment plan shall be submitted to the Department prior to the commencement of drilling, flow testing and abated well cleanout operations. A copy of the plan shall be maintained at the site at all times and supervisory personnel shall be aware of its provisions at all times.

10. During well drilling operations, the release of any geothermal steam shall be diverted to the hydrogen sulfide abatement equipment or action immediately taken to shut-in the well.

    In no case shall the cumulative steam releases from the well drilling operations result in total abated hydrogen sulfide emissions of five (5) pounds per hour or more. If the cumulative steam releases from the well drilling operations result in total abated hydrogen sulfide emissions of five (5) pounds per hour or more, the permittee shall take immediate action to shut-in the wells.

11. During flow testing and abated well cleanout operations, the permittee shall utilize hydrogen sulfide abatement. If the abated hydrogen sulfide emission rate increases to five (5) pounds per hour or more, or if any steam is released through the power plant emergency steam release facility, the permittee shall cease operations and shut-in the well. The problem shall be corrected before testing or cleanout operations can continue.

    During periods of flow testing, abated well cleanouts, and well equipment failure or malfunction which result in hydrogen sulfide ambient air concentrations exceeding the specified limits in Attachment IIB, Special Condition No. B.15, the permittee shall apply appropriate measures to control and minimize any air emissions and take immediate steps to correct the condition. If the well equipment in question cannot be repaired within twenty-four (24) hours of the occurrence, the permittee shall cease operations and shut-in the well in accordance with Attachment IIB, Special Condition No. B.15.

12. The unabated venting of a geothermal well is prohibited. During abated well cleanout and flow testing operations, the geothermal resource shall be directed through the hydrogen sulfide abatement equipment. Flow testing and abated well cleanout operations shall be conducted only during the daytime and performed for no more than a total of four (4) hours.

    In no case shall any abated well cleanout coincide with any pipeline cleanouts, well drilling which opens new holes, or well flow testing operations, or commence if the power plant emergency steam release facility is being utilized. If emergency steam releases from the power plant occur during any abated well cleanout, the well cleanout operations shall be terminated as quickly as practical.

13. The permittee shall install a control system acceptable to the Department for the throttling of steam flow and the soft shut-in on each development well prior to the well being connected to a resource distribution system.

14. To prevent well blowouts, the permittee shall employ good drilling practices with proper blowout prevention equipment and experienced personnel in the drilling of the exploratory/developmental wells. Drilling supervisors shall be certified in blowout prevention at a minimum of once every two (2) years by a certified trainer.

15. The combined emissions of hydrogen sulfide from the geothermal power plant and associated wellfield, including periods of operational upsets, equipment failure or malfunctions shall not cause or contribute to an exceedance of the hydrogen sulfide ambient level of ten (10) ppb on a twenty-four-hour (24-hour) rolling average or twenty-five (25) ppb on a one (1) hour average at or beyond the project boundary. Should any of the air quality monitoring stations indicate a hydrogen sulfide ambient air concentration greater than ten (10) ppb on a twenty-four-hour (24-hour) rolling average or twenty-five (25) ppb on a one (1) hour average, the permittee shall cease all well drilling, flow testing, and abated well cleanout operations, and shall shut-in those wells experiencing equipment failure or malfunction which result in emissions of hydrogen sulfide. The affected wellfield construction activities shall be allowed to proceed only after

the permittee has satisfactorily demonstrated to the Department that the contributions from the well drilling, well flow testing, abated well cleanout operations or well equipment repair will not result in or contribute to the exceedance of the hydrogen sulfide ambient concentration of ten (10) ppb on a twenty-four (24) hour rolling average or twenty-five (25) ppb on a one (1) hour average.

16. During those periods of normal power plant and normal wellfield operations, the combined emissions of hydrogen sulfide from the geothermal power plant and associated wellfield shall not cause an increase in the hydrogen sulfide ambient concentration in excess of five (5) ppb (above background) on a one (1) hour average at or beyond the project boundary as monitored at any of the air quality monitoring stations and so identified in the monthly monitoring report. As used in this context, a normal power plant operation is a power plant which is operating without any pipeline cleanouts, upsets, equipment failure, malfunction or which is otherwise operating normally. A normal wellfield operation is a wellfield in which no well drilling, flow testing, or abated well cleanout are occurring and where the completed wells are not experiencing any equipment failure or malfunction and are either shut-in, being used as an injection well, or connected to a sound geothermal resource distribution system.

