UNITED STATES DEPARTMENT OF THE INTERIOR
(BUREAU OF MINES)

SUMMARY REPORT

MINERAL INVESTIGATION OF THE WHITE MOUNTAINS RARE II AREA (NO. A5058), INYO AND MONO COUNTIES, CALIFORNIA, AND ESMERALDA AND MINERAL COUNTIES, NEVADA

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This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines standards and nomenclature. Work on this study was conducted by personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, Washington 99202

FOREWORD

The U.S. Bureau of Mines and U.S. Geological Survey jointly conduct mineral surveys of lands which in the U.S. Forest Service Second Roadless Area Review and Evaluation (RARE II) program have been designated for further planning. These evaluations are used in the RARE II program which conforms with the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528-531), the Forest and Rangeland Renewable Resources Planning Act of 1974 (88 Stat. 476, as amended; 16 U.S.C. 1601 note), and the National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1600 note). Reports on these surveys provide the President, Congress, the U.S. Forest Service, and the general public with information essential for determining the suitability of land for inclusion in the National Wilderness Preservation System.

This report is on the White Mountains RARE II area (No. A5058) in California and Nevada.

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SUMMARY

The White Mountains RARE II area encompasses 189,800 acres in California and Nevada, and covers most of the White Mountain Range. It is about 260 mi north of Los Angeles, California, and about 200 mi south of Reno, Nevada.

A mineral survey of the area was conducted by the U.S. Bureau of Mines and by the U.S. Geological Survey in 1980 and 1981. The Bureau reviewed pertinent literature and county mining records, obtained current claim information from the administrative agencies, and contacted claim owners. During the field investigations all known properties were examined and 3,670 samples were collected by the Bureau. The Geological Survey evaluated the regional mineral potential by geologic mapping, geochemical sampling, and geophysical surveys.

Mineral deposits and occurrences are related to the intrusion of Mesozoic plutons into Proterozoic to Permian sedimentary, metasedimentary, and metavolcanic rocks. These strata and some of the older plutons are hosts for fissure-filling quartz veins, faults, shear zones, silicified zones, or any combination of the above that contain gold, silver, lead, zinc, copper, uranium, barite and iron minerals. Silver, lead, zinc, and copper minerals also occur in two replacement bodies and in one tactite body. In another part of the area, metasomatism of interlayered metasedimentary-metavolcanic rocks has resulted in the formation of andalusite and rutile; the same process has produced sericite deposits (referred to as pyrophyllite in literature). Widespread Quaternary volcanism and subsequent subaqueous deposition formed pumice deposits along the western range front.

Resources, some of which are reserves, were identified at 9 mines or prospects in the study area, five partly inside the area, and four outside (table 1). These properties also have potential for unidentified resources. Three properties with subeconomic resources might become reserves if developed in conjunction with larger nearby properties. An additional 51 properties (42 in the area, six partly inside the area, and three outside, but adjacent to it) have potential for metallic or nonmetallic mineral resources.

The most important metallic mines in the area are: 1) the Sacramento Mine, with 5,500 tons of measured and inferred marginal reserves averaging 0.47 oz gold per ton, 0.3 oz silver per ton, and 0.56 percent copper; 2) the Moulas Mine, with 22,000 tons of indicated and inferred marginal reserves averaging 0.23 oz gold and 0.2 oz silver per ton; 3) the Green Monster Mine, with 2,600 tons of indicated and inferred marginal reserves averaging 17 oz silver per ton, 4.0 percent zinc, and 0.73 percent lead, and a smaller block of higher-grade resources; and 4) the Saratoga, Lexington, and Ranger, with 1,600 tons of indicated and inferred marginal reserves averaging 0.41 oz gold per ton, and 0.54 oz silver per ton.

The most important nonmetallic mine inside the study area, the Colton Mine, has 1.2 million tons of indicated and inferred subeconomic sericite resources. Two other non-metallic mines are partly in the area. The Pacific Mine has 630,000 tons of indicated and inferred reserves and 430,000 tons of indicated and inferred subeconomic resources of sericite. The Champion Mine has 250,000 tons of inferred subeconomic resources of andalusite and rutile and potential for additional rutile resources. The Gunter Canyon area pumice deposits have 9.6 million tons of indicated and inferred subeconomic resources, and are adjacent to the study area.

Table 1.--Properties with mineral resources in and adjacent to the White Mountains RARE II area

[*, outside the study area; **, partly inside the study area]

Property number (pl. 1)	Property name	Type of occurrence	Classification of resource	Quantity (tons)	Grade and commodity (oz per ton)	(percent)
29	Black Warrior Mine Area	Shear zone---------	Indicated and inferred subeconomic resources--------------------------	16,000	8.5 silver	0.61 lead
29	Black Warrior Mine Area 1/	do-----------------	do----------------------------------	650	6.8 silver	2.0 lead
103	* Bullion	Shear zone-fissure veins--------------	do----------------------------------	370,000	.07 gold 1.2 silver	
55	** Champion Mine	Contact-metasomatic	Inferred subeconomic resources------	250,000	andalusite and rutile	
44	Claw Nos. 1-3	Fissure veins------	Indicated and inferred subeconomic resources--------------------------	27,000		.14 U_3O_8
61	Colton Mine	Contact-metasomatic	Indicated and inferred marginal reserves---------------------------	1,200,000	sericite	
84	** Comstock Pumice Deposit (Piute Mine)	Volcanic-subaqueous	do----------------------------------	110,000	pumice	
72	Eva Belle Mine	Shear zone-fissure veins--------------	Indicated subeconomic resources-----	7,000	.13 gold 1.2 silver	1.0 lead .17 zinc .11 copper
39	Green Monster Mine	Contact-metasomatic	Indicated and inferred marginal reserves---------------------------	2,600	17 silver	4.0 zinc .73 lead
39	Green Monster Mine	do-----------------	do----------------------------------	150	140 silver	4.0 zinc 3.3 lead .7 copper
108	* Gunter Canyon area	Volcanic-subaqueous	do----------------------------------	9,600,000	pumice	
38	Mollini Mine	Shear zone--contact-metasomatic---------	do----------------------------------	720	19 silver	2.7 lead 1.5 zinc .12 copper
85	Moulas Mine	Fissure veins	do----------------------------------	22,000	.23 gold .2 silver	
85	Moulas Mine 1/	do-----------------	Indicated subeconomic resources-----	9,600	.08 gold .5 silver	

Table 1.--Properties with mineral resources in and adjacent to the White Mountains RARE II area--Continued

Property number (pl. 1)	Property name	Type of occurrence	Classification of resource	Quantity (tons)	Grade and commodity (oz per ton)	Grade and commodity (percent)
53	** Pacific Mine (main deposit)	Contact-metasomatic	Indicated and inferred reserves-----	630,000	sericite	
53	** Pacific Mine (north deposit)	do-----------------	Indicated and inferred marginal reserves----------------------------	400,000	sericite	
53	Pacific Mine (south deposit)	do-----------------	Inferred subeconomic resources------	30,000	sericite	
75	** Sacramento Canyon Pumice Deposit	Volcanic-subaqueous	Indicated and inferred subeconomic resources----------------------------	7,600	pumice	
77	Sacramento Mine	Fissure veins------	Measured and inferred marginal reserves-----------------------------	5,500	0.47 gold .3 silver	0.56 copper
77	Sacramento Mine	do-----------------	Measured and indicated subeconomic resources----------------------------	11,000	.15 gold .10 silver	.32 copper
101	* Saratoga, Lexington, and Ranger	Shear zone-fissure veins--------------	Indicated and inferred marginal reserves-----------------------------	1,600	.41 gold .54 silver	.06 copper
28	Silver Tiger - S and J Nos. 1-6	Shear zone---------	Indicated and inferred subeconomic resources----------------------------	45,000	4.5 silver	.58 zinc
96	** Twenty Grand Mine	Shear zone-fissure veins-------------	do----------------------------------	12,000	.03 gold 1.4 silver	
96	** Twenty Grand Mine 1/	do----------------	do----------------------------------	8,000	.06 gold 1.0 silver	
130	* Unknown (2, 6, 36)	Fissure veins-----	do----------------------------------	8,300	.12 gold .37 silver	1.4 lead

1/ This property would not return enough revenue to be classified as a resource, based on hypothetical production costs for this deposit alone. However, it is favorably located for possible consolidated development with other deposits, and viewed collectively, they represent resources.

Other deposits and occurrences in the study area include: a small subeconomic uranium resource that is relatively inaccessible; a large volume placer occurrence with gold values of about 13 cents per cu yd (at $400 per oz gold); two copper-silver mineralized areas containing 11 occurrences that have resource potential; deposits of limestone that are unimportant when compared to larger, more pure carbonate strata lying closer to markets; a small occurrence of scheelite; and stone, sand, and gravel deposits that are lower quality than alluvium from the Sierra Nevada Range.

The study area has no known deposits of coal, oil, gas, or geothermal energy.

