



## Site Description

### N Railroad Valley

(updated 2010)

#### Geologic setting:

Geothermal features: Thermal springs and wells in Railroad Valley are located mainly along the margins of the valley ([figure](#)) either coincident with or basinward from major basin-and-range faults. Spring temperatures are as high as 71°C, although many are less than 38°C. French (1995) discusses the petroleum drilling history and stratigraphy of Railroad Valley.

[Railroad Valley 1](#)

[Railroad Valley 2](#)

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***Eagle Springs Oil Field:*** Bottom-hole temperatures at the Eagle Springs Oil Field in Sec. 35,36, T9N, R57E are anomalous, averaging about 93°C at 1,830 m. The heat improves the oil production rate, because oil has a high (24°C) pour point and must be heated for transport.

The Shell Oil Co. ESU No. 2 well (Sec. 2, T7N, R56E) has a reported maximum temperature of 69.7°C. The well is 522 m deep, with estimated flows from 57 to 1,820 L/min. At 428 m, 54°C water was reported to contain 890 ppm NaCl; at 488 m the water temperature was 60°C. The hot water was present in Paleozoic limestone and dolomite. The alluvial valley fill is present in the well from 0 to 290 m, volcanic rocks (tuffs) from 290 to 399 m, and Paleozoic carbonate rocks to the bottom of the hole.

***Bacon Flat-Grant Canyon Oil Field:*** Reservoir temperatures in the Bacon Flat-Grant Canyon Oil Field (Sec. 17, 21 T7N, R56E) are 120-130°C at about 1,625 m (Hulen and others, 1994, although Hulen and others (1991, p. 1128) report the Bacon Flat Oil Field to be 171°C. The Na-Cl-CO<sub>3</sub> waters are not brines, but relatively dilute (<5,000 ppm total dissolved solids). Chemical geothermometers indicate similar temperatures (Goff and others, 1994). Wright (1992, p. 39) noted that neither of these systems would have been known if petroleum exploration had not taken place. The geology and geothermal origin of this area are discussed by Hulen and others (1994). Carl Hanks Well



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**Coyote Oil Field:** Other exploratory oil wells in Railroad Valley also report high temperatures. The Shell Oil Co. Coyote Unit No.1 well (Sec. 28, T7N, R55E) had an artesian flow of water, hot below 427 m.

**Blue Eagle Springs, Kate Spring, Tom Spring:** The springs issue from the toe of an alluvial fan slightly west of a major fault along Blue Eagle Mountain. Tom Spring is along the east margin of Railroad Valley about 2.9 km southeast of the Eagle Springs Oil Field and Blue Eagle and Kate Springs are 1.3 and 1 km, respectively, southeast of Tom Spring ([figure](#)). The springs and a slightly thermal flowing water well are located in Sec. 11,12,14, T8N, R57E. The water is used for irrigation and domestic purposes. Reed and others reported Tom Spring to have temperature of 22.2°C with a flow rate of 946 L/min (1983, p. 43), Blue Eagle had a temperature of 27.8°C and a flow rate of 6810 L/min, and Kate Spring had a temperature of 22.8°C and a flow rate of 53 L/min (Reed and others, 1983, p. 43).

**Lockes Hot Springs, Lockes Stockyard Spring, Reynolds Springs, Big Spring, North Spring:** Four springs and several seeps (all thermal) occur in the E½ Sec. 15 and the western edge of Sec. 16, T8N, R55E (see [figure](#)) at Lockes on U.S. Highway 6 on the west side of Railroad Valley. The springs and seeps issue from a low hill of calcareous tufa over half a kilometer in diameter. Reported water temperatures are 34-38°C and the combined discharge rate is about 157,100 L/min, with an estimated reservoir temperature of 38°C (Reed and others, 1983, p. 106). The water is used for irrigation, stock watering, and as a domestic supply for the Titus Ranch. The remaining water flows to ponds about 4 km to the southeast which support abundant waterfowl. The springs are in alluvium (valley fill); the nearest bedrock is Tertiary tuff and Paleozoic limestone in the Pancake Range, 3 km to the west. According to Fiero (1986), the springs "probably rise due to artesian head along a high permeability zone associated with range front faulting".

