New Mexico Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

David Martin
Cabinet Secretary

Brett F. Woods, Ph.D.
Deputy Cabinet Secretary

David Catanach
Director, Oil Conservation Division

May 14, 2015

Nicholas Goodman
Cyrq/Lightning Dock Geothermal, LLC
136 South Main Street, Suite 600
Salt Lake City, Utah 84101

RE: Groundwater Quality Monitoring Associated with the Geothermal Power Plant (Permit GTHT-1) in Hidalgo County, New Mexico

Mr. Goodman,

The Oil Conservation Division (OCD) has reviewed the *Groundwater Background and Compliance Report* dated October 2014 prepared by AMEC Environment & Infrastructure, Inc., et al, regarding water quality in the general area around your facility and the April 20, 2015 addendum report prepared by Geo-Science Solutions, LLC. Groundwater in the area is protectable, however certain dissolved constituents appear to exist naturally at concentrations in excess of the state's water quality standards. Furthermore, water quality appears to be somewhat variable in the area both laterally and vertically. It is generally understood that the geothermal resource behaves in a complex manner with shallow and deep groundwater interaction via highly variable permeability. Due to the observed upwelling of groundwater in the area along with the potential interest expressed by Cyrq in the relatively shallow injection of some percentage of spent geothermal waters from the power plant for an indeterminate period of time, the OCD is requiring the regular monitoring of groundwater quality and water levels. This letter is intended to provide Cyrq with direction in that regard.

Quarterly Monitoring Requirements
The following eight shallow wells should be gauged for depth-to-water and appropriately sampled on a calendar quarter basis: MW-1, MW-1B, MW-2, MW-3, MW-4, MW-5, MW-6, and G3S. Spent geothermal water from the plant should also be sampled on a quarterly basis prior to subsurface injection. All samples should be analyzed for: arsenic, fluoride, chloride, iron, manganese, sulfate, total dissolved solids, and pH.

Annual Monitoring Requirements
In addition to those cited above, the following three deeper wells should also be gauged for depth-to-water and sampled annually: LDG 47-7, G2SE, and INW-1. All samples should be analyzed for not only the quarterly monitoring constituent list provided above, but also for: barium, cadmium, chromium, lead, mercury, nitrate, selenium, uranium, combined radium-226 and -228, aluminum, boron, nickel, phenol, and volatile organics via Method 8260 (full list).

General Conditions
The frequency of sampling along with the constituents of concern may be modified after an appropriate period of time once a more complete database of information is developed. Water samples should be obtained only after proper purging, properly preserved, and delivered under chain of custody conditions to an accredited laboratory for analysis by standard methods with appropriate detection limits, i.e. below the approved background concentrations or state water quality standards (20.6.2.3103 NMAC). All water quality and potentiometric information must be

provided to the OCD within 30 days of receipt of the laboratory reports. The OCD must be immediately notified if the measured concentration of any constituent in any sample exceeds the maximum levels provided in 20.6.2.3103 NMAC with the exceptions of fluoride exceeding a concentration of 17 milligrams per liter (mg/l), sulfate exceeding a concentration of 1200 mg/l, and total dissolved solids exceeding a concentration of 2200 mg/l. Furthermore, if such an exceedance is measured the operator shall resample and analyze water from the associated source within 15 days. Once that information is available it must be provided to the OCD such that a path forward can be developed, but injection of spent geothermal waters might need to be temporarily suspended.

If any additional monitoring wells are installed, discussions with the OCD should be undertaken to decide if they need to be included in the monitoring requirements established herein. If chemical additions such as tracers, acids, or stimulants are to be introduced into the groundwater system, the OCD needs to first approve a complete G-103 Sundry notice and the laboratory analysis requirements may need to be modified for a period of time.

If you have any questions, please feel free to contact me at (505) 476-3465 or by email at *jim.griswold@state.nm.us*.

Respectfully,

Jim Griswold
Environmental Bureau Chief

cc: David Janney, Geo-Science Solutions
Carl Chavez, OCD