

from NBMG OFR 83-9
See also 83-10 for
geochemical
results.

MODARELLI-FRENCHIE CREEK DISTRICT

(118)
Item 6

3130 0006 The Modarelli-Frenchie Creek district is located in the north-central Cortez Mountains about 25 miles south-southwest of Carlin. The main mine in the district is the Modarelli iron mine located on the east side of the range in section 30, T29N, R51E. Lesser iron mines and prospects are located along the range crest above and south of the Modarelli mine and within Frenchie Creek canyon. A few small prospects south of the main district occupy Sheep Creek and Hand-me-down Creek. These prospects explore deposits of iron and sulfur, respectively. Also there are several minor occurrences of copper and barite in the mineralized areas.

The Modarelli iron mine, originally known as the Amarillo deposit, was discovered in 1903 (Shawe, et al, 1962). Mining of the deposit began in 1951 and continued sporadically through 1961. During this time, a total of 395,900 long tons of iron ore were produced (Muffler, 1964). The other iron deposits in the district are less extensive and were apparently never productive.

The geology of the Frenchie Creek 15' quadrangle was mapped by Muffler, 1962 and later published as USGS Bulletin 1179. Before his work in the area, the volcanic rocks in this part of the Cortez Range were considered to be Tertiary in age (Shawe, 1962). On the basis of field evidence, Muffler determined that the volcanic sequence is entirely Mesozoic, or more specifically, Jurassic (?) in age.

In Frenchie and Big Pole Creeks, the volcanic section may be as much as 10,000' thick (Muffler, 1964). The package of rocks are assigned to the Pony Trail Group which is subdivided into three members, the Big Pole Formation (volcanic wackes and flows), the Sod House Tuff (silicic tuffs, flows and water-lain material) and the Frenchie Creek Rhyolite (rhyolite and rhyodacite flows). "Iron mineralization and several types of associated hydrothermal alteration" has affected all three members of the Pony Trail Group, but the main iron ore replacement deposits are

localized "almost exclusively" in the Frenchie Creek Rhyolite, the youngest of the three members (Muffler, 1964).

In the Frenchie Creek area, the flows generally dip northwestward and are folded into an east-northeast trending anticline/syncline pair. Throughout the area, the rocks are kaolinized and near the mineralized sites some units are sericitized or silicified.

Surrounding the main district, the Pony Trail Group and Pennsylvanian and Permian sediments of the Brock Canyon Formation are intruded by a large, irregular shaped, multiple intrusive body, referred to as the Frenchie Creek intrusive complex. Muffler (1964) petrographically examined the various bodies in detail. Their compositions and textures are widely varying, but the most abundant intrusive type in the mapped area is granodiorite. Intrusion breccias are present and suggest a forceable mode of emplacement for the bodies. Radiometric age dates obtained from mafic phenocrysts separated from a diorite at Hand-me-down Creek and a quartz monzonite north of Sod House Creek ranged between 125-150 my, indicating a Cretaceous age for the complex (Schilling, 1965). The rocks are widely albitized through deuteric processes and show local kaolinitic overprints resulting from a latter stage of hydrothermal alteration (Muffler, 1964). In addition to the large intrusive bodies, there are numerous dikes and plugs of various compositions emplaced into the volcanic and plutonic section. A rhyolite plug which may have been a feeder for the Frenchie Creek Rhyolite is located near the mouth of Frenchie Creek canyon.

High-angle faults of various orientations cut the intrusive rocks and the volcanics. Some of the structures are silicified and mineralized and may have originated in response to deformation caused during the intrusive episode (Muffler, 1964).

The iron replacement body at the Modarelli mine is located at the intersection

of a N60E and east-west-striking high-angle fault. The triangular wedge formed between the fault zones is presently the location of a large terraced open pit. The walls of the pit expose a large mass of red and black iron ore; the oxidized portions of the original black magnetite ore are converted to red hematite. The most intense replacement of the host rock occurs in areas of high fracturing. Small stock piles of ore found near the crusher below the pit consist of specular hematite (martite ?) with some quartz, apatite and barite on fracture surfaces and in pods within the ore. Adjacent to the deposit the rhyodacitic flows are silicified or sericitized. Commonly, plagioclase phenocrysts in the rocks are replaced by clay minerals and iron-oxides. Away from the main deposit, the rocks contain abundant chlorite.

Less extensive iron ore bodies are located elsewhere in the district. These deposits lie along fault zones, and because of intense silicification, generally form resistant vein-shaped outcrops. The vein material is usually less oxidized and contains more original magnetite than the ore observed at the Modarelli Mine. In addition to massive black magnetite, the ore consists of hematite and has vug and cavity fillings of limonite, quartz and barite. The ore material is brecciated and cut by vitreous veinlets of quartz or apatite. Rose colored quartz occurs as vein material and as a gangue mineral in iron ore found as float near the Frenchie Creek prospect.

During our examination of the district in July, 1982, Amoco Minerals Co. was conducting exploration work within Frenchie Creek Canyon. Existing roads had been improved at the head of Frenchie Creek and along the ridgecrest area toward the Modarelli mine. Drill pads were constructed at scattered intervals along the roads. A rotary drill rig was actively drilling on the east side of the canyon floor in section 26, T29N, R50E. According to the Amoco geologist at the site,

the hole had reached a depth of 900'. Judging from the cuttings examined at the site, the drilled section was entirely in volcanics or tuffaceous sediments.

Behind (to the east) the drill area, the rocks form bold, jagged pinnacles which contrast markedly with the more easily eroded volcanics flanking the outcrop. At sample location 1545, located about 1 mile south of the drill area, there are similar jagged outcrops which, when examined more closely, were found to consist of a silicified and iron-rich volcanic breccia. The breccia is chaotic in appearance and contains bleached, silicified volcanic fragments of fine pebble to boulder size. The fragments are suspended in a matrix of hematite and silica. Hematite veins cross-cut some of the fragments. Internal, open-centered breccia zones cut the outcrop at high angles. The brecciated outcrop forms a rib which trends N80°E. Its discordant appearance suggests that it is a highly silicified fault zone or possibly an intrusive plug or dike. However, Muffler (1964) mapped this zone as the contact between the Sod House Tuff and overlying Frenchie Creek Rhyolite.

One and one-half miles east of the mouth of Frenchie Creek are numerous underground and surface workings which explore copper and silver-bearing, north-west-striking fault zones in rhyodacites of the Frenchie Creek Rhyolite. Although no recent activity was noted at the property, the extent of the workings indicate there may have been a small production of silver ore from the deposit. A sample collected from the mine (1546) consists of altered volcanic rock with pyrite, chalcopyrite and secondary coatings of copper oxides.

Sulfur is being deposited at warm springs located along a range front fault just southwest of Hand-me-down Creek (Muffler, 1964).

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