INTRODUCTION

Location and Access

The White Mountains RARE II study area (No. A5058) covers 162,800 acres in Inyo and Mono Counties, California, and 27,000 acres in Esmeralda and Mineral Counties, Nevada (plate 1). It surrounds an area occupying 58,800 acres of the range crest called the Boundary Peak Wilderness. The study area is located about 200 mi south of Reno, Nevada, and 260 mi north of Los Angeles, California. The closest towns are Bishop, 5 mi west of the southwest corner of the area, and Benton, 7 mi west of the northern tip.

The main access to the south, west, and north portions of the range is by California State Highway 168, and U.S. Highways 395 and 6. Nevada State Highway 3A and California State Highways 266 and 168 provide the main access to the east range front. The partly paved White Mountain road is the primary access route along part of the south end of the range crest. Several other unimproved roads branch from the highways and penetrate for short distances into the White Mountains.

The topography consists of rugged mountainous terrain with a rolling, hilly crestal area. Elevations range from 14,246 ft at White Mountain Peak to 5,200 ft at the range front 5 mi west. The variety of vegetation found at different elevations attests to the wide range of climatic conditions found in this arid to semi-arid environment. The highest parts of the range are mostly barren of vegetation. Bristlecone pine, and less abundant limber pine and mountain mahogany favor the 8,000 to 11,000 ft elevations. Juniper and pinyon pine are predominant from about 7,000 to 8,000 ft. The lower slopes are partly covered with sagebrush, cactus, and other spiney desert type plants. Annual precipitation, measured in the southern part of the range is from 12.9 to 17 in. per year, mostly occurring as snow (Marchand, 1974, p. 383).

Previous and Present Investigations

California State and U.S. Geological Survey publications by Whiting (1888), Goodyear (1888), DeGroot (1890), Fairbanks (1894), Crawford (1896), Hill (1912), and Knopf (1914) recorded information on early mining activity and on the producing mines in the area. Specific information on various mines, prospects and mineralized areas has been updated mainly by: Tucker (1926, 1927), Sampson and Tucker (1938, 1940), Eric (1948), Norman and Stewart (1951), Bateman (1956), Jenkins (1957), Wright (1957), and Albers and Stewart (1972). Seven unpublished property examinations were made by the Bureau of Mines and (or) the Geological Survey under the Defense Minerals Exploration Administration (DMEA) program. Several reports on file at the U.S. Bureau of Mines Western Field Operations Center in Spokane, Washington contain detailed descriptions of mining properties in the White Mountain Range not discussed in this report.

The U.S. Bureau of Mines conducted an extensive library search in 1979 which provided a large body of information on mines, prospects and mineralized areas in the Inyo and White Mountains. This data base was supplemented by out-of-print, unpublished, or private information, obtained mostly through mining claim owners. U.S. Forest Service and U.S. Bureau of Land Management records supplied information on currently active claims. All of the county mining claim records were reviewed, and those pertaining to the study areas were organized by drainage or geographical area and plotted on base maps. This helped form the basis for the field examination program and provided information on the locations of mining districts.

The field studies by Bureau personnel and summer assistants took 7.5 man-years to complete from June to November of 1980 and 1981. During the course of this investigation, 131 mining properties or groups of properties were examined from which 3,670 samples were taken to assess mineral resources and potential. The samples were checked for radioactivity and fluorescence, then analyzed by fire assay, atomic absorption, and inductively coupled argon plasma spectrophotometry (ICAP) methods. At least one sample from each property was analyzed by semiquantitative emission spectrography to determine the presence and approximate amount of unsuspected elements. Special samples, such as those from nonmetallic deposits, were evaluated by test procedures similar to those commonly used by private industry. Complete sample analyses and detailed property maps are on file at the Bureau's Western Field Operations Center in Spokane, Washington.

Geology

The White Mountains Range is a north-trending fault block bounded on the west by Owens Valley and on the east by Fish Lake and Deep Springs Valleys. Rocks exposed in the study area are igneous, sedimentary, metamorphic, and metavolcanic types that range in age from late Proterozoic to Holocene. The central and northern parts of the range are a composite batholith comprised of 16 distinct Triassic to Cretaceous plutons (Crowder and others, 1972, p. 288; McKee and others, 1982). Thick sequences of Cambrian and older rocks are prevalent in the southern part. The range is within a carbonate to clastic transitional zone, 50 to 100 mi wide and at least 300 mi long, which separates the Sierra Nevada physiographic province on the west from the Great Basin province on the east (Ross, 1965, p. 58, 59; Albers and Stewart, 1972, p. 1, 42).

Two major periods of folding and faulting, including thrust faulting, are related to the Antler and Sonoma orogenies that occurred during the middle and late Paleozoic Era (Ferguson and Muller, 1949, p. 9-12; Stewart and others, 1966, p. 31, 32; Albers and Stewart, 1972, p. 45). In the central part of the range is a 3- to 5-mi wide band of late Paleozoic metasedimentary and metavolcanic rocks that have been thrust-faulted into their present position from the northwest (Crowder and Ross, 1972, p. 95; McKee and others, 1982). The orogeny-related northwest to southeast compressional forces resulted in large scale, south-plunging anticlines and synclines (Stewart, 1949, p. 55-76; Perry, 1954, p. 53-58; Pittman, 1958, p. 83-89). In some areas drag folding produced local small-scale overturned beds. Periods of relaxation resulted in longitudinal and transverse ("cross" or tensional) faults.

During the middle and late Mesozoic Era, the existing rocks were intruded by a series of granitic plutons that are part of the composite Sierra Nevada Batholith (Ross, 1969, p. 1). The former faults provided major avenues for intrusives and mineralization (Nelson and Sylvester, 1971, p. 2891-2900). The forceful emplacement of the intrusives followed and intensified much of the structural pattern of the region (McKee and others, 1982).

The last period of deformation was in the Cenozoic Era, and was characterized by Basin and Range block faulting. Nearly vertical displacements of the down-dropped Owens Valley have been estimated at 19,000 ft of total structural relief (Pakiser and others, 1964, p. 54; Bateman, 1965, p. 172). The White Mountains fault zone is 0.5 to 2 mi wide, 20 mi long, and located along the west range front. Recent tectonic activity has been recorded in fault scarps in the alluvial fans of the White Mountains (Bateman, 1957, p. 142; Fiedler, 1937, p. 35).

MINING ACTIVITY

History and Production

The earliest known mining activity was in the southern end of the White Mountains Range around 1861. The most important mines included the Sacramento, Twenty Grand, Southern Belle, and Poleta Mines which produced ore containing gold, silver, copper, and lead. Ores from these mines were first processed at the Ida Mill in Owensville, near the present town of Laws, California (Clark and Clark, 1978, p. 137).

The earliest discovery in the northern end of the White Mountains was in 1870 at the Indian Queen-Poorman Mine adjacent to the study area. By 1888 it had a 4 stamp mill; operations were continuous until around 1917, then intermittent until 1983. Other silver-lead-zinc-rich areas were found in this vicinity and south to Montgomery Canyon. Whiting (1888, p. 377) reported that mines in Montgomery Canyon had produced $60,000 worth of metals, but by 1890, most of the thin, rich, easily accessible silver ores had been removed.

Completion of the Carson and Colorado Railroad through the Owens Valley in 1883 made Benton a mining center. Goods and machinery were delivered, and the ores and concentrates were shipped to smelters in the Reno and San Francisco areas (Clark and Clark, 1978, p. 144). In the northeast part of the range another area produced silver-lead-zinc-copper minerals from about 1920 to 1940; they were processed at Fallon and elsewhere in Nevada.

Interest in the nonmetallic deposits, all of which are located on the west range front between Sacramento and Silver Canyons, began around 1920. A deposit of andalusite in Jeffrey Mine Canyon was mined from 1921 to 1945, mostly by hand sorting. Deposits of sericite (referred to in some previous reports as pyrophyllite) flank the andalusite deposit and have been mined since the mid-1940's. Crude ore from the open pits is transported by truck to a grinding mill at Laws, California, for processing. Barite was mined in the Gunter Canyon area from the late 1920's to the late 1950's. Some barite came from the Hobo property, but most of it came from the Gunter Canyon Barite Mine adjacent to the study area. Production from several pumice deposits from the mid-1920's to 1983 has supplied local and southern California markets with material for abrasives, lightweight aggregates, and other related building products (Stewart, 1949, p. 77). Limestone from Silver Canyon was shipped to soda plants on Owens Lake for production of carbon dioxide (CO_2) gas used in carbonation (Logan, 1947, p. 245). A small, unspecified amount of limestone from a quarry outside the study area, between Coldwater and Piute Canyons, was used for roofing granules (Bateman, 1956, p. 86).

The only site in the study area where placer gold is found is the Crooked Creek placers, where a section of early(?) Tertiary stream gravels has been dissected by Crooked Creek. It was first discovered in 1861 (Chalfant, 1933, p. 143). The Beauregard family of Bishop, California has periodically worked the gravels since 1909. The amount of gold recovered is unknown but assumed to be small.

Recorded production from metallic and nonmetallic mines in and near the study area is listed in table 2 and 3, respectively.