17. The permittee shall have wind socks placed at two (2) opposite edges of the drill site and on the drill floor.

18. The permittee shall maintain a twenty-four-hour (24-hour) telephone service to accept calls concerning this permit. This telephone number must be operational prior to commencement of drilling operations.

19. The diesel engines shall be fired only on fuel oil no. 2 with a maximum sulfur content of 0.0015% by weight and a minimum cetane index of forty (40) or a maximum aromatic content of thirty-five (35) volume percent.

20. The total combined fuel usage of all nine (9) diesel engines shall not exceed 250,000 gallons in any rolling twelve-month (12-month) period.

21. For any six (6) minute averaging period, the exhaust from each of the diesel engines shall not exhibit visible emissions of twenty (20) percent opacity or greater, except as follows: during start-up, shutdown, or equipment breakdown, each of the diesel engines may exhibit visible emissions not greater than sixty (60) percent opacity for a period aggregating not more than six (6) minutes in any sixty (60) minutes.

22. Nonroad Engine Requirements

    For the purpose of retaining the diesel engine's status as a nonroad engine, the diesel engine shall not remain at a location for more than twelve (12) consecutive months, except for equipment storage. A location is any single site at a building, structure, facility or installation. Any engine (or engines) that replace an engine at a location and that is

intended to perform the same or similar function as the engine replaced will be included in calculating the consecutive time period. Should the diesel engine remain at a location for more than twelve (12) consecutive months, the diesel engine would no longer be classified as a nonroad engine and would be subject to the requirements of 40 CFR Part 63, Subpart ZZZZ.

23. The pressure relief valves for the production and injection wells shall be maintained and operated at all times in accordance with the manufacturer's operational specifications and design.

Section C. Monitoring and Recordkeeping.

1. The permittee shall operate and maintain a minimum of three (3) meteorological monitoring stations, three (3) ambient air quality monitoring stations for hydrogen sulfide and one (1) PM_{10} monitor. The monitoring stations required in Attachment IIA, Special Condition No. C.3 shall be used towards fulfilling this requirement.

2. At the discretion of the Department, the permittee may at any time be required to install, operate, and maintain additional ambient air quality and meteorological monitoring stations, but only after due notice to the permittee on the reasons for the proposed change and providing the permittee an opportunity to respond within **seven (7) working days**.

3. The permittee shall monitor the hydrogen sulfide concentration and emission rate during drilling, flow testing, and abated well cleanout operations.

4. During well drilling operations, records of each steam release associated with upsets, equipment failures or malfunctions shall be maintained and include as a minimum, the date, time and duration of steam release, the resultant hydrogen sulfide emissions, chemical injection rate, steam flow rate, and any corrective measures taken.

5. The permittee shall operate and maintain a non-resetting fuel metering system for the permanent recording of the total gallons of fuel consumed by the nine (9) diesel engines associated with the drilling rigs for the purpose of the fuel limitation specified in Attachment IIB, Special Condition No. B.20. The permittee shall maintain records on a monthly and rolling twelve (12) month basis on the total amount (gallons) of fuel oil consumed by the nine (9) diesel engines. The installation of any new non-resetting meters or the replacement of any existing non-resetting meters shall be designed to accommodate a minimum of five (5) years of equipment operation, considering any operational limitations, before the meter returns to a zero reading.

6. The permittee shall keep invoices of fuel deliveries for the diesel engines identifying the delivery dates and the type and amount of fuel (gallons) received. Include with the records copies of the supplier's certificate of analysis showing the sulfur content (percent by weight), cetane index or aromatic content (volume percent) of the fuel delivered, as applicable.

7. The permittee shall keep a log identifying the diesel engines used for drilling a well and for the removal of fill or other materials from wells.

8. Nonroad Engine Location Changes

   For the purpose of demonstrating compliance with Attachment IIB, Special Condition No. B.22, and to retain the diesel engine's status as a nonroad engine, the permittee shall maintain a log of all location changes of the diesel engine. For each location change, the permittee shall record in a log:

   a. A description of where on the property the diesel engine(s) is moving;
   b. The date the diesel engine(s) is moved to another location;
   c. The make, model, and serial number of each diesel engine involved in the move; and
   d. The purpose or reason for the location change.

   The permittee is prohibited from circumventing or attempting to circumvent the residence time requirements of Attachment IIB, Special Condition No. B.22 (i.e., moving the diesel engine only for the purpose of avoiding the applicability of 40 CFR Part 63, Subpart ZZZZ).

