FACT SHEET - UPDATED

U. S. Environmental Protection Agency, Region 9
Draft Class V Underground Injection Control Permit
Permit Number R9UIC-HI5-FY16-1R
Puna Geothermal Venture

Location:
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Pahoa, Hawaii, 96778

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I. Purpose of the Fact Sheet

The U.S. Environmental Protection Agency, Region 9 (EPA) has prepared this fact sheet for the draft Underground Injection Control (UIC) Class V Permit (Draft Permit) for Puna Geothermal Venture (PGV or the Permittee). The EPA is proposing this Draft Permit, with a term of ten (10) years, pursuant to the EPA's permitting authority under the Safe Drinking Act (SDWA) and Underground Injection Control (UIC) regulations in Title 40 of the Code of Federal Regulations (CFR), which exists to protect underground sources of drinking water (USDWs). The purpose of this fact sheet, which was prepared pursuant to 40 CFR §124.8, is to briefly describe the principle facts and considerations that went into preparing the Draft Permit. This fact sheet also briefly describes the facility and activities being permitted, type of fluids to be injected, a summary of the basis for permit conditions along with regulatory citations and appropriate supporting references to the record, background information on the permit process, and a description of the EPA's final decision-making process. More information may be found in the Draft Permit.

II. Description of the Facility

PGV owns and operates a geothermal electrical power generating facility located at 14-3860 Kapoho-Pahoa Road, Pahoa, Hawai'i (the PGV Facility). The PGV Facility produces electric energy from a geothermal power plant and geothermal wellfield and is located approximately 21 miles south of Hilo in the Puna District. The PGV Facility occupies approximately 25 acres in the geologic region of the island called the "East Rift Zone," on the eastern flank of the Kilauea Volcano.

The PGV Facility has two types of wells, production wells and injection wells. The production wells are regulated by the Hawai'i Department of Land and Natural Resources (DLNR); the EPA regulates the injection wells. Production wells are drilled approximately 4,000 to 6,000 feet deep into the geothermal reservoir. After the power plant extracts energy from the geothermal fluids, the geothermal fluid waste is injected into the injection wells, which are between 6,000 and 8,000 feet deep. The injection wells are structurally the same as production wells, but the injection wells are deeper. This greater depth of the injection wells makes the well more conducive to accepting the fluids back into the reservoir, which renews the geothermal resource. There are five injection wells currently permitted by the EPA at the PGV Facility (the Existing Wells). PGV seeks to continue operation of the Existing Wells. Pursuant to the Draft Permit, PGV may also seek to convert up to eleven (11) production wells to injection wells (the Proposed Wells). The Draft Permit outlines requirements that PGV will need to meet for the EPA to approve conversion from production to injection for any of the 11 Proposed Wells.

The Existing Wells are numbered as follows: Kapoho State (KS) -1A, KS-3, KS-11, KS-13, and KS-15. The Proposed Wells would be numbered sequentially: KS-17 through KS-27.

Pursuant to the Draft Permit, the Permittee is authorized to inject the following materials into the Existing Wells: geothermal fluids consisting of geothermal brine, geothermal steam condensate, and geothermal non-condensable gases that are produced during the operation of the production well field and power plant; chemical additives for process system and well casing biofouling, corrosion, and scale control; and supplemental water. The fluids to be injected into the Proposed Wells, should they be authorized, would be the same as those described above. The Draft Permit sets a limit on injectate pressure and quantity; this information must be reported quarterly to the EPA.

Well Conversion

The drilling, installation, and operation of the geothermal production wells is regulated by the Hawai'i Department of Land and Natural Resources (DLNR). The Draft Permit clarifies that the term "conversion" refers to converting a production well to injection capacity.

In the Draft Permit, the EPA has developed conversion construction requirements pursuant to 40 CFR § 144.52(a)(1), which the Permittee must submit to the EPA for review and approval prior to converting any of the eleven (11) Proposed Wells from production to injection capacity. When the EPA receives an application from the Permittee to convert any of the Proposed Wells, the EPA will review those requirements and determine whether a modification to the Permit may be required pursuant to 40 CFR § 144.39 or § 144.41(f). See Part II. B1 of the Permit for additional information about the requirements that the Permittee must meet to receive authorization from the EPA to convert any of the existing production wells to injection capacity.

