

Site Description

Tungsten Mountain

(Updated 2014)

Geologic setting:

The Clan Alpine range is made up of folded and faulted Mesozoic rocks, principally fine-grained clastic sediments of Upper Triassic age, intruded by granite and gabbro and unconformably overlain by Tertiary volcanic rocks. The northern part of the Clan Alpine range is partly covered by accumulations of rhyolitic ash flows that may be as much as 2,000 feet thick. These rocks are thickest along the northwestern margin of Edwards Valley, and thin rapidly northward. The Clan Alpine Mountains host the Tungsten Mountain mine (also known as the Hilltop mine); the ore occurs as sheelite in tactite developed at the contact of granodiorite with Upper Triassic rocks that are mostly siltstone, fine-grained quartzite, and limestone (Willden and Speed, 1974).

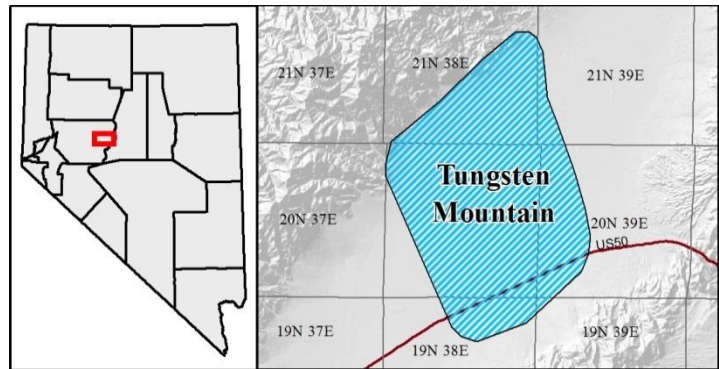
A small outcrop of brecciated and argillized volcanic rocks are present along the Clan Alpine range front, NW Edwards Creek Valley. Anomalous gold is associated with the outcrops, which attracted the interest of Newcrest Resources. Small carbonate (tufa) veins and chalcedonic veins appear nearby (John Wood, oral commun., 2006).

Geothermal features:

In 2005-6, Newcrest Resources drilled 23 mineral exploration holes in Edwards Creek Valley, southeast of Tungsten Mountain (T21N R38E Sec. 22-23) (Coolbaugh and Blackwell, 2007). All 23 holes encountered hot water and steam at depths of 300 meters or less (Tom Kilbey, oral commun., 2006). The hottest measured temperature, obtained with a thermal infrared spectroradiometer on the drill pipe, was 96.1°C. Temperature reversals were noted in some holes, but in many cases well water (lifted from the holes with air) was a mixture of deeper, higher temperature waters and shallower, cooler waters.

Hot water was collected from two wells and analyzed at the Desert Research Institute laboratory, in coordination with the Great Basin Center for Geothermal Energy (UNR). One of those samples produced significant orange brown precipitate (iron hydroxide) upon cooling, and yielded poor analytical charge balance. However, the second sample was of clear, 82.2°C water that produced no precipitate and a good charge balance. This sample was obtained for hole NT-23 at 184.4 m depth, after air-lifting water from the bottom of the hole at ~190 L/min for 15 minutes. The Mg-corrected Na-K-Ca geothermometer is 174°C (Fournier and Truesdell, 1973; Fournier and Potter, 1979) and the quartz is 177°C (no steam loss) geothermometer (Fournier, 1977; Fournier, 1981).

In 2007, a two meter temperature survey identified a thermal anomaly near these drill holes, roughly paralleling the hydrothermally-altered range-front fault (Kratt et al., 2010). The thermal area lies along what appears to be a step-over in range-front faults along the northwestern margin of Edwards Creek Valley. This step-over zone may exercise control over subsurface thermal-fluid flow. No hot springs or steam vents are known to occur in the area.



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Tom Ormechea Well: The Tom Ormechea Well, a 24°C water well, is about 8 km southwest of the Newcrest drilling.

Cold seeps: UNR staff sampled one seep (11.0°C) of six along the southwestern Edwards Creek Valley playa. The area is south of the Tungsten Mountain thermal anomaly, and 100-200m from borate crusts. A 12" deep tube encased the flow, which ran clear within 20 minutes. Location coordinates are 39.63982 N, 117.7056 W (NAD83).

A cold spring on the northwestern playa margin (15.4°C) flows into 3 ponds, each 20m wide. A good upwelling flow zone was sampled directly by NBMG staff. Periodic H₂S bubbling was observed from an upwelling area of 30 X 10 cm. Location coordinates are 39.68199 N, 117.64535 W (NAD83). Geothermometer values are moderate, at 69.5°C (Na-Ca-K-Mg) and 99.3°C (chalcedony).

Leasing information:

The Edwards Creek project was originally leased by Standard Steam Trust but Ormat took possession of the leases in in 201. The leases encompass 4,160 acres alongside 9.6 km of the Clan Alpine Mountains range front. SST has completed a detailed gravity survey which shows a ~60° degree southeast dip to the range front fault, which would place the reservoir at feasible depths beneath Ormat's leaseholds.

A second project leased by Standard Steam Trust, Edwards Creek SW encompasses 7,617 acres over 13 kilometers of the Clan Alpine Mountains range front. A 2008 gravity survey identified the location of the Clan Alpine fault as well as a sub-parallel fault that lies basin-ward of the range-front fault. This sub-parallel fault may be the more significant of the two, and is thought to be associated with high-temperature ground water encountered by shallow exploration drilling in 2005 and 2006. The Edwards Creek Southwest leases were also acquired by Ormat in 2010. Five observation wells were permitted and one was drilled by Ormat in 2012 (Shevenell and McDonald, 2013).

Ormat Nevada Inc. leased an additional 75 acres in the November 2013 geothermal lease sale by the Bureau of Land Management with the lease expiring in 2023.

Bibliography:

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