Table 2.--Recorded production from metallic lode deposits in and adjacent to the White Mountains RARE II area

[From U.S. Bureau of Mines production records 1/; N.R., not reported; *, outside the study area; **, partly inside the study area]

Property no. (pl. 1)	Property	Year(s)	Tons	Gold (oz)	Silver (oz)	Copper (lb)	Lead (lb)	Zinc (lb)
37	Argentite Maid	1952	5	1.2	200	N.R.	200	750
29	Black Warrior Mine or Blonde Eskimo	1898-1921	14,484	.02	14,666	N.R.	211	N.R.
103	* Bullion	1906	800	145.1	44	N.R.	N.R.	N.R.
--	* Container Mine 2/	1927-1942	540	N.R.	N.R.	N.R.	N.R.	N.R.
46	Copper Queen No. 3 3/ (Copper Queen Nos. 1-3)	1968	4	N.R.	4	104	N.R.	N.R.
72	Eva Bell (Eva Belle Mine) 3/	1901-1976	607	303.7	11,826	6,629	55,284	17,943
41	Evergreen Mine, Queen of the Hills, or Kyle	1925-1963	197	N.R.	13,377	1,062	4,134	446
93	** Golden Siren Mine 3/ (Gladys)	1912	6	6.0	2	N.R.	N.R.	N.R.
39	Green Monster Mine or Alexander	1938-1953	768	7.1	39,800	6,889	48,741	3,792
8	Queen (Queen Canyon Mine) 3/	1935	6	.1	432	161	1,929	N.R.
87	Rainbow or Mono-Piute 3/ (Z and S Mine)	1940-1950	16	14.0	8.0	N.R.	N.R.	N.R.
--	* Red Rock Mine 4/	1928-1954	21,644	N.R.	N.R.	N.R.	N.R.	N.R.

Table 2.--Recorded production from metallic lode deposits in and adjacent to the White Mountains RARE II area--Continued

Property no. (pl. 1)	Property	Year(s)	Tons	Gold (oz)	Silver (oz)	Copper (lb)	Lead (lb)	Zinc (lb)
77	Sacramento Mine	1889-1950	119	750.9	115.2	684	3,804	N.R.
38	Silver King (Mollini Mine) 3/	1910-1938	418	62.6	22,077	1,682	8,023	N.R.
102	* Southern Bell or Inyo Gold (Southern Belle Mine) 3,5/	1893-1937	339	1,024.77	182	N.R.	N.R.	N.R.
96	** Twenty Grand Mine 6/	1936	48	11.8	909	1,213	9,100	N.R.
Grand totals:			26,305	2,457.56	102,777.2	18,424	131,426	22,931
Total for study area			2,994	1,290.64	102,551.2	18,424	131.426	22,931

1/ This production data is from one source only. It does not reflect: a) amounts recovered prior to 1889, b) amounts not reported, and c) additional data supplied by claimants. Also, production from mines probably inside the study area, but without confirmed locations was not included.

2/ A total of 81 flasks of mercury were recovered (76 pounds per flask).

3/ U.S. Bureau of Mines production records list the following names: Copper Queen No. 3, Eva Bell, Golden Siren Mine, Queen, Rainbow, Mono-Piute, Silver King, Southern Bell, and Inyo Gold. Through correlation studies these were found to be the same properties as those found in the parentheses.

4/ A total of 2,002 flasks of mercury were recovered (76 lb per flask).

5/ Production from the Southern Belle Mines also included production from other nearby properties.

6/ According to Sampson and Tucker (1940, p. 139-140), 5 cars of $60 ore was shipped from the workings.

Table 3.--Recorded production from nonmetallic lode deposits in and adjacent to the White Mountains RARE II area

[From U.S. Bureau of Mines production records;
*, outside the study area; **, partly inside the study area]

Property no. (pl. 1)	Property	Year(s)	Tons	Commodity	Value
55 **	Champion Mine 1/	1921-1945	26,457	Andalusite	$183,992
61	Colton Mine	1948-1959	6,762	Pyrophyllite (sericite)	28,446
84 **	Comstock Pumice Deposit (Chalfant, H. Comstock, or Piute Mine) 2/	1943	987	Pumice	10,857
106 *	Gunter Canyon Barite Mine	1928-1959	8,535	Barite	67,195
108 *	Gunter Canyon area pumice deposits	1937-1947	22,991	Pumice	313,298
100	Hobo Nos. 1-8	1940	275	Barite	1,450
53 **	Pacific Mine	1945-1983	124,294	Pyrophyllite (sericite)	1,072,671
Grand totals:			190,201		$1,677,909

1/ Production between 1922 to 1936 is about 20,000 tons of 53 percent andalusite. (Varley 1968, p. 107).

2/ Bureau production records usually list owners or operators for nonmetallic commodities. Though correlation studies production was linked to the mine name(s). Also, those names listed were found to be the same property as those in the parentheses.

Mining Districts

Published information on mining districts in the White Mountains is obscure. Hill (1912, p. 116, 125) indicated that only the White Peak and Deep Springs (Pine Mountain) districts are in the study area. Clark (1970, p. 152) refers to the White Mountains mining district, and states that the Sacramento and Twenty Grand Mines were the principal lodes.

Prior to about 1920, mining districts were important references in locating the general vicinity of claims. If a significant number of claims were located in a small geographical area, smaller districts and (or) subdistricts were developed to better define these locations. More recently, with the increased availability of topographic maps, location by section, township, and range became standard. A study of county mining claim records by the Bureau of Mines provided complete information on mining districts, subdistricts and their approximate locations in the White Mountains. The major districts are: Big Pine, including subdistrict Waucoba (Galena); Bishop, including Laws, Black Canyon, Redding Canyon and Poleta subdistricts; Bolton (Botton); Deep Springs, including subdistricts Westgard Pass, Pine Mountain, and Wyman Creek; Montgomery, with White Peak, Cottonwood, Indian and Yellowjacket subdistricts; Oneota (Basalt, Queen, and Buena Vista); Piute, including subdistricts Chalfant, Darkhorse, Gunter Canyon, Silver Canyon, Southern Belle and Union; White Mountain(s) (Fish Lake Valley or Fish Lake), including subdistricts Benton, Blind Spring(s), Hammil, and Willow; and the Indian mining district, including the Cloverpatch subdistrict.

Mining Claims

Approximately 6,500 claims have been located in the White Mountains since the early 1860's. The number of workings are several times less than 6,500, indicating that some properties were relocated numerous times. Almost two-thirds of the total claims were located between 1865 to 1885 and from 1960 to 1980. The Silver Consolidated Mining Claims and the Neptune-Phenix-Creekside Quartz Mine were patented for silver minerals and the Champion Mine for andalusite. The Champion Mine reverted to public domain in 1982. At least seven properties have been leased. Fifty-three lode and four placer claims were active in or near the study area in 1981.

About 90 percent of the study area is open to mineral location. Areas not open include: the Ancient Bristlecone Pine Forest, the White Mountain Natural and Scientific areas, the former Champion Mine property, and the power withdrawal sites in Montgomery and Cottonwood Canyons, on the west range front. The central core of the White Mountain Range, RARE II area B5058, is the proposed Boundary Peak Wilderness; it is not open to mining claim location after 1983.

There are no coal, oil, gas, uranium, or geothermal leases in the study area.

MINES, PROSPECTS, AND MINERALIZED AREAS

Geologic Factors Related to Deposits

The composite batholith is the most significant geologic feature, as it was the source of metallic mineralization. Plutons in this batholith range in composition from quartz monzonite to granodiorite and crop out over two-thirds of the study area. It is not known if any pluton of specific age or composition contributed more to the mineralization than others. In some areas the metasedimentary, sedimentary, or older intrusive rocks surrounding plutons show evidence of several periods of mineralization. A definite sometimes complicated pattern of metal distribution resulted. Silver, with various lesser amounts of lead, zinc, or copper, occurs mainly in the northernmost 12 mi of the study area. Gold, or gold with subordinate amounts of copper, silver, or lead, is mainly present in the southernmost 12 mi of the study area; barite also occurs in this area. Copper with lesser amounts of silver is found in the central part of the west range front in two narrow bands that flank the nonmetallic deposits. Uranium occurs in one area of copper mineralization.

Other than the source rocks, perhaps the most significant geologic features are faults, shear zones, and fractures, which are close to the igneous-sedimentary, or in some cases between two igneous rock contacts. These structures provided conduits for mineralizing fluids, and in some cases increased the permeability and porosity of adjacent wall rocks. Metallic mineral concentrations tend to be in, but are not limited to the carbonate layers and calcareous shale. Most deposits in the area consist of metallic minerals in quartz veins, silicified zones, or disseminations within structures. The distance of each deposit from the intrusive contact is usually within 300 ft in non-igneous host rocks and even closer in igneous host rocks. With a few notable exceptions, most mineralized structures are no larger than 2 ft thick and 100 ft long. Where they intersect, many deposits are larger and more highly mineralized. Orientations of the deposits and occurrences are diverse, but most tend to follow the predominant north-trending structural pattern of the longitudinal faults and oblique tensional faults. A few east-trending tensional fractures were also mineralized.