   The relocation of nonroad engines within a single property does not need the approval of the Department.

9. If any of the pressure relief valves for the production and injection wells has a malfunction, the permittee shall monitor the perimeter of the facility using portable hydrogen sulfide analyzers. Records shall be maintained and include the following:

   a. Dates, times, and locations of hydrogen sulfide concentration readings; and
   b. Hydrogen sulfide concentration readings in ppbv.

10. Leak Inspections for Hydrogen Sulfide

    The permittee shall perform daily leak inspections of all steam, brine, and noncondensable gas piping for hydrogen sulfide. For the daily leak inspections, detection methods incorporating sight, sound, smell, and an instrument are acceptable. When a leak is detected, an instrument which continuously monitors hydrogen sulfide levels must be used to determine if the leak is at levels above the OSHA threshold of ten (10) ppm at a distance of one (1) meter. For all leaks with readings above these levels, an initial attempt to secure or repair the leak shall be made as soon as possible, not to exceed twelve (12) hours. For all leaks below these levels, an attempt to secure the leak shall be made as soon as possible not to exceed twelve (12) hours or repair of the leak shall be made in a timely manner not to exceed thirty (30) days, unless circumstances dictate a longer timetable, i.e., procurement of necessary materials, contractors, equipment, shipping issues, etc.

A log entry shall be made in the Central Station Control (CSC) operations logbook and shall be signed by the permittee at the completion of each inspection. Each detection of a hydrogen sulfide leak shall be recorded in the CSC operations log book. The permittee shall record for each leak that is detected the following information:

a. The equipment type and identification number;
b. The nature of the leak (i.e., vapor or liquid) and the method of detection (i.e., sight, sound, smell, or instrument). If an instrument is used to detect a leak, the hydrogen sulfide level;
c. The date/time the leak was detected and the date of each attempt to repair the leak;
d. Repair methods applied in each attempt to repair the leak; and
e. The date/time of successful repair of the leak.

11. All records shall be true, accurate and maintained in a permanent form suitable for inspection, retained for a minimum of three (3) years following the date of such records, and made available to the Department or their representatives upon request.

Section D. Reporting and Notification Requirements.

1. A written plan must be submitted to and approval obtained from the Department at least **thirty (30) calendar days** prior to the commencement of construction of each well. The Department shall act on the approval in a timely manner provided all required and requested information have been submitted. Each plan shall include a drawing identifying the well location, the property boundary, access roads approaching and traversing the property, the location of the nearest residence, the locations of the ambient air quality monitoring stations, and hydrogen sulfide abatement procedures. The status of all previous constructed wells shall be provided including a clear description of the measures taken to shut-in the well. The Department may at any time request for additional information.

2. The permittee shall notify the Department in writing at least **two (2) working days** prior to the commencement, and within **two (2) working days** after the completion of the drilling, abated well cleanout, and flow testing operations, for each geothermal well. The Department must concur before the permittee can commence operations.

3. Prior to any drilling, flow testing or abated well cleanout operation, the public shall be notified a minimum of twenty-four-hours (24-hours) in advance by notices in the newspapers of general circulation in Hawaii County. In addition, the permittee shall make a reasonable effort to notify all residents living within 3,500 feet of the permittee's property boundary a minimum of twenty-four-hours (24-hours) in advance of each drilling, flow testing or abated well cleanout operation.

4. In the event of a well blowout, the permittee shall immediately proceed with measures to kill or gain control of the well and notify the Department. The permittee shall submit to the Department a written report within **five (5) working days** of the blowout. The report shall

include, as a minimum, the probable cause of the blowout, the actions that have or will be taken, the estimated time before the well was controlled or is expected to be controlled, an analysis of the air quality impact from any unabated emissions, and a monitoring plan to determine the actual air quality impact resulting from the blowout. A status report shall be submitted to the Department on a **daily basis** until such time the control of the well is established.

5. The permittee shall orally notify the Department when an abnormality or a situation occurs that could result in an exceedance of the state ambient air quality standards, or has resulted in a hydrogen sulfide measurement of twenty-five (25) ppb or more (one-hour (1-hour) average) at any of the ambient air quality monitoring stations, or if not properly resolved, may threaten the health or safety of persons in the vicinity of the project site. Notification shall be provided immediately, unless the protection of personnel or public health or safety demands immediate attention to the abnormality or situation and makes such notification infeasible. In the latter case, the oral notice shall be provided as soon as practicable.

