

**Geology and Mining Activity in the Capital Peak-Mockingbird Gap Area,
White Sands Missile Range, Socorro County, New Mexico**

By

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Submitted to:

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Introduction

The undersigned were contacted by Mr. Jim Cummings, Deputy for the Air Force, WSMR and requested that we examine and report upon the extent and condition of historic mine workings in the subject area. Mr. Cummings' group is hoping to locate a mine tunnel of 1000+ feet in length that can be rehabilitated for underground ordnance testing. The mine areas were visited on March 19, 1999.

Previous work in the study area includes many publications both public and private. The general geology of the area is best summarized in a USGS Professional Paper by Bachman (1968) in addition to a map of the southern part of the area by Bachman and Harbour (1970). A Paper summarizing the ore deposits of the region was produced by Lasky (1932).

Geology

The deposits are located in the northern portion of the San Andres Mountains. These mountains consist of a fault-bounded horst block. Layered rocks dip toward the west. Adjacent to the mountains are down-dropped grabens. Rock exposures are confined to the mountain ranges. The basins are filled with loose, unconsolidated sediments. The rocks exposed in the study area are summarized in Table 1.

Table 1 – Summary of rock formations in the Mockingbird Gap Area.

Age	Formation	Thickness (feet)	Lithology
Quaternary		Variable	Alluvium, alluvial-fan deposits, and pediment deposits composed of siltstone, sandstone, and conglomerate. Mostly unconsolidated.
Permian	Yeso	120-200	Gypsum, thin beds of gray dolomitic limestone, shale, siltstone, and fine- to medium-grained sandstone. Clastic rocks are mostly light red, light brownish gray, and light gray.
	Abo	525 (ave.)	Dark-red arkosic sandstone, arkose, and lenticular beds of conglomerate at base; grades upward to light-red siltstone and arkosic sandstone with lenticular beds of dark-red conglomerate.
	Bursum	65 - 450+	Interbedded gray marine limestone and dark-red arkosic sandstone, arkose, and lenticular beds of conglomerate. Marine limestone and associated gray shale more abundant southward. Interfingers with overlying Abo Formation.
Pennsylvanian	Madera	500 - 1,575	Upper member is gray limestone, marly shale, sandstone, arkosic sandstone, arkose, and lenticular beds of conglomerate. Colors chiefly shades of gray, brown, green, and yellow. Individual beds nonpersistent. Lower member is gray marine limestone, cryptocrystalline to coarsely crystalline. Commonly very cherty. Weathers to prominent ledges
	Sandia	16 - 252	Gray to brownish- or greenish-gray siltstone, sandstone, and graywacke and lenticular beds of conglomerate. Contains a few thin beds of gray limestone.
Ordovician	Montoya	0 - 43	Medium- to dark-gray thick beds of fine- to medium-crystalline dolomite. Weathers to thick rounded ledges that are deeply pitted.
	El Paso	0 - 128	Medium-gray to yellowish-gray thin beds of sandy dolomite and calcareous dolomite.
Cambrian	Bliss	0 - 19	Light-gray to dark-brown sandstone; contains greenish-gray shaley interbeds and some calcareous beds. Very glauconitic in places.
Proterozoic			Pink to light-gray granite and some associated diorite

Proterozoic granites comprise the basement. The granite is medium to coarse-grained and range range in color from light gray to pink-red. They are composed mainly of quartz and potassium feldspar with subordinate amounts of ferro-magnesian minerals. The granite is commonly fractured, but on wide sets. Fracturing and brecciation of the granite is most common in the vicinity of faults, especially on the margins of the mountain range. The granite is covered by a mantle of Paleozoic sedimentary rocks. The lower Paleozoic units tend to be thin beds of sandstone and dolomite. Upper Paleozoic rocks are dominantly limestone in thick sections. Debris, weathered from the mountain ranges, fills the basins.

Historic Mining Activity

The Mockingbird Gap area and the San Andres Range were prospected as early as the 1880s contemporaneously with the Hansonburg district, several miles to the north. The entire area was quite isolated until the arrival of the AT&SF RR (San Marcial was reached in Nov. 1880). Late 19th century prospectors were interested primarily in deposits of the precious metals (gold and silver), both of which are commonly associated with copper, lead, and zinc.