The thermal regime during emplacement of the plutons was an important factor. Conditions were, with two or three known exceptions, not favorable to form significant areas of tactite (Bateman, 1956, p. 79-80). In addition, the element tungsten which is commonly associated with tactites was not present in anomalous quantities in mineralizing fluids at those locations. Thermal metamorphism was, however, sufficient to form nonmetallic deposits of andalusite-rutile and sericite (pyrophyllite) in the interlayered metasedimentary-metavolcanic rocks. Nonmetallic deposits are larger than the known metallic deposits.

A few deposits in the area are not directly related to the composite batholith. A nearly continuous 3 mi long remnant of auriferous alluvium is part of an early (?) Tertiary, south-flowing stream channel. East-flowing Crooked Creek has dissected and exposed a 200 ft thick V-shaped section of the gravel. Erosional remnants are found as far as 40 mi to the south in Marble Canyon in the Inyo Range (Knopf, 1914, p. 90). Pleistocene glaciation and basalt flows north of McAfee Creek have removed or concealed other evidence of the former stream course.

Pumice deposits, along the west range front from Sacramento Canyon to the western base of Black Mountain, resulted from Quaternary eruption of the Long Lake Caldera, located on the east flank of the Sierra Nevada Range. The deposits were not formed by the nuée ardente process. The air-fallen material was washed into shallow, temporary lake basins at elevations between 5,000 and 6,000 ft. Late Quaternary eruptions from a 100 mi long chain of volcanoes known as the Inyo-Mono Craters distributed tephra southward, but did not add any volume to the existing pumice deposits in and adjacent to the study area (Wood, 1977, p. 89-95).

Mineral Properties

Locations of 131 mines and prospects examined during this study are shown on plate 1. Those properties with identified resources or reserves are listed alphabetically in table 1. Summary descriptions of all 131 properties are in table 4.

Several properties listed as "unknown" could not be identified by claim notices or through published literature. The numbers in parenthesis following "unknown" represent locations by section, township, and range, with respect to the Mount Diablo Meridian. All of these properties lie within Township 1 North to 6 South and Range 32 to 36 East.

APPRAISAL OF MINERAL DEPOSITS

Definitions

The definitions of mineral resource classifications are basically from U.S. Bureau of Mines and U.S. Geological Survey (1980). The measured, indicated and inferred categories, respectively, reflect decreasing knowledge of the characteristics of a deposit. Also, for this report, an attempt has been made to further define subeconomic resources and resource potential. The following definitions are the basis for the selection of those properties appearing in table 1.

Mineral Resources: Deposits classified as reserves are mineral resources believed to be minable at a profit, under current economic conditions. Feasibility studies were conducted to substantiate this classification. Properties having marginal reserves would require up to a 50 percent increase in commodity price, or identification of a larger deposit for an equivalent reduction in unit production cost. Subeconomic resources would require a greater improvement in economic conditions and (or) identification of a larger deposit to be mined profitably. In this report, a subeconomic resource, if mined today, is expected to return at least 20 percent of the cost of producing the commodity(s).

In some cases, identified tonnage and grade estimated at a property may not be sufficient to be classified a resource. However, the deposit might be favorably located for consolidated development with others and with centrally located processing facilities. Because of relatively small tonnages at individual properties, these might be developed by small-scale mining operations, possibly involving portable concentrating equipment. Those properties that may collectively contain resources are included in table 1.

Resource potential: The terms high, moderate, and low resource potential, as used in this report, reflect degrees of probability that undiscovered resources exist. The terms are based on the assessment of published information, the results of field examination, particularly sample analyses and apparent degree of geologic continuity, and the judgement of the evaluator.

Deposits in and Adjacent to the Study Area

The study area has 51 properties with identified reserves, resources or resource potential. At least 12 mines in the area, and 11 which are outside or partly inside, have produced metallic or nonmetallic commodities (tables 2 and 3). The most important metal mines are the Sacramento, Green Monster, Moulas, and Saratoga-Lexington-Ranger. The most important nonmetallic deposits are at the Colton, Pacific, and Champion Mines.

Eight properties with identified gold-silver-copper resources, as well as several others with resource potential, are located along the western range front between Pellisier Creek and Gunter Canyon; under favorable economic conditions, they might contribute ores to a custom mill, possibly to the Southern Belle Mill, which could be refurbished and updated. Small quantities of high-grade, free-milling gold ore, known to occur at several properties, could be processed at the mill about 5 mi south of Big Pine, California; it has an electrically operated one-ton-per-hour capacity arrastra and four small flotation cells. Another possibility would be to truck ore to the Firestone Mill, near Independence, California. Built in 1978, its gravity and chemical circuits are capable of processing local gold-bearing ores.

At least seven properties with identified silver-lead-zinc resources and several others with resource potential are in the Montgomery-Queen Canyon and the Indian-Marble Creek areas. Some of these deposits would be economically feasible if 1982 plans for a mill at the mouth of Queen Canyon were fulfilled. Sustained mill operations would likely depend on additional ores from the Blind Spring Hill and Benton Range areas. Some flotation equipment is located near Dyer, Nevada, but as of 1983 it is non-operational. The closest operating mill and smelter are in Austin, Nevada, about 200 mi northeast of the study area. The mill has a 500-ton-per-day capacity silver-lead-zinc flotation circuit.

The nonmetallic deposits may become more important to the economy than the metallic deposits. This premise is based on the facts that these deposits: 1) are easily accessible, 2) can be mined by relatively inexpensive surface mining methods, 3) are more homogeneous than typical metallic deposits, and 4) are many times larger than most of the metallic deposits in the study area. However, markets for the products must be developed within reasonable transportation distances.

At least two properties have been, or are producing sericite (described in earlier publications as pyrophyllite) from the Lone Tree Creek-Milner Canyon area. Annual production is about 1,000 tons. At least four properties have produced pumice in and adjacent to the study area, between Sacramento and Silver Canyons. Between 1937 and 1947, when economic conditions were more favorable, pumice was shipped by rail, mostly to southern California markets.

In the 1920's, the Champion Mine was the only known economic source of andalusite, a natural high temperature refractory material. It has been largely replaced by mullite, a synthetic material. Several reports have identified a rutile content of 2 to 3 percent, with even higher concentrations bordering the andalusite-rich quartz mass (Jeffery and Woodhouse, 1931, p. 461). Although exact dimensions and grade are unknown, a low grade rutile deposit of several million tons may exist, considering the geologic favorability and unexplored distance between the developed (mined) areas.

A uranium deposit at the Claw Nos. 1-3 claims has been identified, but access to it is difficult and the tonnage is small. A large increase in price of uranium is necessary to cover road building, mining, and other production costs.

Two areas along the west range front contain a total of 11 properties which have anomalous concentrations of copper and silver minerals. The area south of Milner Canyon is 0.5 mi wide and 2 mi long; the one between Pellisier Creek and Cottonwood Canyon is 0.5 mi wide and 5 mi long. The copper-silver minerals are concentrated in quartz veins, quartz-rich shear zones, and intensely fractured strata, especially near intrusive contacts. Most structures are so discontinuous, widely spaced, or poorly exposed, that resources can not be identified. The 11 properties that have a moderate potential for copper-silver resources are: Mountain View and Proctor Mine, Copper Queen Nos. 1-3, Birch Creek area prospects, Stairway Copper Nos. 1-16, Little Dipper Group, Heine B. Nos. 1 and 2, Copper Queen Mine, Little Blue Group, Copper Kings Nos. 1 and 2, Mono Copper Nos. 1 and 2, and the White Mountain Copper Nos. 1 and 2.

Two large limestone deposits are accessible by road. One is the Rogers Limestone Deposit in Silver Canyon and the other is located south of Sacramento Canyon (Bowen, 1973, pl. 1). Limited sampling of the deposit in Silver Canyon indicates that it is not of high purity. The cost of transportation to major markets is the main factor in classifying them as subeconomic.

Altered, silicified rhyolite and tuff flows in the Dry Creek-Trail Canyon part of the study area were prospected for mercury. However, no resources have been identified. Tungsten occurrences identified at the Ridge Runner Nos. 1-5, near Dead Horse Meadow are minor.

Part of an early (?) Tertiary stream channel on the Crooked Creek property has consistent but low-grade gold values averaging 13 cents per cu yd, estimated from near-surface gravel strata (based on gold at $400 per ounce). The deposit is not amenable to large-scale low cost mining. However, it is assumed that greater concentrations of gold would be found at or near bedrock. Therefore, the property has a low potential for placer gold resources. Erosional remnants of this channel can be traced for 40 mi south to Marble Canyon, in the Inyo Range.

Easily accessible stone from the area is predominantly sedimentary, and generally not suitable for construction materials. Sand and gravel consists mostly of sedimentary clasts. The more durable, rounded granitic alluvium in slopes of the Sierra Nevada Range is preferred for aggegate.

