ATTACHMENT 2

ALTAROCK ENERGY INC. FIELD WORK FOR THE INNOVATIVE ENGENEERED GEOTHERMAL SYSTEM EXPLORATION METHODOLOGY

BACKGROUND

AltaRock Energy Inc. (AltaRock) has been funded by the U.S. Department of Energy (DOE) under the American Recovery and Reinvestment Act to develop exploration methods for Engineered Geothermal Systems (EGS) through the integration of geophysical, geological, and geochemical data sets. The area chosen for this project is Dixie Valley, Nevada. This area was chosen because the Dixie Valley geothermal resource is the most highly characterized geothermal resource with respect to the public domain database in the Basin and Range Province of the western U.S.

Our project strategy is to first develop a statistically valid, baseline model using existing, public domain geoscience information in the project area. Figure 1 presents the proposed Project Area, 50 kilometers (50km), about 31 miles (31mi), on a side. The coordinates of the four corners of the proposed Project Area are presented in Table 1. The Project Area spans three different BLM Field Offices. A separate Notice of Intent (NOI) of Geothermal Exploration will be sent to each Field Office. We present all planned work to all Field Offices but break out the surveys stations per Field Office for your evaluation purposes.

New geological, seismic, gravity, magnetotelluric (MT), and geochemical data will be collected and integrated into existing baseline geothermal resource conceptual model to improve model coverage and resolution, and generate an enhanced geothermal resource conceptual model.

This document describes the location and field methodology to be used for these new surveys. Note that both the geology and gravity surveys are unobtrusive in that they involve traversing an area and at any particular spot making a measurement by either placing a Burton Compass on the ground, taking a hammer to a rock, or setting a gravimeter on the ground surface for a reading. The geology and gravity surveys will be along existing and passable roads with short off-road hikes to examine local outcrops.

Access for any type of survey will be by 4-wheel drive, ATV, or hiking. To address Mt. Lewis Field Office cultural resources concerns, no survey locations are located in T25N R35E Sections 22, 23, 24, 25, 26, and 27.

Table 1. GPS Coordinates for the Dixie Valley, Nevada Proposed Project Area

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GEOLOGY SURVEY

A team of two AltaRock geologists will conduct field reconnaissance in the proposed Project Area reviewing the rock types and structure in the area. This will involve conducting traverses throughout the area, potentially collecting geological samples, and taking photographs. The geology field team will be led by Dr. Trenton Cladouhos of AltaRock. A description of the field work for each Field Office that will receive a NOI application follows.

- **Mount Lewis Field Office Area** No geology field work.
- **Stillwater Field Office Area** - Field work will be confined the Stillwater Range, the Clan Alpine Mountains, and the Augusta Mountains. No field work will be done in the valley bottom of Dixie Valley, Humboldt Salt Marsh, or Carson Sink. In the Ranges, field work will be mostly confined to
100 m of existing and passable roads. No off-road vehicles will be used to access remote sites. If a visit to a site further than 100 m from a road is made, the visit will be made on foot.

- **Humboldt River Field Office Area** - Field work will be confined the Stillwater Range and Augusta Mountains. No field work will be done in the valley bottom of Dixie Valley except for Hayder Hot Springs, which has an existing road to it. In the Ranges, field work will be mostly confined to 100 m of existing and passable roads. No off-road vehicles will be used to access remote sites. If a visit to a site further than 100 m from a road is made, the visit will be made on foot.

**GRAVITY SURVEY**

An AltaRock team member from the University of Nevada Reno, Dr. Robert Karlin and one of his graduate students, will conduct the gravity survey. This work will involve taking about 200 new measurements at selected sites throughout the project area and beyond using a 4-wheel drive or an ATV, a gravimeter, and a hand-held differential GPS unit. The gravity measurement will be made on the surface in an area with no brush. Once the measurement is taken, the gravimeter will be removed and moved to next location. No instrumentation will be left on the ground. Figure 2 is an example of the gravimeter instrumentation. A map of the new gravity station locations has not been provided because of the minimal impact such measurements have on the environment. At the time of this NOI application submittal, Dr. Karlin has not decided where specifically to place the gravity stations. An addendum to this application showing the locations of the gravity stations will be submitted at a later date.

![Figure 2. Gravimeter Instrument](image)

**GEOCHEMICAL SAMPLING OF SPRINGS AND FUMAROLES**

Figure 3 shows potential geochemical sampling sites within the EGS Exploration Methodology Project Area. The latitude and longitude coordinates for these potential sampling sites is given in Table 2.