III. Brief Summary of Specific Permit Conditions

To ensure that the proposed project and any permitted injection activity complies with all relevant Safe Drinking Water Act regulations at 40 CFR § 144, 146, 147 and 148, and to protect public health and USDWs, the EPA is proposing conditions and requirements for construction, testing, corrective actions, operation, monitoring and reporting, plugging and abandonment, and financial assurance in the Draft Permit. The sections below summarize the proposed conditions, requirements, and other Draft Permit considerations.

Location of Existing and Proposed Injection Wells (Part II, Section A of the Draft Permit)

The Draft Permit, and the map provided by the Permittee in Appendix A identifies the location of the five Existing Wells and includes a generalized schematic for the Existing Wells below ground surface. The Draft Permit (Appendix A) also identifies the locations of the Proposed Wells. Well schematics for the Proposed Wells would be submitted by the Permittee to the EPA for review at a later date if PGV seeks to convert any production wells into injection wells.

Well Construction and Related Conditions (Part II, Section B of the Draft Permit)

Pursuant to 40 CRF § 144.52(1), for the conversion of any of the Proposed Wells, the Permittee shall submit detailed conversion plans for the EPA's review and approval. These plans must contain an explanation of operations and procedures for the proposed action including, but not limited to, a complete set of drilling and construction records and reports of the production wells authorized pursuant to the DLNR Permit, so that the EPA can establish that the wells proposed for conversion will comply with requirements of the Draft Permit.

Under the terms of the Draft Permit, if PGV receives approval from the EPA to complete conversion of a production well to an injection well, the Permittee shall not commence injection into the well until it receives additional authorization from the EPA. In addition to other required demonstrations outlined in the Draft Permit, the Permittee must demonstrate to the EPA's satisfaction that each well has mechanical integrity (discussed below) prior to receiving the EPA authorization to commence any injection activities.

Pursuant to 40 CFR § 144.51(j), the Draft Permit also requires the installation and maintenance of monitoring devices to measure and record various parameters, including, but not limited to: injection pressure, annular nitrogen pressure, injection and flow rates, and injection volumes and injectate temperature.

Corrective Actions (Part II, Section C of Draft Permit)

Applicants for Class V injection well permits are required to identify the location of all known wells within the injection wells' Area of Review (AOR) which penetrate the injection zone. 40 CFR §144.55. The AOR for this project is defined as the property boundary plus a ¼ mile strip around the perimeter of the property. 40 CFR §146.6(b). Corrective action may include, but is not limited to reentering, plugging, and abandoning any production or exploratory wells which penetrate the injection zone and are located within the ZEI. 40 CFR § 144.55 and 146.7. There are no improperly sealed or improperly constructed wells within the PGV Facility AOR, therefore, there are no corrective action requirements in the Draft Permit.

Well Operation (Part II, Section D of the Draft Permit)

In addition, the Draft Permit calls for adequate notification of activities to test the permitted injection well and the injection formation and timely reporting of those activities to the EPA. 40 CFR § 146.13(c).

PGV must demonstrate that each injection well has mechanical integrity. Mechanical Integrity is demonstrated when there are no significant leaks in the casing, tubing or packer, and there is no significant fluid movement into a USDW through vertical channels adjacent to the well bore. 40 CFR § 146.8(a). The Draft Permit requires periodic mechanical integrity tests (MITs) via an annulus pressure test at least once every five (5) years, continuous pressure monitoring in the existing wells, and a radioactive tracer and a temperature log (or other approved diagnostic tool or procedure) annually to ensure protection of USDWs. 40 CFR § 146.13(b)(3). The Draft Permit requires PGV to continuously monitor and record the tubing/casing annulus pressure of each permitted injection well in order to verify that internal mechanical integrity of the wellbore is maintained during operations, as required by 40 CFR § 144.51(q). PGV is also required to conduct radioactive tracer and temperature surveys to verify the absence of significant fluid movement through vertical channels adjacent to the wellbore. Loss of mechanical integrity of any injection well requires PGV to cease injection into the well, notify the EPA, and take action to restore and confirm mechanical integrity of the well prior to recommencing injection.