The study area has no known deposits of coal, oil, gas, or geothermal energy.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area

[Underlined names refer to properties with mineral reserves, resources, or resource potential; those not underlined have no apparent potential or are insufficiently exposed to permit evaluation; *, outside the study area; **, partly inside the study area]

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
1 **	Buckley Nos. 1-6	Quartz and quartz breccia cemented with limonite occurs as float in weathered argillite.	Two pits and three shallow trenches.	Three select samples of quartz contained traces of silver, lead, and zinc. One of these samples also contained 0.05 oz gold per ton.
2	Double Lucky	Poorly exposed shear zones that trend north-northeast and dip 20° to 80° NW. are in siltstone, marble, argillite, and phyllite which have been intruded by quartz monzonite. Shear zones are up to 15 ft thick and contain fault breccia, gouge, minor vein quartz, and small pockets of galena, chalcopyrite, sphalerite, and pyrite.	Nine adits, 15 to 250 ft long; four caved adits, one caved shaft, and ten pits are scattered for about 2,000 ft along a northwest trend.	Of 62 chip and 14 select or grab samples taken, 22 chip and 2 select samples had significant metals values. Of the chip samples, four from shear zones ranged from 0.006 to 0.026 oz gold per ton, seven had from 0.2 to 0.7 oz silver per ton, 13 contained from 0.01 to 0.09 percent copper, and eight had 0.01 to 0.58 percent lead. Of the shear zone chip samples that included quartz, three assayed between 2.3 and 3.2 oz silver per ton, two contained 1.2 to 4.0 percent lead, and four had 0.69 to 2.90 percent zinc. The property has a low potential for silver-lead-zinc resources.
3 **	Wall Door	Siltstone and phyllite contain many randomly-oriented shear zones up to 6 in. thick with pods of quartz up to 4 in. in diameter. Iron-oxide staining, gouge, bands of limonite and hematite comprise the material in the shear zones.	Four adits totalling less than 100 ft, three caved adits, one caved shaft, and five pits.	Of 16 samples collected, only one chip sample of hematite-rich phyllite contained significant values--0.15 oz gold per ton.
4 *	Orchard Spring Prospect	Discontinuous quartz veins and veinlets from a few inches to 1 ft thick are in fractured, northeast-trending, northwest-dipping quartzite, limestone, siltstone, and phyllite.	One caved adit and three pits.	Three chip and two grab samples of quartz and country rock contained no significant values.
5	White Cloud No. 1	Fine-grained alaskite dikes are in coarse-grained granite.	One 22-ft-long trench.	One grab sample of the granitic rocks contained no significant values.
6	Apex-Fawn	Heavily iron-stained, discontinuous quartz veinlets up to 3 in. thick are along a poorly exposed shear zone that trends N. 30 to 35° E. and dips 40° to 55° NW. in argillite and phyllite. Small bodies of granitic rock crop out nearby.	Two inclined shafts (55 ft, 12 ft) a caved shaft, and 13 pits.	Of 14 chip samples, three from sheared phyllite and argillite contained 0.005 to 0.06 oz gold per ton and 0.23 to 2.4 oz silver per ton. Of 13 grab and select samples, four from small quartz veins and iron-stained argillite contained 0.03 oz gold per ton and 0.2 to 3.9 oz silver per ton. One select sample of quartz had 3.35 percent lead and 6.10 percent zinc. A low potential for gold, silver, lead, and zinc resources exists.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
7	Blue Type No. 1	An iron-oxide-stained gouge-filled shear zone at least 5 ft thick is in marble with small calcite-filled fractures.	One 5-ft-long adit.	One chip sample across the shear zone contained no significant values.
8	Queen Canyon Mine (Overlay Nos. 7 and 10 Claims	Silver-lead-zinc-bearing calcite veins are scattered along randomly oriented shear zones in interbedded marble and siliceous hornfels near quartz monzonite. Calcite veins are less than 1.5 ft thick and pinch out in a few feet. They contain galena, sphalerite, and argentite. The marble wallrock contains epidote and pyroxene.	Seven adits with about 1,300 ft of underground workings. Surface excavations include a 200-ft-long cut and three pits. Six tons yielded 0.1 oz gold, 432 oz silver, 161 lb copper, and 1,929 lb lead (U.S. Bureau of Mines production records). An unknown amount of production was combined with the Indian Queen-Poorman Mine (in the Sugarloaf Roadless Area) which probably came from this mine.	Thirty-six samples were taken. Twenty-two from veins and associated shear zones averaged 1.0 oz silver per ton, 0.19 percent lead, and 0.84 percent zinc. Ten of the 22 samples had between 0.5 and 16.7 oz silver per ton, 20 had between 0.01 and 4.8 percent lead, and 21 had between 0.03 and 8.4 percent zinc. The highest-grade samples came from the small vein remnants in stopes. Sampling indicates that the metal values are confined to the veins, which are too small and scattered to constitute resources. They have a low potential for silver, lead, and zinc resources.
9	Buffalo Canyon Prospect	A localized swarm of 1 to 5 ft thick aplite dikes crops out in quartz monzonite. Crystalline milky white quartz pods and veins are coated with malachite and azurite.	One 14-ft-long adit and one shallow pit.	One select sample of stockpiled quartz contained 1.3 oz silver per ton, 0.43 percent copper, and traces of lead and zinc. Four chip or random chip samples of quartz also contained trace amounts of copper.
10	Overlay No. 9	Small calcite and quartz veinlets occur in a 6 ft-thick northwest-trending, iron-oxide-stained, shear zone in quartzite.	One 40-ft-long adit.	No significant values were detected in two chip samples.
11	Unknown (4, 1, 33)	Several hornblende-biotite segregations that measure up to 100 ft by 200 ft crop out in coarse-grained granite. Float is from the nearby Tertiary rhyolite flows.	Six bulldozer trenches, 22 to 500 ft long and up to 20 ft deep.	No significant values were detected in nine samples.
12	Ruth E.	Banded limestone and shale strikes N. 44° W. and dips 47° SW. An irregular, sheeted, bedding plane shear zone ranges from 2 in. to 2.5 ft thick and is comprised of limonite- and hematite-stained gouge and silicified rock fragments; malachite stains some fractures. The structure is not exposed beyond the deepest shaft; tactite float was found nearby.	Two inclined shafts, 12 and 25 ft deep, and a 40-ft-long open cut.	Four chip samples from the shear zone had 0.13 to 0.43 percent lead and 0.39 to 1.00 percent zinc. One grab sample contained 0.10 percent lead and 0.31 percent zinc and another had 0.10 percent copper. Four samples of country rock and tactite float contained no significant values. The property has a low potential for lead-zinc resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
13	Cinna-Belt Nos. 1 and 2	Small isolated pods of opaline silica occur in slate, limestone, and rhyolite porphyry.	One bulldozer scrape and one pit.	One random chip and three grab samples contained no significant values.
14	Canyon Nos. 1-12	Rhyolite and rhyolite porphyry overlies limestone that is sheared, iron-oxide- and malachite-stained and contains secondary quartz, calcite, and opaline pods.	Two adits (20- and 40-ft-long), one inaccessible adit, and 38 pits and trenches.	Of ten chip samples collected, one across a shear zone contained 0.24 oz gold and 0.7 oz silver per ton. Three chip samples from another shear zone and two select samples of opaline pods had from 0.6 to 1.6 lb mercury per ton. A grab sample of rhyolite and opaline material contained 0.03 oz gold per ton.
15	Unknown (13, 1, 33)	A north-trending, shallow-dipping, shear zone in pulverized shale and limestone is exposed for 70 ft. Quartz, jasper, and limonite boxworks were found in float and dump material.	One adit, caved 80 ft from portal, and one pit.	No significant values were detected in five samples.
16	Golden Star No. 1	Granite is in contact with foliated shale that trends N. 40° to 60° E. and dips nearly vertically. Iron-oxide-stained quartz pods, aplite dikes, and zones of calc-silicate minerals are in the shale.	One 25-ft trench and 11 widely scattered small pits.	Seventeen samples from all rock types contained no significant values.
17	* Unknown (18, 1, 34)	Shale, limestone, and quartzite beds that strike N. 50° W. and dip 40° SW. are faulted, and have been intruded by aplite. Hairline fracture fillings and quartz veinlets up to 0.5 in. thick occur in localized areas.	Five trenches total 222 ft.	Eight chip and grab samples contained no significant values.
18	* White Rock	Calcite veinlets, iron-oxide stain, and pyrite occur along fractures and shale partings in locally opalized quartzite.	One 120-ft-long adit.	No significant values were detected in four samples.
19	* Picture Rock	Opal- and calcite-filled joints are in interbedded limestone and argillite that strike N. 75° E. and dip 60° NE.	One 122-ft-long adit.	Four samples contained no significant values.
20	* Montana Nos. 1 and 2	A 1- to 2-ft thick, north-trending fault zone follows the axis of a tight, inclined fold in quartzite and marble interbedded with argillite. The fault zone contains gouge and is silicified with opaline silica.	One 70-ft-long adit and a 60-ft-long trench.	Seven samples from the fault zone and dumps contained no significant values.