Lockes Stockyard Spring (SW¼ NW¼ NW¼ Sec. 14, T8N, R55E) is about 1.5 km northeast of the ranch house at the base of the tufa hill. The flow is presently held by an earth dam forming a pool 30.5 m in diameter. The water is used for stock watering and irrigation. A flow of about 2,271 L/min at 34°C was recorded on February 7, 1934 (Eakin and others, 1951); the Nevada Fish and Game Commission recorded a temperature of 35°C on June 30, 1957; the Center for Water Resources Research (University of Nevada) estimated the flow rate as 1,608 L/min on November 12, 1966.

Reynolds Springs (SW¼ SE¼ NE¼ Sec. 15, T8N, R55E) are two small pools about 12 m apart at the base of the tufa hill about 0.5 km northeast of the ranch house. The water is used for pasture irrigation before flowing into the ponds to the southeast. The combined flow of the springs was 1,136 L/min on February 7, 1934 (Eakin and others, 1951); approximately 1350 L/min on June 30, 1957 (Nevada Fish and Game Commission, unpublished report); 1,223 L/min on November 12,



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1966 (Mifflin, 1968); and 1,041 L/min and 1,086 L/min on September 27 and November 22, 1967, respectively (U.S. Geological Survey measurements reported by Fiero, 1986). The easternmost pool had a temperature of 37°C on November 12, 1966 (Mifflin, 1968).

Big Spring (NE<sup>1</sup>/<sub>4</sub> SW<sup>1</sup>/<sub>4</sub> NE<sup>1</sup>/<sub>4</sub> Sec. 15, T8N, R55E) is atop the tufa hill 0.5 km north of the ranch house ([figure](#)). It is used for irrigation and domestic needs. The earliest discharge records, February 7, 1934, showed a flow of 3407 L/min at a temperature of 37°C (Eakin and others, 1951). On June 30, 1957, T.C. Frantz of the Nevada Fish and Game Commission measured a discharge of 2,044 L/min at 38°C, using the float method. On November 12, 1966, a flow of 1,970 L/min at 37-38°C was measured (Mifflin, 1968). Monthly pygmy-meter measurements by the U.S. Geological Survey showed an increase from 1,783 L/min on August 7, 1967, to 2,200 L/min on November 22, 1967. Although the period recorded is short, this may indicate response of the spring to seasonal recharge (Fiero, 1986).

North Spring (NE<sup>1</sup>/<sub>4</sub> NE<sup>1</sup>/<sub>4</sub> NE<sup>1</sup>/<sub>4</sub> Sec. 15, T8N, R55E) flows into a ditch just south of the U.S. Highway 6 fence-line about 1.5 km northwest of the ranch house. Its water is used for pasture irrigation. A flow of about 757 L/min at 35°C was recorded on February 7, 1934 (Eakin and others, 1951); the Nevada Fish and Game Commission recorded a discharge of between 640 and 1,200 L/min at 34°C on June 30, 1957; U.S. Geological measurements indicated flows of 598 and 625 L/min on August 4 and November 22, 1967, respectively. There are a number of thermal seeps a short distance east of the ranch house; their flow rates and temperatures are not known. Possibly this is "South Spring," although the name has also been applied to Reynolds Springs.

**Chimney Hot Springs:** Chimney Hot Springs in Sec. 16, T7N, R55E have reported temperatures up to 71°C, the highest spring temperatures in Railroad Valley. The water is used for cattle. Three springs issue from an extensive travertine mound, which is nearly 0.8 km in diameter and about 9 m high (Fiero, 1986). Reed and others (1983, p. 42) reported the flow rate to be 1440 L/min. The springs and mound are located at the base of a bajada ~3 km from the nearest bedrock outcrop. They rise due to artesian pressure along a high permeability zone associated with range-front faulting (Fiero, 1986). The location of Chimney Hot Springs is midway between Lockes Hot Springs to the north and Storm, Coyote, and Abel Springs to the south. All these springs are associated with faulting, and may, in fact lie along the same major fault.

**Abel Spring, Storm Spring, Coyote Hole Spring:** A group of warm springs are located in Secs. 11, 12, 13, 23, 24, T6N, R54E along a fault which cuts the alluvium. The springs are 29-45°C and each is reported to be associated with travertine mounds about 90 m in diameter and 3 to 5 m high (Fiero, 1986). All springs are fenced, and Abel Springs is additionally improved by a short buried pipeline to a cattle trough (Fiero, 1986). Reed and others reported Storm Spring to have a temperature of



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36.7°C and a flow rate of 19 L/min, and Abel Spring to have a temperature of 46.1°C and a flow rate of 95 L/min (1983, p. 42).

***The Big Well:***

Leasing information: