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

79-A

ITEM 5

2420 0005

BURNS BASIN (JERRITT CANYON) DISTRICT

Since the discovery of disseminated gold mineralization at Jerritt Canyon in the northern Independence Mountains, the Burns Basin district of Smith (1976) and Lawrence (1963) is now simply referred to as Jerritt Canyon. For the purposes of this report the district is expanded to include the entire north half of the Independence Mountain range between Taylor Canyon and Jacks Creek. The approximate length of this segment of the range is 30 miles. The extension of the district is necessary in order to include the barite mines near Taylor Canyon, the Jerritt Canyon area, the antimony deposits of Lawrence (1963), and the new disseminated gold project located near Jacks Creek. The mineralization of the Gance Creek area on the east slope of the range is summarized in a separate section of this report (see Gance Creek area).

Antimony mines and prospects are located along the entire length of the Independence Mountains north of Taylor Canyon. Some of the deposits are described by Lawrence, 1963. In general, the deposits are vein or fracture fillings of quartz in silicified limestones and quartzites of lower Paleozoic age. Long, bladed crystals of stibnite and yellow and white antimony oxides occur in the quartz and are commonly intergrown with barite. According to Smith, 1976, the Burns Basin mine (sec. 22, T40N, R53E) produced 20 tons of antimony in 1918 and 12½ tons in 1945. Production from the other mines was apparently insignificant.

In recent years the north half of the Independence Mountains have been the focus of enthusiastic prospecting for barite and gold. Deposits of bedded barite are scattered throughout the range. A cluster of barite mines are located in the southern portion of the district just north and south of Taylor Canyon. Several of the deposits were productive, but all are currently inactive. The largest producers in the district were the Taylor Canyon (Fantastic; sec. 14, T39N, R52E)

and Snow Canyon (sec. 17, T41N, R53E) mines. The most active years for barite production were between 1977-1980.

A "Carlin-type" disseminated gold deposit was discovered in the early 1970's by FMC in the Jerritt Canyon area of the Independence Mountains. Their initial interest in the area was for antimony. Attention soon focused on the gold potential of the district, which was later confirmed by favorable geochemical results obtained in the North Fork of Jerritt Canyon (Hawkins, 1982). In 1976, FMC formed a joint venture with Freeport Exploration Co., who assumed management of the project. Subsequent sampling, detailed mapping and exploratory drilling in the latter half of the 1970's successfully outlined three separate but adjoining areas of low-grade gold mineralization named the Generator, Marlboro and Alchem ore bodies. Subsequent development of an open pit mine area ensued. The mine area, collectively known as the Bell Mine, is approximately 2 miles long (E-W direction) and ½ mile wide. It is located in sections 33, 34 and 35 of T4N, R53E. The mill, locate on the lower east flank of the range, began operation in June 1981. The initial cost of development was 105 million dollars.

According to figures obtained in late 1982, the Bell mine has estimated reserves of 12.5 million tons of grade 0.231 oz Au/ton or better (Bonham, 1982) At the time of our August, 1982 visit, the Marlboro pit was being stripped and most of the ore was coming from the Generator pit which has ore reserves of 35,000-37,000 tons at 0.2 oz Au/ton or better. The output from the mill was approximately 800 oz. Au/day, with an estimated production capacity of about 200,000 oz. Au/year.

Active exploration continues on other portions of Freeports' claim block north and south of the Bell Mine. The claim block encompasses a 15 mile by 10 mile area along the ridge crest of the range. The entire claim block is on National Forest land.

The geology of Jerritt Canyon is similar to that exposed in the remainder of

the north half of the Independence Range. Large areas of the range are underlain by Ordovician-Devonian, western facies, eugeosynclinal rocks which form the upper plate of the Roberts Mountains Thrust. The sequence consists of bedded clastic and siliceous sediments and includes minor greenstones. Throughout the range there are lower plate exposures of miogeosynclinal carbonate and clastic sediments ranging from Ordovician through Mississippian age. Both the upper and lower plate rocks are cut by several sets of high-angle faults. Unaltered Tertiary volcanic rocks, consisting predominately of andesite tuffs and flows, lie east of the range and overlie the sediments to the south near Taylor Canyon.

The geology of the Jerritt Canyon area was studied by Hawkins (1973) and more recently in detail by Collord (1979) and Birak (1979). The existing mines are developed in the Jerritt Canyon window which is an eroded, uplifted block bounded by high-angle and low-angle faults. Within the window the lower plate stratigraphy consists of the middle Ordovician Eureka Quartzite and continues upward through the Silurian Hanson Creek and Roberts Mountains Formations. The mineralization at the Bell Mine is hosted by the upper portion of the Hanson Creek Formation and the lower 60 meters of the Roberts Mountains Formation. From oldest to youngest the host rocks consist of banded carbonaceous limestones, dolomites, interbedded cherts and carbonates, and calcareous siltstones and dolomites. A major portion of the ore grade mineralization is hosted by banded, carbonaceous limestone and a chert-carbonate unit in the upper Hanson Creek Formation.

Gold mineralization at the Bell Mine is localized along steeply dipping normal faults, but extends out laterally into favorable stratigraphic horizons. Three high-angle fault systems are recognized, an older but still active east-west system and two younger northeast and north-striking systems. Two of the northeast-

striking faults, the Marlboro Canyon and Mill Creek Faults, lie in the heart of the district and are important ore controls. Since faulting physically improves the permiability and porosity of wallrocks, the largest concentration of ore grade material is commonly localized along structural intersections. Thrust faults enhance the ore zone, but are not an important locus for mineralization.