21	Allen	Milky quartz occurs in float near a rhyolite-granitic rock contact.	Two small pits.	Two grab samples contained no significant values.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
22	Middle Creek area prospects	Northwest- to northeast-trending, iron-oxide-stained quartz veins and lenses occur along a poorly exposed contact between granite and metasedimentary rocks. Veins are as thick as 2 ft and are generally exposed for no more than a few feet. A small body of garnet tactite is also present.	One 24-ft-long adit, three trenches from 30 to 40 ft long, and five pits.	Thirteen samples of quartz, country rock, and tactite were collected. One chip and one random chip sample of quartz from two widely spaced locales had 1.5 and 1.1 oz silver per ton.
23	Silver King	Highly contorted, recrystallized limestone and marble along the White Mountains fault zone have been intruded by quartz monzonite. At one igneous-sedimentary rock contact, a quartz vein strikes north and dips 25° to 55° west. The vein ranges from 1 to 15 ft thick, averages 5 ft thick, and is exposed for 200 ft along strike and 80 ft down dip. The quartz vein is massive to fractured and most areas are stained by iron-oxide, malachite, and chrysocolla. In one part of the vein are blebs of disseminated chalcopyrite.	A 200-ft-long adit has a 60 ft side drift, a 15 ft winze, several stopes, and a 60-ft-long raise to an upper level. The 40-ft-long upper level extended to the surface, and is now caved. Other workings include two small pits.	Twenty samples, including 15 chip samples were collected. A mineralized portion of the quartz vein contains about 6,000 tons with a weighted average of 0.50 percent copper. Three grab samples from two dumps and one stockpile contained 0.3 oz gold per ton and 4.5, 0.9, and 9.2 percent copper. One chip sample of quartz contained 0.01 oz gold per ton. The property has a moderate potential for copper resources.
24	Silver Button	Quartz monzonite forms an irregular north-trending contact with massive, fractured marble, limestone, dolomite and thin beds of shale, slate and quartzite. Primary flow banding and mafic segregations in the granitic rocks are part of the structural deformation caused by the White Mountains fault zone. Silver and copper minerals are found at four locales along an 800 ft portion of the igneous-sedimentary rock contact. Mineralized structures were not observed in place. Float and stockpiles indicate small quartz veins or lenses, siliceous shale, and quartzite contain bands or streaks of finely disseminated argentite and pyrargyrite, chalcopyrite, malachite and azurite stain. Assay results indicate sphalerite may also be present.	One 15-ft-deep shaft, 4 caved adits totaling an estimated 240 ft, and 6 pits are scattered along the contact zone.	Seventeen samples were taken: two chip samples across a shear zone contained 0.05 and 0.09 percent lead, 0.19 and 0.15 percent zinc, and 0.02 and 0.06 percent copper; one had 1.3 oz silver per ton. Two select samples of mineralized quartz, quartzite, and shale had 16.4 and 34.0 oz silver per ton, 0.13 and 0.27 percent lead, 1.45 and 1.20 percent zinc, and one had 0.18 percent copper. One random sample chip of mineralized dolomite contained 20.1 oz silver per ton. Two grab samples of mineralized granitic rock and dolomite contained 11.1 and 1.0 oz silver per ton, 0.61 and 0.14 percent lead, 0.37 and 0.23 percent zinc, and 0.02 and 0.03 percent copper. A moderate potential for silver-copper-lead-zinc resources exists.
25 **	Silver Mule	No mineralized structure is exposed. However, stockpiled material suggests that argillite and quartz stained with malachite and azurite are associated with shear zones. The zones trend northeast and northwest along the northeast-trending White Mountains fault zone between argillite and slate, and granite.	One 52-ft-long adit and two trenches.	Four chip samples of slate, three grab samples of slate-argillite-granite dump material, and one stockpile sample were taken. The only mineralized material found was on the stockpile. A sample assayed 81.2 oz silver per ton, and 0.78 perent copper. Three of the chip samples had 0.01 percent copper; the others were barren. A low potential for silver-copper resources exists.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
26	Bristlecone	Alternating beds of marble, dolomite, chert, siltstone and quartzite, have multiple shear zones and a 4- to 6-ft-thick aplite dike. Stockpiles contain malachite-stained vein quartz with blebs of galena and hematite.	One 250 ft by 300 ft open cut and one pit.	Two select samples from stockpiles had 0.02 and 0.23 percent copper, 0.10 and 0.27 percent lead, and 0.11 to 0.74 percent zinc. A grab sample and three chip samples contained no significant values.
27	Silver Pile	Siliceous to calcareous slate and argillite were intruded by granite along an irregular north-trending contact zone. All the rocks have been brecciated, folded and sheared by the White Mountains fault zone. The shear zones are discontinuous and narrow, and some contain quartz and calcite stringers. The silicified shear zones and nearby rocks are stained by limonite, malachite, azurite and chrysocolla. A 700-ft-long portion of the contact zone has been explored; the highest-grade silver values are within a 100 ft segment comprised of malachite and limonite stained argillite.	Three adits, 10, 30, and 130 ft long, five caved adits, and six small pits.	Twenty-seven samples of argillite and granite were collected. Two stockpile samples contained 40.3 and 18.2 oz silver per ton with 0.38 and 0.23 percent copper. These values were substantiated by a chip sample of iron- and copper-oxide stained argillite that had 11.8 oz silver per ton and 0.08 percent copper. Seven other samples, from widely spaced locales, contained from 1.2 to 2.2 oz silver per ton and a trace copper. This property has a moderate potential for silver-copper resources.
28	Silver Tiger-S and J Nos. 1-6	Calcareous argillite, limestone, quartzite, marble and slate have been intruded by aplitic granite and all rocks have been brecciated, sheared and folded by the White Mountains fault zone. Factors controlling localization of the mineralized zones are unclear, but they are most concentrated in brecciated or sheared carbonate rock and in quartz veins and lenses. The largest exposed zone is in a roughly defined block measuring 32 by 42 by 68 ft. Galena, sphalerite, chalcopyrite, and copper carbonate and sulfate minerals occur in the zones as both disseminated blebs and veinlets.	Twenty four adits totaling 1,700 ft, 17 caved adits, 6 shafts (3 caved) from 30 to 140 ft deep, 18 pits and four trenches are scattered for 1.5 mi along a northeast trend.	About 7,200 tons of indicated subeconomic resources average 4.5 oz silver per ton and 0.58 percent zinc. Projected extensions contain 38,000 tons of inferred subeconomic resources. Silver was detected in 82 of 212 samples. Most samples had low copper-lead-zinc values; six had a trace to 0.092 oz gold per ton. A high potential for additional silver-zinc resources exists.
29	Black Warrior Mine area	Intensely sheared and fractured argillite, limestone, marble, and slate in the White Mountains fault zone are intruded by granitic rocks. Mineralized zones along bedding, mainly in calcareous argillite near contacts with slate, contain silver-bearing galena, cerrusite, sphalerite, and secondary copper minerals. Recognized zones trend N. 40-65° W. and dip 15-35° NE. One zone is 165 ft long, 65 ft wide and 9 ft thick.	Thirty-seven adits as long as 380 ft and totaling more than 3,600 ft are in the 132 acre mine area. Twenty caved adits, eighteen pits and trenches and three cabins are also on the property. The mine produced 14,482 oz of silver from 1898 to 1901. Two tons of ore that yielded 0.02 oz gold, 184 oz silver, and 211 lb lead may have come from this property in 1921 (U.S. Bureau of Mines production records).	A mineralized zone in the southern area contains 6,400 tons of indicated and 10,000 tons of inferred subeconomic resources that average 8.5 oz silver per ton and 0.61 percent lead. A small mineralized zone (about 650 tons) in the northeastern area contains 6.8 oz silver per ton and 2.0 percent lead. Silver was detected in 99 of 292 samples, which ranged from 0.2 to 67.0 oz per ton; including a select stockpile sample that contained 277.4 oz silver per ton. Three samples contained 0.005 to 0.012 oz gold per ton. Most samples contained small amounts of lead, zinc, and copper. The area has a moderate potential for additional silver-lead resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
30	Unknown (24, 1, 32)	Recrystallized limestone- and gabbro-colluvium obscure outcrops.	One small pit.	No significant values were detected in one grab sample.
31	Russell Nos. 1-17	Calcareous metasedimentary rocks, fractured by the White Mountains fault zone are intruded by granite. They contain scattered poorly exposed, 2- to 3-ft-thick and 5- to 10-ft-long, mineralized replacement zones with malachite, azurite, chalcopyrite, and sphalerite.	Ten pits, three adits, and two shafts totaling 162 ft, are scattered over an area of about 115 acres.	Thirty-eight samples were taken: Of 17 chip samples one contained 0.5 oz silver per ton. Chip samples had no copper, lead, or zinc values exceeding 0.25 percent. Of eight grab samples: two contained 1.6 and 5.2 oz silver per ton; two contained 0.28 and 0.73 percent lead; and four contained 0.13 to 3.55 percent copper. Eight of 12 select samples had 0.7 to 4.2 oz silver per ton; seven had 0.10 to 6.7 percent lead; 10 had 0.61 to 24 percent copper; and four had 0.30 to 9.50 percent zinc. Mineralized structures were not continuous or sufficiently exposed to estimate tonnage or average grade. However, there is low potential for silver-copper-zinc resources.
