# Site Description

**Desert Valley**

(updated 2010)

Geologic setting: Desert Valley, a 1760 km$^2$ valley between the Slumbering Hills (E), Jackson Mountains (W), Jungo Hills (SW), and Eugene Mountains (SE), extends northward into the Quinn River drainage and Kings River Valley. The southeastern valley hosts a producing geothermal plant, Blue Mountain, 35 km west of Winnemucca. The western portion of Blue Mountain is primarily Triassic-Jurassic metasediments (phyllite, slate, quartzite, and limestone), intruded by gabbro. An unnamed(?) thrust fault separates the metasedimentary unit from Triassic Raspberry Formation, a slate with limestone and quartzite lenses. The northwest flank of Blue Mountain is intensely silicified, to the point of jasperoid replacing limestone (Bonham et al., 1985). Jasperoid forms in hydrothermal settings 200°C and higher; below 200°C, the rate of silica replacement is too low to remineralize limestone (Lovering, 1962).

The Slumbering Hills 10 km north of Blue Mountain are underlain by slate, rhyolite, and quartzite, intruded by quartz monzonite and granodiorite. Mica schist, the product of low-grade contact metamorphism, is overlain by basalt, welded tuffs, latite, and Tertiary andesite. The Slumbering Hills are considered part of the Awakening mining district, which produced a historical gold to silver ratio of 1:1.4. Mines throughout the range have similar basic geology: gold-enriched quartz veins within Triassic(?) metasediments (Bonham et al., 1985).

The southernmost end of Desert Valley was classified as a “forgotten” geothermal resource by Richards and Blackwell (2002), from temperature gradient data. The Alpha Mountain—Antelope Range region (Haystack mining district) is also known for quartz-associated gold. Triassic-Jurassic metasediments were intruded by granodiorite and cut by iron-stained, brecciated quartz veins (Vanderburg, 1936; Johnson, 1977).

The Jungo mining district is 18 km WSW of Blue Mountain, southwestern Desert Valley. The mining history is poorly recorded, but geology is well-detailed in Bonham et al. (1985). The Jungo Hills are comprised of Permian-Triassic age (and older) metavolcanics and metasediments, Tertiary volcanics and sediments, and Cretaceous-Tertiary diorite intrusives.

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Geothermal features:

***Blue Mountain:*** Gold exploration drilling in the 1990's intercepted 88°C groundwater at Blue Mountain (Parr and Percival, 1991). The area is covered by Quaternary alluvium, and no hot springs or spring deposits were known prior. Fairbank and Ross (1999) later examined temperature logs and found maximum temperatures of 81°C in a 108-m drill hole. The 12 $km^2$ thermal anomaly is centered on Sec. 14, T36N, R34E (Fairbank and Niggemann, 2004).

Hot fluids circulate along the numerous north-striking normal faults west of Blue Mountain, which in turn is controlled by a northeast-striking range-front fault. A 650-m exploration core hole drilled at this site, Deep Blue No. 1, recorded 144.7ºC at 644.5 m (Fairbank and Niggemann, 2004). The U.S. Department of Energy agreed to provide funding ($657,000 over 3 years) to Noramax Corporation to study and help define the resource. Drilling of an exploration core hole commenced in April 2002. Samples from this new drill hole were collected in summer 2002 (www.eere.energy.gov).

Noramax began drilling Deep Blue No.2 (DB-2) on March 25, 2004, which was successfully completed to 1128 m depth on April 28, 2004 (see also GeothermEx, 2004). Costs for the operations were shared between Noramex Corp. (NGP wholly-owned subsidiary) and the U.S. Department of Energy. The maximum recorded temperature was 167°C at 585 m. Temperatures of 150-160ºC were recorded in the 200-585 m interval in November, five months after drilling (Nevada Geothermal Power press release, 12/20/2004). A potential geothermal production zone between 515 and 760 m is characterized by >150°C temperatures, multiple crystal-lined, open fractures and vuggy quartz veins, and lost circulation zones. A temperature reversal was observed in the well below 585 m. Geothermometry suggests a higher temperature reservoir at greater depth (Niggemann and others, 2005).

A full-diameter production well, 26A-14, was completed to 858 m in September 2006. A 60 hr flow test reported unassisted flow of over 650,000 lbs/hr of fluid. For a complete report see: www.nevadageothermal.com/s/Home.asp. A bottom-hole temperature of 183°C was reported following drilling. Nevada Geothermal Power has announced a Power Purchase Agreement with Nevada Power Co. for geothermal power to be produced from the site (Nevada Geothermal Power Co. press release, 2006). Another production well, 23-14, completed to 1,041 m in September 2007, has a maximum downhole temperature of 190ºC and flowed 118L/sec (Nevada Geothermal Power press release, September 19, 2007).

The current drilling program is aimed at developing a 30-MW power plant. If a suitable geothermal resource is identified in the deep well, the production potential for this site could be as high as 100

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MW. Nevada Geothermal Power has increased its leased ground to approximately 9,600 acres (Nevada Geothermal Power Co. press release, May 2006).

***Jackson Well:***

***Sod House Ranch:***

Leasing information:

N/A

Bibliography:

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