6. The Department shall be immediately notified in accordance with Attachment IIB, Special Condition No. B.10, if the cumulative steam releases from either or both well drilling operations result in total **abated** hydrogen sulfide emissions of five (5) pounds per hour or more.

7. The Department shall be immediately notified in accordance with Attachment IIB, Special Condition No. B.11, if during flow testing or abated well cleanout operations, the abated hydrogen sulfide emission rate increases to five (5) pounds per hour or more, or if any steam is released through the power plant emergency steam release facility (ESRF).

   During periods of flow testing, abated well cleanouts, and well equipment failure or malfunction which result in hydrogen sulfide ambient air concentrations exceeding the specified limits in Attachment IIB, Special Condition No. B.15, the Department shall be immediately notified. Within **five (5) working days** of the occurrence, a report shall be submitted to the Department. The report shall include a description of the equipment failure or malfunction, the date of the initial failure, the estimated resultant emissions, time and duration of the event, and the repairs conducted to restore normal operations.

   Compliance with this notification provision shall not excuse or otherwise constitute a defense for any violation(s) of this permit, law, rule, or order which results from the well equipment failure or malfunction.

8. The daily records specified in Attachment IIB, Special Conditions Nos. E.1.b.i, ii, and iii, shall be reported **daily** to the Department by telephone or facsimile no later than noon of the following work day. The Department may at any time request additional data or revise the frequency of this daily reporting requirement.

9. Notification and reporting pertaining to the following events shall be done in accordance with Attachment I, Standard Condition Nos. 15, 16, and 23, respectively:

    a. *Intent to shut down air pollution control equipment for necessary scheduled maintenance;*
    b. *Emissions of air pollutants in violation of HAR, Chapter 11-60.1 or this permit; and*
    c. *Permanent discontinuance of construction, modification, relocation, or operation of the facility covered by this permit.*

10. The permittee shall submit **semi-annually** the following written reports to the Department. The reports shall be submitted within **sixty (60) days** *after the end of each semi-annual calendar period (January 1 to June 30 and July 1 to December 31)*, and shall be signed and dated by a responsible official.

    a. The monthly and rolling twelve (12) month fuel consumption records for the total combined fuel usage of all nine (9) diesel engines of the drilling rigs; and
    b. The maximum sulfur content (percent by weight), cetane index or aromatic content (volume percent), as applicable, of the fuel oil no. 2 fired in the diesel engines of the drilling rigs.

    The enclosed **Monitoring/Annual Emissions Report Form - Fuel Consumption** and **Monitoring Report Form – Fuel Certification**, shall be used for reporting.

11. Annual emission reports for the diesel engines shall be submitted to the Department on the **Monitoring/Annual Emissions Report Form - Fuel Consumption**, in accordance with Attachment IV, Annual Emissions Reporting Requirements.

    Upon the written request of the permittee, the deadline for the reporting of annual emissions may be extended, if the Department determines that reasonable justification exists for the extension.

Section E. Testing Requirements.

1. The permittee shall conduct wet chemical tests for the determination of the hydrogen sulfide concentrations during periods of drilling, flow testing and abated well cleanout operations where geothermal steam is directed to the hydrogen sulfide abatement equipment.

    a. These tests shall be conducted during the following periods:

        i. At least once every six (6) hours per twenty-four (24) hour period during periods of drilling operations. Additional wet chemical tests shall be required if previous results indicate a +10 percent fluctuation in the hydrogen sulfide concentration; and

ii. At least twice during the four (4) hours per day for abated well cleanouts and flow testing operations.

b. The following data shall be recorded at these times:

i. The hydrogen sulfide concentration (ppm) upstream from the chemical injection system;
ii. The injection rate of sodium hydroxide;
iii. The hydrogen sulfide concentration (ppm) downstream, after chemical injection, calculated hydrogen sulfide emission rate (lb/hr) and calculated hydrogen sulfide abatement efficiency (percent); and
iv. Daily, the quantity of sodium hydroxide remaining in the abatement equipment storage tanks.

The Department may require additional data to be recorded when significant changes in the resource occurs and when changes are made in the injection rates of sodium hydroxide.

The records shall be kept at the well location at all times during the drilling, flow testing and abated well cleanout operations.