32	Unknown (23, 1, 32)	Calcareous argillite has been intruded by granitic rocks; both rock types have been sheared and deformed in the White Mountains fault zone. Associated with some of the shear zones are 3- to 5-ft-thick, discontinuous, quartz and limonite lenses that contain gold, silver and minor amounts of copper and zinc minerals. The greatest concentrations of those minerals are in close proximity to the igneous-sedimentary rock contacts.	Six adits, 5- to 30-ft-long (one caved), two shafts, 10 and 65 ft deep, and six pits.	Twenty-six samples, including ten chip, eight grab, and eight select, were taken. Of the chip samples, two had 0.3 and 3.6 oz silver per ton. The select samples had as much as 9.1 oz silver per ton and 6.05 percent copper. The mineralized shear zones are widely scattered and not exposed sufficiently to determine resources. A low potential for silver-copper resources exists.
33	Neptune, Phenix, and Creekside Quartz Mine	Interbedded calcareous argillite and crystalline limestone is in contact with quartz monzonite. The White Mountains fault zone has produced numerous en echelon, gouge-filled shear zones that are small-scale and discontinuous in both rock types. Near the contact area, especially in the limestone strata, are fractured, iron-oxide-stained quartz veinlets, stringers and irregular silicified areas. Most quartz is less than 6 in. thick and a few feet long; one vein is 3.3 ft thick. Pyrite, chalcopyrite, malachite, and chrysocolla are associated with the quartz. Three claims were patented in 1889.	Two adits, 105 and 95 ft long, and 11 pits. Several thousand oz of silver were produced (Whiting, 1888, p. 378).	Three chip samples of sheared granite and vein quartz contained 0.2 to 0.5 oz silver per ton and traces of copper. Two chip samples of siliceous limestone contained 0.2 and 0.3 oz silver per ton and 0.02 and 0.13 percent copper. Two select samples of stockpiled quartz and siliceous limestone contained 1.2 and 2.2 oz silver per ton and 1.17 and 2.30 percent copper. Four other select samples of siliceous limestone had 0.2 to 0.4 oz silver per ton and 0.2 to 0.24 percent copper. A low potential for silver-copper resources exists.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
34	Silver Piñon	Limestone, marble, shale, argillite, and chert have been intruded by granite along an irregular, gradational contact zone. Granitic dikes 5- to 10-ft thick, and xenoliths with calc-silicate mineral assemblages are characteristic of this transition zone. Sturctural deformation of both rock types by the White Mountains fault zone has resulted in numerous discontinuous shear zones 2- to 5-ft-thick and faults. Most mineralized zones are in limestone, usually near dikes, and are characterized by: 1) silicification, including quartz veinlets and quartz veins up to a few inches thick, 2) iron minerals, including local heavy iron-oxide-stain; 3) copper minerals, including copper carbonate stain; 4) thin streaks, about 1/10 in. thick, of black, fine-grained, vitreous pyrargyrite (ruby silver) and (or) argentite (De Groot, 1890, p. 338), surrounded by bands of copper- and iron-oxide alteration; and manganese dendrites.	Five adits, 20 to 95 ft long, 19 caved adits, one caved shaft, eight pits and the ruins of a mill are scattered for 1,600 ft along a northerly trend.	Fifty-one samples were taken: 34 were chip samples across shear zones. Five chip samples had 0.2 to 2.8 oz silver per ton, and one had 28.7 oz silver per ton. Eight chip samples had from 0.01 to 0.43 percent copper. Select samples of stockpiled shear zone material and tactite contained as much as 23.6 oz silver per ton and 0.91 percent copper. There is moderate potential for silver-copper resources.
35	Unknown (35, 1, 32)	Sheared argillite and marble are cut by quartz veinlets.	One caved adit.	No significant values were detected from one grab sample.
36	Unknown (7, 2, 34)	Brecciated, malachite-stained, quartz veins up to 8 in. thick occur in a 4.8-ft-thick, 100-ft-long, northwest-trending monzonite intrusive in shale.	One open cut about 20 ft long and one pit.	Three samples were taken; one grab sample of quartz contained 0.04 percent copper.
37	Argentite Maid	A fractured vein of quartz breccia at least 4 ft thick strikes N. 65° W, dips 60° SW, and is associated with a shear zone, up to 4.5 ft thick, in siliceous limestone.	Two shafts (20 and 45 ft deep), one 100-ft adit, and four pits. In 1952, 5 tons of ore yielded 1.2 oz gold per ton, 200 oz silver per ton, 200 lbs of lead and 750 lbs of zinc (U.S. Bureau of Mines production records).	Thirteen samples were taken. Of seven chip samples across the shear zone, one contained 0.15 oz gold and 8.1 oz of silver per ton. Of five quartz and siliceous limestone grab samples, one contained 0.01 oz gold per ton and four contained 1.1 to 2.0 oz of silver per ton. This propery has a low potential for silver resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
38	Mollini Mine (Good Willie Nos. 1-4)	Along the northeast-trending contact zone between granitic and metasedimentary rocks are 0.8- to 7.8-ft-thick shear zones that contain pods of quartz and veinlets of galena, tetrahedrite, and sphalerite. One mass of quartz is about 30 ft in diameter. Many limits of this deposit are not exposed underground; thick overburden obscures contacts on the surface.	Ten adits with 900 ft of workings, seven caved adits, three shafts, and four pits and trenches are scattered for 800 ft along the contact zone. From 1910 to 1938 about 418 tons yielded 62.6 oz gold, 22,077 oz silver, 1,682 lb copper, and 8,023 lb lead (U.S. Bureau of Mines production records).	In three shear zones and a quartz pod are 540 tons of indicated marginal reserves averaging 19. oz silver per ton, 2.0 percent lead, 1.6 percent zinc, and 0.11 percent copper; and 180 tons of inferred marginal reserves averaging 19 oz silver per ton, 4.9 percent lead, 1.3 percent zinc, and 0.15 percent zinc. Classification as a marginal reserve is based on: proximity to other high-grade silver-lead-zinc deposits which could be developed concurrently, easy access, and location near existing and planned processing facilities. This property has a high potential for additional silver-lead-zinc resources.
39	Green Monster Mine	Interbedded marble, silicious limestone, and argillite strike northeast and dip northwest near an irregular contact with granodiorite. Sphalerite, galena, tetrahedrite, chalcopyrite and pyrite, with minor pyrargyrite and chalcanthite, occur randomly as 1 in. long elongate blebs and in discontinous veinlets, and 1.2- to 10.5-ft-thick. These minerals are in silicified and gouge-filled shear zones up to 35 ft thick in limestone that strikes northeast to northwest and dip steeply.	Four adits, totaling 470 ft, two 15 ft deep shafts, and a small pit are scattered for 700 ft along a northeast contact. From 1938 to 1953 the mine produced 781 tons containing 6.1 oz gold, 40,329 oz silver, 6,916 lbs copper, 46,767 lbs lead, and 5,775 lbs zinc (U.S. Bureau of Mines production records).	An estimated 1,100 tons of indicated and 1,500 tons of inferred marginal reserves average 17. oz silver per ton, 4.0 percent zinc, and 0.73 percent lead. Near the same contact, 600 ft southwest are 150 tons of marginal reserves that average 140 oz silver per ton, 4.0 percent zinc, 3.3 percent lead and 0.7 percent copper. The hanging wall host rocks adjacent to the veins contain similarly high but spotty silver values; therefore a high potential exists for additional silver-lead-zinc resources. A select sample assayed 612 oz silver per ton. Easy access, location near other deposits which could be developed concurrently and proximity of existing and planned processing facilities are factors that influence the classification as a marginal reserve.
40	Silver Consolidated Mining Claims	Replacement pods are associated with localized shears, faults, and breccia zones in recrystallized limestone in a 500 by 700 ft area along the crest of a northeast-trending anticline in limestone and shale. The fold is intruded by quartz monzonite. The pods are composed of silicious, iron-rich, massive to banded limestone with fine grained pyrite, galena, sphalerite, acanthite (argentite), chalcopyrite, tetrahedrite, and native silver. Some pods contain secondary copper minerals along fractures; the largest pod is about 14 ft long and 3 ft thick.	Patented 195 acre claim group with five adits, 23 to 95 ft long; two shafts 11 and 30 ft deep; four trenches and two pits.	Twelve of 34 samples contained traces to 0.096 oz gold per ton; 27 contained detectable silver (17 of those had 0.2 to 0.6 oz silver per ton and ten contained from 1.0 to 88.0 oz silver per ton). Ten of 22 analyzed for copper contained 0.01 to 0.67 percent and two had 2.6 and 2.8 percent. Eleven of 19 analyzed for lead contained 0.01 to 0.45 percent and three had from 1.25 to 3.9 percent lead. Sixteen of 19 contained 0.02 to 3.3 percent zinc and three had from 6.4 to 38.0 percent zinc. The mineralized zones are too small and scattered to constitute resources. The potential for silver-zinc-copper resources is moderate.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