The injection pressure and injection volume limitations for the Existing Wells are provided in the Draft Permit. The Permittee shall propose for the EPA review and approval the maximum injection wellhead pressure limitation for any of the Proposed Wells for which PGV seeks authorization to inject. 40 CFR §146.13(a).

The requirements described in Part II, Section D of the Draft Permit would also apply to the Proposed Wells should any be approved by the EPA during the 10-year permit term.

Monitoring, Recordkeeping, and Reporting of Results (Part II, Section E of Draft Permit)

The Draft Permit requires hydrologic monitoring as outlined in Appendix G of the Draft Permit. Semi-annual hydrologic monitoring is also required by DLNR. The purpose of hydrologic monitoring is to monitor for any potential effects to groundwater quality from the injection activity. Detailed monitoring of the fluid being injected into the Existing Wells is also required under the Draft Permit. The injectate must be sampled quarterly to determine the quantities/values of several constituents using EPA-approved methods, as adopted from the Hawai'i Department of Health. 40 CFR §146.13.

The following parameters shall also be monitored and recorded daily: quantity (in gallons) of total injectate, quantity of geothermal fluids, quantity of supplemental water, quantity of any chemical additives, and injectate temperature. Pursuant to the Draft Permit, PGV is required to maintain all operational and monitoring records, and to submit four (4) quarterly reports to the EPA each year that include the results of the required monitoring. 40 CFR §146.13(c).

The requirements described in Part II, Section E of the Draft Permit would also apply to the Proposed Wells, should any be approved by the EPA during the 10-year permit term.

Plugging and Abandonment (Part II, Section F of the Draft Permit)

PGV will be required to plug and abandon all injection wells as provided in the Plugging and Abandonment Plan in Attachment Q of their permit application and Appendix I of the Draft Permit, which PGV submitted pursuant to 40 CFR §§144.51(o). After a cessation of injection operations for two (2) years in any permitted well, PGV must plug and abandon the inactive well(s) in accordance with the Plugging and Abandonment Plan unless PGV notifies the EPA of its intent to reactivate the well(s), has demonstrated that the well(s) will be used in the future, and describes actions or procedures to ensure that the well(s) will not endanger USDWs during the period of temporary abandonment (40 CFR §144.52(a)(6)). The inactive well(s) must pass an initial internal MIT before the EPA authorizes temporary abandonment status. The EPA may change the manner in which the wells will be plugged if the well(s) is modified during its permitted life, or if the proposed Plugging and Abandonment Plan for a well is not consistent with the EPA requirements for construction or mechanical integrity.

Financial Assurance (Part II, Section G of the Draft Permit)

The UIC regulations require that a permittee choose a financial assurance mechanism from a list of options. PGV provided evidence of financial assurance for the plugging and abandonment of wells KS-1A, KS-3, KS-11, KS-13, and KS-15 to the EPA, as required by 40 CFR §146.10. Financial assurance for the plugging and abandonment of potential additional injection wells KS-17 through KS-27 will be required and must be approved

by the EPA prior to the conversion of each well. The Draft Permit requires that PGV maintain financial assurance until such time as the well(s) have all been plugged and abandoned. 40 CFR §144.63. The Draft Permit also requires PGV to annually demonstrate financial responsibility.

IV. Permit Process

Application and Review Period

The EPA has authority to issue permits for underground injection activities under 40 CFR §144.31. PGV is applying for UIC Permit Number R9UIC-HI5-FY16-1R to continue to inject geothermal energy related fluids as listed in the Draft Permit.