2. The permittee shall sample and test the liquid and vapor phases of each geothermal resource well to determine the concentrations of the following constituents in the steam condensate, brine and noncondensable gases:

Steam Condensate

Benzene	Fluorides (Total)
Ammonium (Total)	Mercury (Total)
Arsenic	pH
Lead	Total Dissolved Solids
Cadmium	Total Suspended Solids
Bicarbonate and Carbonate	Beryllium
Sulfates	Asbestos
Chlorides	Vinyl Chloride
Nitrates	Radon
Boron (Total)	Radionuclides (gross Alpha and Beta)
Hydrogen Sulfide	

Brine

Benzene	Fluorides (Total)
Ammonium (Total)	Mercury (Total)
Arsenic	pH
Lead	Total Dissolved Solids
Cadmium	Total Suspended Solids
Bicarbonate and Carbonate	Beryllium
Sulfates	Asbestos

Chlorides	Vinyl Chloride
Nitrates	Radon
Boron (Total)	Radionuclides (gross Alpha and Beta)
Hydrogen Sulfide	

Noncondensable Gases

Benzene	Carbon Dioxide
Hydrogen Sulfide	Arsenic
Ammonia	Beryllium
Mercury Vapor	Asbestos
Methane	Radon
Non-Methane Hydrocarbons	Radionuclides (gross Alpha and Beta)
Vinyl Chloride	

The sampling and testing of the resource shall be performed once upon experiencing the first steam release, and at least once during abated well cleanout and flow testing operations.

During normal operation of each well, the sampling and testing of the resource shall be performed on an **annual basis**. During the testing of the noncondensable gases, if the hydrogen sulfide concentrations deviates more than +10 percent of the previous well test measurement, the permittee shall repeat the sampling and testing of the resource for the steam condensate, brine and noncondensable gases within the next **six (6) months**. The permittee shall be required to perform a retest only **once** after performing an annual resource test.

All sampling shall be submitted to a qualified laboratory for analyses within **five (5) working days** after obtaining the sample. The permittee shall submit a copy of the results of the analyses to the Department within **five (5) working days** after receiving the results from the qualified laboratory. The Department may at any time require the permittee to analyze for additional constituents or perform more frequent testing.

The Department may waive the annual resource testing for a specific constituent upon prior written request of the permittee. Such a request would need to be justified on the grounds that previous testing had shown that constituent to be below detection limits. The annual resource testing may not be waived for more than two (2) consecutive years.

3. At least **thirty (30) calendar days** prior to performing tests and analyses of the geothermal resource well as required in Attachment IIB, Special Condition No. E.2, the permittee shall submit a written test plan to the Department that describes the test methods, analytical procedures, the constituents to be measured and other parameters that may affect test results and analyses. Such a plan shall conform to U.S. EPA guidelines including quality assurance procedures. A test plan that does not have the approval of the Department may be grounds to invalidate any test and require a retest.

4. Prior to the commencement of any geothermal well drilling, abated well cleanout, or flow testing operations which will result in the release of geothermal steam to the atmosphere, the permittee shall submit to, and receive the approval of, the Department a sampling and testing protocol, identifying the analytical procedures and methodologies to be used and the constituents to be measured, which shall seek to physically and chemically characterize the particulate and aerosol emissions and corresponding ambient concentration from these operations. Each collected sample shall be submitted to a qualified laboratory for analyses within **five (5) working days** after the sample is collected. The permittee shall submit a copy of the results of the analyses within **five (5) working days** after receiving the results from the qualified laboratory. The Department may at any time require the permittee to analyze for additional constituents or perform more frequent testing.

Section F. Agency Notification.

Any document (including reports) required to be submitted by this permit shall be done in accordance with Attachment I, Standard Condition No. 25.

ATTACHMENT III: ANNUAL FEE REQUIREMENTS
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

The following requirements for the submittal of annual fees are established pursuant to Hawaii Administrative Rules (HAR), Title 11, Chapter 60.1, Air Pollution Control. Should HAR, Chapter 60.1 be revised such that the following requirements are in conflict with the provisions of HAR, Chapter 60.1, the permittee shall comply with the provisions of HAR, Chapter 60.1:

1. Annual fees shall be paid in full:

   a. Within **sixty (60) days** after the end of each calendar year; and
   b. Within **thirty (30) days** after the permanent discontinuance of the noncovered source.

2. The permittee shall be assessed $500.00 annually for each valid noncovered source permit held during the prior calendar year, or $42.00 per month for any fraction of the year the noncovered source permit is valid.

