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January 13, 2010
NGA ref: 720

Jeff Witter, Ph.D.
Sierra Geothermal Power Corp.
500-666 Burrard Street
Vancouver, BC, Canada V6C 3P6

Re: ***Gravity and Magnetic Modeling***
Alum Geothermal Prospect
Esmeralda County, Nevada

Dear Dr. Witter,

This letter, and attached figures, presents the results of a gravity and magnetics modeling project for the Alum Geothermal prospect in Esmeralda County, Nevada. NGA constructed five (5) two-dimensional profiles, modeling the gravity and magnetic data with the GM-SYS software.

Figures 2-6 show the profile locations superimposed on the datasets utilized for the modeling, the Hulen (2009) geologic map, the gravity dataset, the magnetic dataset, and the surface topography. Figures 7-11 show the geologic models resulting from this modeling project.

DATA SOURCES

This work was conducted by Northwest Geophysical Associates, Inc. (NGA) for Sierra Geothermal Power Corp (SGP). The modeling utilized two datasets provided by SGP:

- Gravity data, acquired by McGee Geophysical in 2008 for SGP. These data were collected on a 250m grid over the survey area and on a broader spacing (nominally 750m) over a larger area extending over the Silver Peak prospect to the south. A color contour plot of that dataset is shown in Figure 4.

  NGA utilized the data set which was processed by McGee Geophysical using a Bouguer density of 2.35 g/cm^3. Qualitative analysis showed this density provided the least correlation with topography.

- Ground magnetic data, acquired by McGee Geophysical in 2008 and 2009 for SGP. These data were collected with a 200m line spacing over the SGP lease

area, and with a 400m line spacing over a broader area extending 2km beyond the lease area. A color contour plot of that dataset is shown in Figure 5.

- Geologic maps and conceptual geologic cross sections. These were the work of Hulen (2009) of SGP. Hulen's geologic map of the Alum Prospect is included as Figure 3.
- Density and magnetic susceptibility data acquired by Jeff Witter (SGP) from selected rock samples and outcroppings collected in the summer of 2009. Those data are included as Table 1.

  Magnetic susceptibilities in the models are reported in micro-cgs units (μcgs). The conversion factor from SI units to μcgs units is $4*pi*10^6$ (μcgs = $4*\pi*10^6*$SI). Densities are reported in g/cm^3.

  Preliminary well log data for SGP boring 25-29, current to 11-Nov-2009 and a depth of 2350 feet (715m).
- A 10m digital elevation model (DEM) available from the USGS. This dataset was provided to NGA by SGP.

In creating the modeled profiles, gravity, magnetic, and topography data have been resampled from the grids at 10m or 20m intervals. While this is oversampling for the gravity data, it is not oversampled for the magnetic or topography data.

Interpretation Software

The GMSYS modeling software used for this project is a product of Geosoft, Inc. of Toronto, Ontario (www.geosoft.com). The GMSYS modeling package was developed by NGA and recently (2007) sold to Geosoft. GMSYS Profile version 5.01.10 was used for this project.

DISCUSSION OF MODELED PROFILES

General Discussion

Models are based on Hulen's profiles G-G1 and G-G'. Our profile G-Gp corresponds to his profile G-G1 but extends at the same azimuth past G1 to the limit of the SGP lease area. Profiles G-Gp and J-Jp pass within 50m of well 25-29. The Hulen profiles were modified accordingly, bringing up the Weepah discontinuity to 670m. This constrains the density contrast between the lower Paleozoic section (PrT) and the overlying geologic section.

Magnetic data – near-surface geology

The strong magnetic anomalies with a short spatial wavelength are due to near-surface geology, probably local volcanic and volcanic tuff units. As these near surface units are unlikely to influence the deeper geothermal regime, we have not made an extended effort to model the magnetic response in as much detail as the gravity.

Deep Paleozoic section

The deep Paleozoic section at the west end of the profiles is not very well constrained. This was inserted based on Hulen's geologic cross sections. The thickness of the Paleozoic section could be increased (or decreased) while making the underlying Weepah detachment deeper (or shallower) without changing the gravity response. We have used a density of 2.65 g/cm^3 for the Paleozoic section. That density could be increased (decreased) while making the section thinner (thicker) without changing the gravity response.

Profile G-Gp

The gravity-magnetic model for Profile G-Gp is shown in Figure 7. As noted above, Profile G-Gp is modified from Hulen's profile G-G' with the Weepah Detachment (PrT) shifted upwards to match SGP well 25-29, and the densities adjusted accordingly. This one well serves as the only "calibration" of densities for the project. These densities agree well with the sample densities provided by Jeff Witter (Table 1).

Profile I-Ip

The gravity-magnetic model for Profile I-Ip is shown in Figure 8. Profile I-Ip was cloned from J-Jp, with the faults and surface geology adjusted to conform with Hulen's mapping, and with the gravity and magnetic response.

Profile J-Jp

The gravity-magnetic model for Profile J-Jp is shown in Figure 9. Profile J-Jp was cloned from G-Gp, with the faults and surface geology adjusted to conform with Hulen's mapping, and with the gravity and magnetic response.

Profile K-Kp

The gravity-magnetic model for Profile K-Kp is shown in Figure 10. Profile K-Kp was cloned from J-Jp, with the faults and surface geology adjusted to conform with Hulen's mapping, and with the gravity and magnetic response.

Profile B-Bp

The gravity-magnetic model for Profile B-Bp is shown in Figure 11. Profile B-Bp was modeled after Hulen's cross section B-B' with the densities of the units conforming with the previous profiles.

The fault between 2500m and 3000m profile distance is interpreted from the strong gravity gradient. The steepness of the gradient indicates a deep low density basin on the down thrown side of the fault. This would typically be Quaternary or Pliocene alluvium.

Thank you for the opportunity to work with you on this project. Please contact us at your convenience should you have questions or need additional information.

Sincerely,

Northwest Geophysical Associates, Inc.

Rowland B. French, R.G., Ph.D.
President

Attachments:

Table 1	Sample densities and magnetic susceptibilities
Figure 1.	Site Location Map
Figure 2.	Base Map
Figure 3.	Geologic Map
Figure 4.	Gravity Map
Figure 5.	Magnetics Map
Figure 6.	DEM
Figure 7.	Profile G-Gp
Figure 8.	Profile I-Ip
Figure 9.	Profile J-Jp
Figure 10.	Profile K-Kp
Figure 11.	Profile B-Bp

Data CD

File: NGA_Alum_Grav-Mag_report02.doc
NGA Project: 720