Jasperoids and jasperoid breccias are abundant and well exposed in the claim block and at the minesite. Many of the jasperoids an developed in the uppermost Hanson Creek Formation (Hawkins, 1982). The jasperoids form bold, rugged outcrops on the barren hillsides north of the two existing open pits. The east-west trending "Generator Hill" jasperoid lies along the surface trace of the Bell Fault. At the time of our tour, the Bell Fault was exposed at depth in the north end of the Generator pit. Jasperoids and remobilized carbonaceous ore are localized along the fault zone. The jasperoids exposed above the fault zone are dark grey in color, contain abundant barite and stibnite crystals, are fractured or brecciated and cut by numerous open-spaced, cross-cutting guartz veinlets, some containing pyrite. Coarse, white barite crystals up to 2" in length fill iron-stained, quartz encrusted vugs. Jasperoids occur on top of or beneath the ore bodies and commonly are directly underlain by a hard-pan clay zone. The silica is pourous to massive chalcedony and comprises as much as 98% of the total volume of rock. Many of the jasperoids are anomalous in gold, but some are barren. In the Generator pit, jasperoids contribute less than 5% of the total mined gold.

Within the open pits the rocks are hydrothermally altered and show effects of bleaching and leaching, in addition to silicification. Areas of ore grade mineralization are characterized by decalcification and remobilization of carbon (Hawkins, 1982). We observed large, lense-shaped bodies of carbon localized along fault structures in the Generator pit. The carbonaceous material is dark grey to black, greasy to the touch, generally pyritic and contains arsenic sulfides. About 50-60% of the ore grade material is carbonaceous, the remaining is oxidized.

The carbonaceous ore is usually higher grade and contains as much as 30 gr. Au/ton (Hawkins, 1982). The processes which led to the formation of the oxide ore are not exactly known.

The gold at Jerritt Canyon is micron or less in diameter. The deposit contains no visible gold and almost no silver. The gold is associated with realgar, orpiment, arsenopyrite, cinnabar and thallium. Stibnite, barite and quartz were deposited during the last stages of mineralization. According to Freeport, the best indicator element for exploration is gold, but antimony is also useful.

A few small intrusive bodies have been mapped in the area but none are exposed at the minesites. Travertine and hot spring deposits are reportedly located near the mineralized areas (Hawkins, 1982). The characteristics of the deposit indicate it originated from a shallow, low-temperature hydrothermal system. However, further studies are needed in order to determine more accurately the origin of the deposit.

Exploration and drilling continues on other parts of the claim block. Several areas were drilled last summer, including the sites of a few antimony deposits cited by Lawrence, 1963. Freeport informed us that they have found mineralized structures extending as far down as the Eureka Quartzite and as much as 0.5 oz Au/ton in drill core (?) from upper plate rocks.

In February 1983, a Canadian exploration firm named Bull Run Gold Mines, Ltd., announced a new area of disseminated gold mineralization located in the Independence Range approximately 10 miles north of the Bell Mine. Freeport conducted exploration work on Bull Runs' Mesona claims during 1982. Two drill areas were defined on the basis of geological mapping and surface sampling. The drill results are encouraging. Near surface, ore grade mineralization was encountered in approximately 50% of the 58 vertical rotary holes drilled (press release, Bull Run Gold Mines, Ltd, Vancouver, British Columbia, Feb.1983). Further exploration work is necessary in order to define the potential of the project, but the discovery is good

evidence for the existence of deposits similar to that at the Bell Mine in other portions of the Independence Mountains.

The bedded barite deposits located throughout the range are all hosted by upper plate cherts, argillites, mudstones, shales and quartzites of the Ordovician Valmy Formation. In general, the barite occurs in units 2-6' in thickness. Some of the units contain chert or shaley interbeds or organic material. The deposits consist of one or more units which are discontinuous because of faulting. The host rocks are generally sheared and iron-stained.

Selected References:

Birak, D. J., (1979) Detailed geology and stratigraphy of the Hansen Creek and Roberts Mountain Formation, Jerritt Canyon Project: unpub. Freeport Expl. Co. report.

Bonham, H. F. Jr., Dec. (1982) Reserves, host rocks, and ages of bulk-minable precious metal deposits in Nevada: NBMG OFR 82-9.

Collord, E. J. (1979) Geology of the Marlboro Canyon area, Jerritt Canyon Project, Elko County, Nevada: unpub. Freeport Expl. Co. report.

Hawkins, R. B. (1973) The geology and mineralization of the Jerritt Creek area, northern Independence Mountains, Nevada : Masters thesis, Idaho State Univ.

Hawkins, R. B. Feb.(1982) Discovery of the Bell Gold Mine: Mining Congress Journal, v. 68, no.2., p. 28 - 32.

Ketner, K. B.(1975) Replacement barite deposits, southern Independence Mountains, Nevada: Jour. Research U. S. G. S., v. 3, no.5, p. 547-551.

Lawrence, E. F. (1963) Antimony deposits of Nevada: NBM Bull 61, p. 45-51.

Nevada Mining Association Bulletin, April 1980, Freeport reserves expanded, milling upped to 2,750 tpd.

Papke , K. G. Barite deposits in Nevada: to be published as NBMG Bull.

Smith, R. M. (1976) Mineral resources of Elko County, Nevada: USGS OFR 1976-56, p. 30.

Also see general references for the Independence Range.