

US EPA ARCHIVE DOCUMENT

APPENDIX G

PUNA GEOTHERMAL VENTURE

HYDROLOGIC MONITORING PROGRAM

December 2005

Sampling Locations: The following wells will be monitored.

| Well Name | Elevation (MSL) | Completion Depth (MSL) |
|----------------|-----------------|------------------------|
| MW-1 | 610 | -46 |
| MW-2 | 588 | -2 |
| MW-3 (standby) | | |

Frequency: Regular sampling shall occur twice a year, once in January and once in July.

Water Level Measurements: Prior to bailing or pumping the well and sampling, water level measurements will be taken and recorded. The permittee can use an Echo Meter or similar device, or an electronic direct contact detection probe with a calibrated cable/tape for direct measurement at the top of the well casing. Calibrated cable/tape length shall be sufficient to measure water levels in the deepest wells. The metering device shall be equipped with an audible signal and light to indicate water level contact.

Quality Assurance/Quality Control: Quality assurance/quality control procedures will be in compliance with standards of practice for similar programs relative to the acquisition, reduction, verification, and validation of the site data. At each location, standardized equipment cleaning will be conducted prior to obtaining each sample.

Prior to ground water sampling, the well will be bailed or pumped at least three times the wellbore volume.

All samples will be taken and field analyses conducted in accordance with standard protocols approved by the EPA. An EPA or State of Hawaii certified laboratory will be used to conduct the analyses for samples submitted. Samples will be transferred from the sampling device directly to appropriately prepared containers supplied by the laboratory. Samples will be labeled, stored and transported in a chilled state in insulated containers to the laboratory.

In the analyses, detection limits will be used that are below maximum contaminant levels. If they are not, the sampling and analyses will be repeated using the proper detection limits.

The contractor will provide a copy of their Quality Assurance program to DOH and EPA for review and approval.

Physical and Chemical Parameters: Field analyses will include:

- pH
- temperature
- conductivity
- salinity
- chloride concentration
- water level

These measurements will be obtained by using calibrated instruments specifically designed to directly measure these physical and chemical parameters within the operational constraints dictated by site conditions.

The inorganic (Type I) and organic (Type II and IV) constituents that are to be sampled for are specified in Appendix H.

Reporting: Sampling results and measurements will be submitted during the February following the January sampling, and the August following the July sampling. Original laboratory reports will be included with a cover letter. Reporting units shall be specified. The laboratory shall not use text descriptions, such as "Below Regulatory Limits" or "BRL", in its reporting, but rather, the actual numerical results will be reported. If the actual numerical results are not reported, the sampling and analysis will be redone until numerical results are reported.

Further Monitoring: If leakage of the injectate into the USDW is suspected, the ground water sampling may be modified. Depending on the situation, this could include sampling from Malama Ki and GTW-III, sampling for certain analytes and more frequent sampling.