3. If any part of the annual fee is not paid within thirty days after the due date, a late payment penalty of five (5) percent of the amount due shall at once accrue and be added thereto. Thereafter, on the first day of each calendar month during which any part of the annual fee or any prior accrued late payment penalty remains unpaid, an additional late payment penalty of five (5) percent of the then unpaid balance shall accrue and be added thereto.

4. The permittee shall complete and submit the attached **Annual Fee Form** with the required annual fee. *Make copies for future use*.

5. If any annual fee, including the late payment penalty required by HAR, Chapter 11-60.1, is not paid in full within thirty (30) days after the due date, the Department may terminate or suspend any or all of the permittee's noncovered source permits, after affording the opportunity for a hearing in accordance with HRS, Chapters 91 and 342B.

ATTACHMENT IV: ANNUAL EMISSIONS REPORTING REQUIREMENTS
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the nature and amounts of emissions.

1. Complete the attached form(s):

   Monitoring/Annual Emission Report Form - Fuel Consumption

2. The reporting period shall be from January 1 to December 31 of each year. All reports shall be submitted to the Department **within sixty (60) days after** *the end of each calendar year* and shall be mailed to the following address:

   Clean Air Branch
   Environmental Management Division
   Hawaii Department of Health
   919 Ala Moana Boulevard, Room 203
   Honolulu, HI 96814

3. The permittee shall retain the information submitted, including all emissions calculations. These records shall be in a permanent form suitable for inspection, retained for a minimum of three (3) years, and made available to the Department upon request.

4. Any information submitted to the Department without a request for confidentiality shall be considered public record.

5. In accordance with HAR, Section 11-60.1-14, the permittee may request confidential treatment of specific information, including information concerning secret processes or methods of manufacturing, by submitting a written request to the Director of Health and clearly identifying the specific information that is to be accorded confidential treatment.

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ANNUAL FEE FORM
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

(Make Copies for Future Use)

For Calendar Year: _____

1. Company Name: _____
2. Facility Name (if different from the Company): _____
3. Mailing Address: _____
   City: _____ State: _____ Zip Code: _____
   Phone Number: _____
4. Location of Equipment: _____
5. Plant Site Manager/Other Contact: _____
   Title: _____ Phone Number: _____

Noncovered Source Permit	Date of Issuance	If Permit Canceled Provide Date	Amount Due
0008-02-N			
		Total Due:	

6. Make check or money order payable to **Clean Air Special Fund – NON**. Indicate your permit number(s) on all remittance.

7. Mail payment and this form to:

Clean Air Branch
Environmental Management Division
Hawaii Department of Health
919 Ala Moana Boulevard, Room 203
Honolulu, HI 96814

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MONITORING REPORT FORM
FUEL CERTIFICATION
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information semi-annually:

(Make copies for future use)

For Period: _____ Date: _____

Company/Facility Name: _____

Equipment Location: _____

Equipment Description: _____

Equipment Capacity/Rating (specify units): _____
(Units such as Horsepower, kilowatt, tons/hour, etc.)

Serial/ID No.: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate, and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (PRINT): _____

TITLE: _____

Responsible Official (Signature): _____

TYPE OF FUEL FIRED	MAXIMUM SULFUR CONTENT (% BY WEIGHT)	MINIMUM CETANE INDEX	MAXIMUM AROMATIC CONTENT (VOLUME %)

DRAFT

MONITORING/ANNUAL EMISSIONS REPORT FORM
FUEL CONSUMPTION
NONCOVERED SOURCE PERMIT NO. 0008-02-N

Issuance Date: **Expiration Date:**

In accordance with the Hawaii Administrative Rules, Title 11, Chapter 60.1, Air Pollution Control, the permittee shall report to the Department of Health the following information semi-annually:

(Make copies for future use)

For Period: _____ Date: _____

Company/Facility Name: _____

Equipment Location: _____

Equipment Description: _____

Equipment Capacity/Rating (specify units): _____
(Units such as Horsepower, kilowatt, tons/hour, etc.)

Serial/ID No.: _____

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate, and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Department of Health as public record.

Responsible Official (PRINT): _____

TITLE: _____

Responsible Official (Signature): _____

MONTH	FUEL CONSUMPTION MONTHLY BASIS (GALLONS)	FUEL CONSUMPTION ROLLING 12-MONTH BASIS (GALLONS)	NOTES
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			