The field sampling crew will drive and hike as required to the sampling site. Sampling techniques vary somewhat among different entities. Described herein is the procedures used by AltaRock. At the sampling site, the field sampling crew will take GPS readings and photographs. They will record any other useful information about the site such as spring flow rate, accessibility issues, etc.
At the springs, in-situ measurements of temperature and pH will be taken. Four water samples will be taken and filtered, as appropriate, in the field for (1) unreactive elements, (2) reactive elements, (3) silica, and (4) deuterium and oxygen isotopes. All bottles will be labeled with the site name, date and time sampled, person collecting the sample, and whether the sample was filtered or unfiltered. All sample bottles for each site sampled will be placed in gallon ziplock bags. Helium samples will also be collected as appropriate. This procedure involves (1) placing a funnel over the spring outlet which is connected by Tygon-tubing to a pre-cut helium tube with sampling clamps; (2) allowing water, in the case of single phase springs or gas, in the case of two phase springs or fumaroles, to flow through the tubing and helium sampling tube; (3) tightening the clamps once no bubbles are visible in the outflow; (4) wrapping electrical tape around tubing and clamps several times to help stabilize the clamps; (5) placing a small amount of water in each end of the tube then cap each end with a plastic cap or piece of electrical tape to prevent air contamination; and (6) labeling the helium tube with the site name, date and time sampled, and name of person collecting sample.

Figure 3. Potential Geochemical Sampling Sites with ID Nos., see Table 1.
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Table 2. Potential Geochemical Sampling Sites Geographic Coordinates (cont'd)

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SEISMIC SURVEY

The seismic survey will consist of 21 broadband seismometers deployed over a 50km x 50km area in two campaigns, referred to as primary and secondary (Figures 4 and 5, respectively). The seismometers will be placed below the surface at a depth of up to 3ft using hand tools. There will be up to 2 people per site while installing the seismic equipment. Each seismic deployment campaign is expected to be three months in duration, or six months for the total deployment. It is expected that data will be retrieved monthly from the data loggers. The latitude and longitude coordinates for these stations are given in Tables 3.

Figure 4. Proposed Primary Seismic Station Locations in and around the Proposed Project Area; Permanent Seismic Stations at Dixie Valley Are also Shown; see Figure 1 for Well ID Nos.
Figure 5. Proposed Secondary Seismic Station Locations in and around the Proposed Project Area; Permanent Seismic Stations at Dixie Valley Are also Shown; see Figure 1 for Well ID Nos.
### Table 3.

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**Humboldt River Field Office**

**Stillwater Field Office**

Figure 6 presents an example seismic station installation we plan in Dixie Valley with some variation which is described below. We will use Trillium broadband seismometers which are 128 mm (5.04”) tall with a diameter of 90 mm (3.54”), Figure 6a. Note that the seismometer sits on a miniature tripod (which is used for leveling the seismometer) which is shown in Figures 6a and 6b. The seismometer will be placed in a shallow hole approximately 0.15-0.20m (6-8”) wide x 0.15-0.31m (6-12”) deep. A variation of the deployment shown in Figure 6b is that the miniature tripod may be placed on a small concrete pad (0.025-0.05m [1-2”] thick) for enhanced leveling capability. The seismometer will have an installation case (Figure 6d) to protect the seismometer from the environment. The seismometer and installation case hole will be back-filled with native material and the completion will be flush with the surface. The cable from the seismometer will be place in PVC which will be run a few inches below the surface to weatherproof container with house the digitizer and battery to operate the seismometer (Figure 6e). Also shown in Figure 6e, are the weatherproof container secured above ground on 2 x 0.08m (3”) galvanized pipes that will stand about 1.52m (5ft) and solar panels, about 0.31-0.381m (12-
15") x 0.31-0.62m (1.2ft). Figure 6e shows an antenna but this will not be part of the Dixie Valley installation.

Seismic data will be recorded on a 16 Gbyte compact flash and will be retrieved once a month.

**MAGNETO-TELLURIC (MT) SURVEY**

The MT survey will occupied if approved 70 of the 129 stations proposed to be deployed in and around the 50km x 50km Proposed Project Area (Figures 7). A typical MT station setup is shown in Figure 8. The latitude and longitude coordinates for each of the MT stations is given in Table 4. Figure 9 shows a typical field setup.