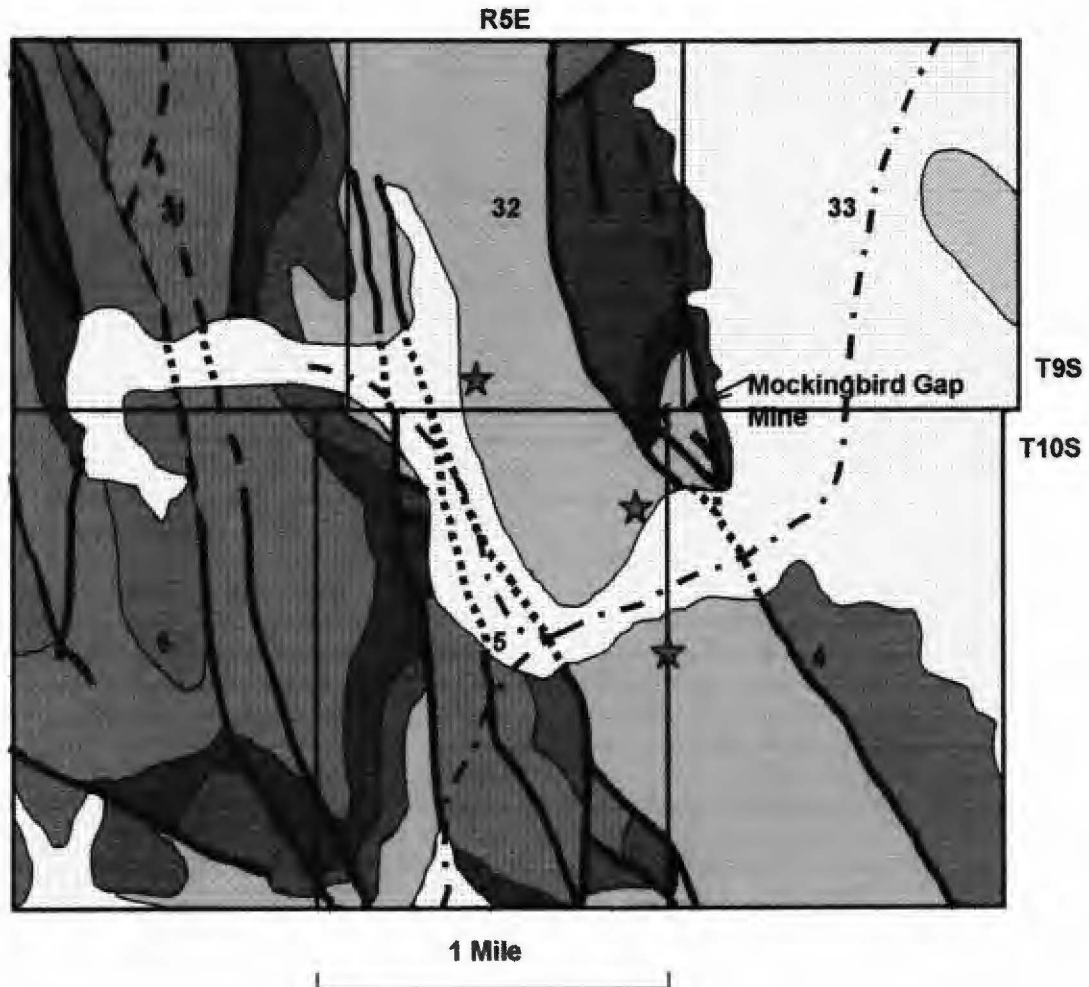
The Hansonburg district was discovered and initially developed during this early period and the entire San Andres range was examined quite thoroughly for metallic deposits at the same time. Long forgotten mining camps were actually established in several places, the most notable of which were Camp Stevens in the Bear Canyon lead district (secs 28 & 33, T20S, R5E), Goodfortune Camp approximately 4 mi. southwest of Salinas Peak (T12S, R4E), and much later, Estey City (sec. 36, T8S, R6E). Other base metal deposits located between Capital Peak (sec 29 T10S, R5E) and Mockingbird Gap include the Mockingbird Gap Mine (sec 4, T9S, R5E) about 6 miles south of the "Gap" in Thompson Park Canyon and the Independence Group directly at the "Gap." Most of the remaining mines and prospects, such as the May Day Group, Baso Four (Lava Group), and Capitol Peak prospects were located much later (ca 1920s-1940s) when barite and fluorspar were in demand.

Mining Areas

Mockingbird Gap Mine

The Estey Mining & Milling Company (later Dividend Mining & Milling Co.) arrived in the area ca 1900 and expended some considerable effort (mostly promotional) developing the "red-bed" copper deposits on the east slope of the Oscura range but also focused some attention in Thompson Park Canyon on the Mockingbird Gap Mine (Geologic Map 1). At this prospect, a tunnel was driven in a northerly direction for about 150 ft along a fault on a granite-quartzite contact (Lasky, p.80). A 50 ft deep winze was sunk along the hanging wall of the fault about 100 feet from the portal. A shaft was sunk a short distance up the hill and connected with the tunnel working, perhaps for ventilation purposes. An early view of the mine was published in a prospectus of the Dividend Mining and Milling Company, and except for a stockpile of fluorspar east of and near the portal, the mine appears essentially identical today. Lasky noted ca 1929 that the mine had been idle for years. Dividend Mining and Milling Co. allegedly spent some \$380,000 in the Estey City/Mockingbird Gap areas, but the majority of this was foolishly wasted

Geologic Map 1: Generalized geology of the Mockingbird Gap Mine Area. Map modified from Bachman and Harbour, 1970.



on a poorly designed mill and smelter whereas it should have been expended in locating a bonafide orebody (Prospectus, ca 1905; Engineering & Mining Journal, 1909).

The geology of the Mockingbird Gap Mine area is dominated by faulted blocks of Proterozoic granite and Paleozoic limestones. Fault zones trend north-northwest and are subparallel. A large canyon has been cut through the mountain range at Thompson Park Canyon and created large exposures of unfaulted granite that represent potential sites for testing. Additional field work should identify favorable areas indicated by star symbols on Geologic Map 1.

Independence Group

The Independence Group of claims is located on the extreme north end of the San Andres range in sections 31 and 32, T8S, R5E, and sections 5 and 6, T9S, R5E (Geologic Map 2). This claim was originally located between 1905 and 1911 by a Mr. J.B. Leasure and/or V.R. Leasure (Independence Mining Company; Walter, 1941) who were apparently associated with the United States Copper Company at Hanover, New Mexico. The claims were developed and sufficient ore exposed such that the properties were taken to patent by Mr. Leasure on 23 May 1912 under patent number 269028 (Plat; Walter, 1941, p.1).

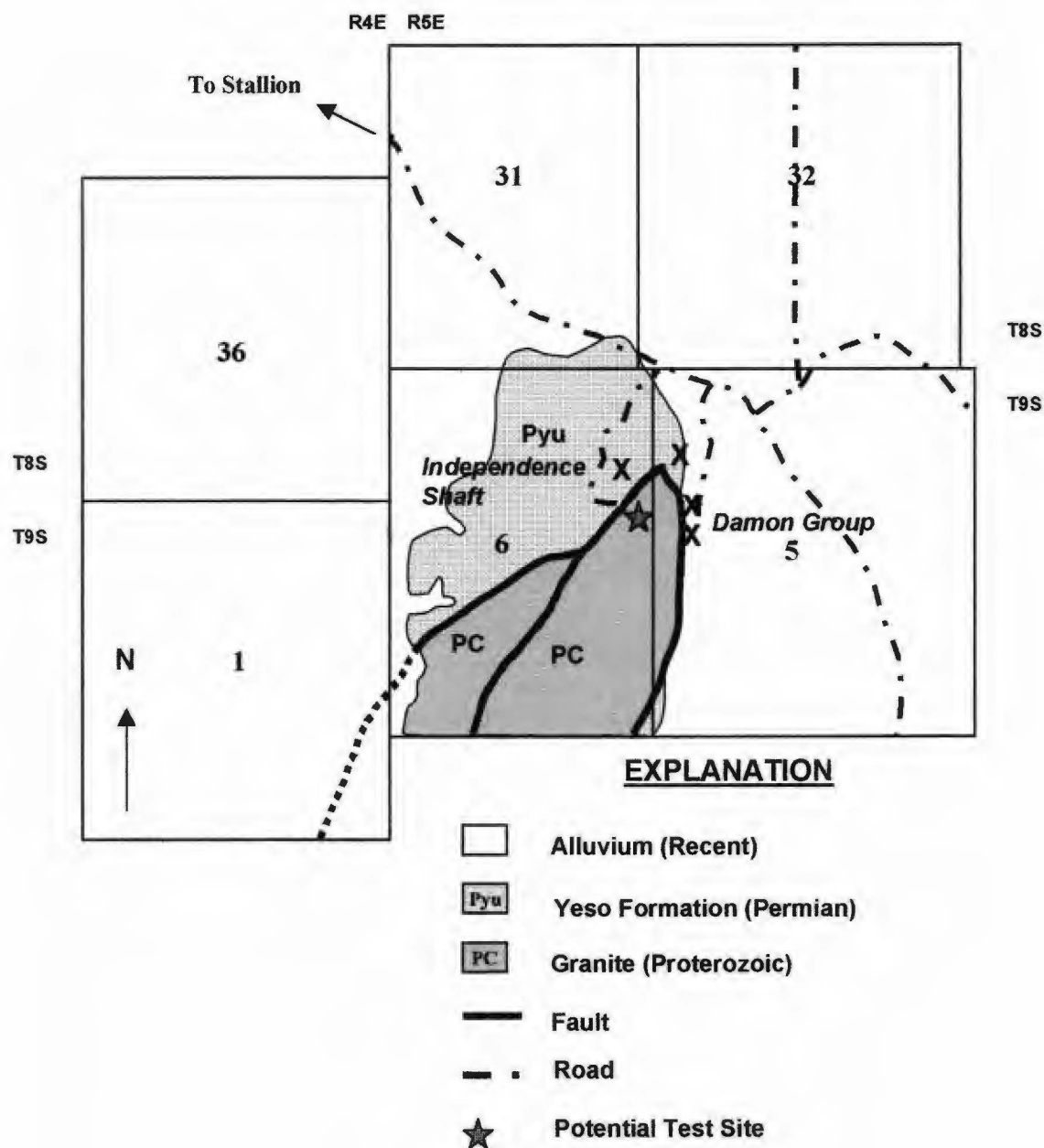
The principal workings on the Independence Group consist of the Independence Shaft on the claim of the same name, a series of open-cut stopes and inclines on the Damon Lode, and several prospect pits on the remaining claims. The Independence Shaft was sunk to a depth of 114 feet with various short drifts, totalling approximately 61 feet, extending north and south from the 50- and 100-foot levels. Ore-grade mineralization was said to be visible throughout the entire depth and early reports indicate that drilling disclosed lead and zinc mineralization some 300 feet below shaft bottom (Independence Mining Co.; Walter, 1941, p.1). An 80-foot shaft was said to have been sunk to the south of the Independence.

The Mockingbird Mining Company, Mr. Paul Ridings, manager, obtained the property from the Leasures in 1939 (Walter, 1941, p.1; McGill and Kral, 1943, p.4) subsequent to which the open stopes (gloryholes) on the Damon claim were developed along a shear zone between the limestone and the granite. All ore produced by Mr. Ridings derived from these workings and no work appears to have been done in the Independence Shaft thereafter.

The geologic relationships at the Independence Group are complicated by abundant faulting. Paleozoic sedimentary rocks are in depositional and fault contact with Proterozoic granite. Barite and base metal mineralization occupies many of the fault zones. Mineralization crosscuts both limestone and granite. The extensive faulting may make the driving of a tunnel at the site indicated on Geologic Map 2, difficult. Additional geologic evaluation is recommended.

Conclusion

The above summary clearly indicates that none of the known mine workings examined in the Mockingbird Gap – Capitol Peak area are of a size or extent sufficient to satisfy the needs of the proposed project. The only other alternative appears to be the excavation of a new tunnel.



Geologic Map 2: General geology of the Independence Group. The potential test sight is at the end of a small drilling access road. It is in close proximity to faults. Squares represent sections, 1 mile on a side. Geology modified from Bachman (1968).

Our preliminary visit served to indicate one or two sites with the appropriate features. Additional field work will be necessary to select the best locations.

Observations of the geology of the two study areas allow for the delineation of two or more potential sites. One is the granite outcroppings in Thompson Park Canyon and marked on Geologic Map 1. The other is in the vicinity of the Independence group, again sited in granite, to the south of the Independence Shaft and indicated on Geologic Map 2. Additional work on the geology of these sites is required since proximity to faulting may greatly influence the ability to drive a tunnel in these areas.

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