In October 2015, PGV submitted a permit application to the EPA for the continued operation of Existing Wells and to potentially convert production wells into additional injection wells. Since their application submittal, PGV provided substantial clarifications and supplemental information to modify and update the permit application to address technical questions from the EPA. After completing a thorough technical review of all submitted information, the EPA has determined that the information provided by PGV is sufficient to prepare the Draft Permit. As described in this fact sheet, the Draft Permit, if finalized, would authorize injection of non-hazardous waste by PGV into the Existing Wells and allow PGV to request EPA approval to convert specific production wells to injection capacity (the Proposed Wells). If approved by the EPA, the Draft Permit would be in effect for ten (10) years from approval.

Based on a review of the operational standards, monitoring requirements, and existing geologic setting, the EPA believes the activities allowed under the proposed Draft Permit are protective of Underground Sources of Drinking Water defined at 40 CFR §144.3, as required under the Safe Drinking Water Act.

Consultation

As part of the permit process, pursuant to 40 CFR §144.4, the EPA is required to consider certain other federal laws and whether those laws require adoption of particular permit conditions.

Endangered Species Act

Under Section 7 of the ESA, the EPA is required to ensure that any action authorized by the Agency does not jeopardize the continued existence of any endangered or threatened species or adversely affect any critical habitat. The EPA is consulting with the US Fish and Wildlife Service (USFWS) to ensure that existing and future operations at the PGV facility comply with the ESA.

National Historic Preservation Act (NHPA)

The historic preservation review process mandated by Section 106 of the NHPA is outlined in regulations issued by the federal Advisory Council on Historic Preservation (ACHP) titled, "Protection of Historic Properties" at 36 CFR Part 800. In considering these requirements, the EPA must determine whether the proposed federal permit is an undertaking and whether it has the potential to cause effects on historic properties. Issuance of a federal permit is considered a federal undertaking; therefore, the EPA is required to meet the statutory responsibilities under Section 106, which include delineating the area of potential effect (APE), and documenting steps taken to identify historic properties, if any, that may be affected by this undertaking.

The EPA has made a preliminary finding that no historic properties will be affected by this undertaking and is consulting with the Hawai'i State Historic Preservation Division (SHPD) on the proposed finding.

Public Participation (40 CFR §124)

On June 22, 2020 EPA initiated a 30-day public comment period on our proposal to issue the Draft Permit. EPA is now extending the public comment period and will accept comments through October 9, 2020. We encourage electronic submittal of comments online at regulations.gov under docket number EPA-R09-OW-2020-0405. (40 CFR §124.10).

Additionally, EPA is announcing a virtual public hearing, scheduled for October 7, 2020 from 5:00 p.m. to 8:00 p.m. Hawai'i time, where the public can provide oral testimony on the Draft Permit. To protect public health during the Coronavirus Disease 2019 (COVID 19) pandemic, the public hearing will be conducted virtually. The hearing will be held via telephone using the toll-free number provided below:

Toll Free Call-in Number: (833) 674-0416

Anyone who wants to provide oral testimony at the public hearing, or listen to the testimony of others, should dial the above number at the start of the hearing or anytime between 5 p.m. and 8 p.m. Hawai'i time on October 7, 2020. The hearing will conclude at 8 p.m. Hawai'i time.

EPA's fact sheet, the Draft Permit, public notice, and the permit application prepared by PGV may be accessed online at regulations.gov under docket number EPA-R09-OW-2020-0405.

The same materials may also be accessed on EPA's website at:
https://www.epa.gov/uic/underground-injection-control-permits-region-9

Final Decision-Making Process

After the close of the public comment period, EPA will consider all comments received, modify the permit, if necessary, and issue a response to the comments with EPA's final permit decision. All public comments submitted, including any testimony provided at the public hearing, and EPA's response to comments, will be available online at regulations.gov under docket number EPA-R09-OW-2020-0405.

The Agency will notify all commenters regarding our decision on the Draft Permit. If comments are filed which request a change in the Draft Permit, EPA's final decision shall become effective no sooner than 30 days after the service of the notice of decision.

Within 30 days after the final permit decision has been issued, any person who filed comments on the Draft Permit, participated in any public hearing on this matter, or takes issue with any changes in the Draft Permit, may petition the Environmental Appeals Board to review any condition of the permit decision. Commenters are referred to 40 CFR § 124.19 for procedural requirements of the permit appeal process.