The recorder is battery operated and there is no transmitting or energizing of the ground (passive recording). Footprint consists of the recorder (breadbox), battery (car size), magnetometer coils 1.22m x 0.08m diameter tubes (4ft x 3in diameter tubes), an ‘L’ layout of two wires centered on the recorder to measure the electric field, and connecting cables. Two of the magnetometer tubes must be buried horizontally for 0.15m (~6"), and one buried vertically almost completely, for thermal and wind stability. The endpoints of the wire cross are ~100m (~328ft) from the center and buried ~0.15m (~6”). This is done with a shovel and sometimes a digging bar by hand, no power tools.

The recorder typically would stay in place for 1 day (overnight). Upon completion of the field recording, all components are removed, holes filled and leveled, and original condition restored to extent possible. All equipment is driven in a pickup truck along existing dirt roads, and then walked a hundred meters so as to not be visible. We do not anticipate effects on fish or wildlife, or on air quality or visual impact. No hazardous material will be used, produced, transported or stored. It is a stand-alone recording that we do not need to attend other than installation and removal.

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Figure 6. Example Seismic Station Installation
Proposed for the Innovative Engineered
Geothermal System Exploration Methodology Project; See Text for an Explanation
Figure 7. Engineered Geothermal System Exploration Methodology Proposed Mageto-tellurics Stations in and around the Proposed Project Area in Dixie Valley, Nevada
Figure 8. Standard Magneto-telluric Station Setup

Figure 9. Installation of Overnight Recording Gear; White Tubes Are 2 of the 3 Magnetic Field Solenoids which Will Be Buried (about 0.08m (6")); Connections for Cabling and Thin Black Electric Field Line Are Visible. Large Yellow Box Is for Setup and Will Be Removed after Installation; Recording Module and Battery Are Buried for the Measurement.
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- **Humboldt River Field Office**
- **Mount Lewis Field Office**
- **Stillwater Field Office**
Hi Ken,

The following are the paths to the new seismic survey project proposal submitted by AltaRock. This proposal is to conduct seismic surveys in and around the Dixie Valley, NV area. The seismic survey includes the use of ten seismic stations deployed in two separate campaigns, each campaign lasting 3 months, to measure microseismic waves. The stations will be monitored once each month for the entirety of the campaign. AltaRock Energy Inc. (AltaRock) has been funded by the U.S. Department of Energy (DOE) under the American Recovery and Reinvestment Act to develop exploration methods for Engineered Geothermal Systems (EGS) through the integration of geophysical, geological, and geochemical data sets. Nancy Spencer-Morris, Mark E Hall, and Kristine Struck should be on the IDTeam. Please forward this email to the NEPA mailbox.

Thanks,

Raquel Minky
Geologist
Bureau of Land Management
Humboldt River Field Office/Winnemucca District
(775) 623-1582
Hi Joe,

Good morning! As stated in our previous phone conversations, the Humboldt River Field Office would issue casual use permits for all previously submitted surveys except the seismic survey and geochemical survey. Until the geochemical survey description is received, I will not be able to identify whether or not the survey will be classified as a categorical exclusion (CX) or casual use. The casual use permits for the geology, gravity, and MT surveys should be issued before the end of November 2010. As for the seismic survey, since it is a CX level document it requires additional work. Now that we have received from you a copy of the revised NOI and associated forms we can now submit your request to our NEPA committee. Our NEPA next meets Monday November 15th, 2010. I will make the greatest effort possible to get the permit out by the end of November. If you have any other questions please feel free to call me!

Thanks,

Raquel Minky
Geologist
Bureau of Land Management
Humboldt River Field Office/Winnemucca District
(775) 623-1582
"Joe lovenitti" <jlovenitti@altarockenergy.com>

I understand through conversation with Raquel Minky that the BLM will be providing a causal use permit for all surveys requested except for seismic which will require a CatEx. Also I understand that all three field offices should finalize the permitting of these surveys by the end of November.

I have a telephone call with DOE managers on Tuesday, 9 Nov. Would it be possible to receive an e-mail from each of you to the status of the permitting process. The reason I am asking is that I need to order the seismic equipment in November to be ready for field deployment in March. In order to do so, DOE needs to feel comfortable that the permit for the seismic survey will be issued.

I appreciate whatever can be done for this request.

Best Regards
Joe lovenitti
VP Resource