41	Evergreen Mine (C and C)	Hornfels, marble and argillite are in contact with a quartz monzonite intrusive. A poorly defined tactite zone exposed in the headwall of the bench cut is at least 150-200 ft long and 75 ft high. Randomly oriented tactite lenses 1.5 to 4.5 ft thick contain disseminations and masses of galena, sphalerite, chalcopyrite and stains of secondary copper-lead minerals. Only a small portion of this zone is accessible; much of the area has a thick cover of colluvium, and has been disrupted by bulldozer activity.	One caved adit and a 500-ft-long bench cut with a headwall of 75 ft. In 1925, 1926, 1940, and 1963, 197 tons yielded 13,377 oz silver, 1,062 lbs copper, 4,134 lbs lead, and 446 lbs zinc (U.S. Bureau of Mines production records).	Of 19 samples taken, three chip samples contained 3.4, 31.6 and 69.5 oz silver per ton, 0.03, 0.18 and 0.47 percent copper, and from 0.25 to 1.22 percent lead; two had 0.16 and 9.10 percent zinc. One chip sample contained 0.013 oz gold per ton. Resources were not determined due to the inaccessibility and limited exposure of the tactite zones. A moderate potential for silver-copper-lead-zinc resources exists.
42	Out of Sight	Poorly exposed discontinuous copper stained quartz veins up to 1 ft thick occur in biotite-quartz monzonite.	Three caved adits, one 25 ft long trench, and one pit.	Five grab and select samples: three of quartz contained 0.005 to 0.02 oz gold per ton and 0.02 oz silver per ton, and four contained from 0.01 to 0.05 percent copper.
43	* Calvada	Iron-oxide-stained granodiorite.	None.	Four grab samples contained no significant values.
44	Claw Nos. 1-3	Metavolcanic rocks in contact with granitic rocks (Crowder and Sheridan, 1972) are cross-cut by a uranium bearing vein comprised of tremolite-actinolite, calcite, quartz, plagioclase, epidote and magnetite. The vein strikes N. 40° E., dips 35-60° NW., averages 3 ft thick. Only 220 ft of the vein was accessible for examination. Several smaller veins were reported but were not found.	One 12-ft adit.	About 6,000 tons of indicated and 21,000 tons of inferred subeconomic resources that contain 0.14 percent U_3O_8 is estimated in the main vein. Three samples also contained 0.12 to 0.65 percent combined lathanium, scandium and yttrium oxides. Consistently high U_3O_8 values have been reported in additional nearby veins (Wrede, 1979, p. 5). There is moderate potential for additional uranium resources.
45	** Mountain View and Proctor Mine	Pyrite, galena, and sphalerite are disseminated along three 8-ft-thick, northwest-trending, shear zones in marble and quartzite. The shear zones are up to 400 ft long and 20 ft thick.	Nine adits (two caved) totaling 200 ft, and one trench.	Twenty-six chip samples: Twenty-two assayed 0.2 to 5.2 oz silver per ton; 20 had 0.01 to 0.02 percent copper, 18 contained from 0.05 to 6.05 percent lead; and 19 had between 0.35 and 16.6 percent zinc. Averages were: 0.8 oz silver per ton, 1.11 percent lead, and 2.90 percent zinc. The property has a moderate potential for silver-zinc-lead resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
46 **	Copper Queen Nos. 1-3	Thin-bedded, fissile shale up to 7 ft thick, strikes N. 70° E., dips 30-77° SE., and is interbedded with recrystallized limestone. The shale has disseminated pyrite and malachite and limonite-stained fractures. The limestone has limonitic zones up to 1.3 ft thick and 25 ft long.	Two adits, 45 and 230 ft long, and one caved adit estimated to be 80 ft long. Bureau of Mines production records indicate that 4 tons yielded 104 lbs copper and 4 oz silver in 1968.	Twelve samples were taken. Two chip samples of shale contained 0.5 and 0.2 oz silver per ton and 0.32 and 1.49 percent copper. One sample of the calcareous limonite zone contained 1.6 oz silver per ton; five additional chip samples of the same material averaged 0.36 oz silver per ton. Three grab samples of shale and limestone from adit dumps contained an average of 0.73 percent copper and 0.27 oz silver per ton. A moderate potential for copper-silver resources exists.
47	Birch Creek area prospects	A thick coating of chrysocolla, malachite, and calcite occurs in 3 in. to 1 ft thick areas of intensely fractured metavolcanic rock. Quartz veins and pods in this area do not contain metallic minerals.	Two adits, 90 and 100 ft long, three caved adits and two pits in widely scattered locations.	Eighteen chip, two grab and one select samples were collected. Three chip samples contained from 0.6 to 1.7 oz silver per ton, and 1.63 to 2.03 percent copper. A select sample of the same material had 1.7 oz silver per ton and 0.85 percent copper. Most of the other samples had traces of copper. A low potential for copper-silver resources exists.
48	Stairway Copper Nos. 1-16	Randomly oriented shear zones, up to 5 ft thick and a few feet long, occur in fractured meta-andesite stained by secondary iron and copper minerals. Shear zones consist of limonitic gouge, meta-andesite, and quartz with blebs of massive chalcopyrite, pyrite, and chrysocolla.	One shaft 165 ft deep, four adits totaling 130 ft, six caved adits estimated to total 200 ft, and five trenches and pits.	Thirty-one samples were taken. Thirteen grab samples from stockpiles had as much as 2.87 percent copper. Thirteen of the 17 chip samples had from 0.01 to 1.07 percent copper. There is moderate potential for copper resources.
49	Little Dipper Group	Fissure-filling quartz veins up to 3.5 ft thick and at least 17 ft long are subparallel with iron-oxide-stained shear zones up to 4 ft thick and 75 ft long. These steeply dipping structures strike N. 48° E. to N. 35° W. in altered andesite.	Three adits 15, 28, and 75 ft long, and two trenches.	Fourteen samples were taken. Six chip samples from quartz and shear zones ranged from 0.4 to 1.1 oz silver per ton. Three grab samples of dump material had from 0.4 to 0.9 oz silver per ton. One chip sample of quartz with malachite had 0.6 percent copper. The property has a low potential for copper-silver resources.
50	Unknown (21, 3, 34)	A 100 by 200 ft roof pendant of iron-oxide-stained siliceous argillite is in quartz monzonite.	One pit.	No significant values in two chip samples.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
51	Heine B. Nos. 1 and 2	Three parallel, 0.3-0.5 ft-thick quartz lenses in phyllite contain disseminated chalcopyrite with chysocolla halos. The lenses are along a poorly exposed, 9.0-ft thick zone that strikes N. 50° W., and dips 30° SW.	One 28-ft adit and three small pits.	Ten samples were taken: a chip sample from each of the three quartz lenses contained 5.8, 3.1 and 1.2 oz silver per ton and 2.56, 1.24 and 0.48 percent copper. One chip sample of quartz from a pit contained 0.2 oz silver per ton and 0.32 percent copper. Three grab samples of stockpiled quartz had 2.3, 6.6 and 6.8 oz silver per ton and 1.22, 5.50 and 4.20 percent copper; one of the grab samples also contained 0.02 oz gold per ton. This property has a moderate potential for copper-silver resources.
52 **	New York No. 1-Mono No. 1	North-trending siliceous hornfels and phyllite contain discontinuous veinlets and pods of quartz 1 to 3 in. thick and up to 8 in. long.	None.	Two chip samples of quartz contained no significant values.
53 **	Pacific Mine	Sericite-bearing schist occurs in a band of felsic metavolcanic rocks that trend north for more than 3 mi along the White Mountains fault zone. The main deposit is more than 800 ft long and 100 ft thick. An additional deposit or extension, about 100 ft thick, lies 400 ft to the north. Three lenses of sericite schist, 160 to 220 ft long, occur at the White Swan Claims 2,000 ft south of the main deposit. Ore grade rock contains mostly sericite with less than 30 percent quartz. This deposit has been described as pyrophyllite in literature.	Two open pits are on the main deposit. The north pit is 200 by 400 ft and has been explored to a depth of 200 ft by five drill holes. The south deposit is developed by a 111-ft-long adit. Ore is crushed and classified at a mill at Laws, California, 4.5 mi northeast of Bishop. The Pacific Mine has produced more than 160,000 tons since 1945, (U.S. Bureau of Mines production records) and continues to produce about 1,000 tons per year on a custom basis. The product is sold under the trade name Chromacal which is used principally as a paint extender.	Approximately 170,000 tons of indicated and 460,000 tons of inferred sericite reserves are in the main deposit. An additional 40,000 tons of indicated and 360,000 tons of inferred marginal reserves were delineated by drilling in the northern deposit. Approximately 30,000 tons of inferred subeconomic resources are at the White Swan Claims. A high potential exists for additional sericite resources.
54	Unknown (10, 4, 33)	Shale hosts two quartz veins 0.5 to 2.5 ft thick and 4 to 25 ft long. Fractured quartz is coated with chrysocolla.	None.	Of the four samples, one select sample of quartz contained a trace gold, 0.7 oz silver per ton, and 0.49 percent copper.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
55 **	Champion Mine	A zone of andalusite containing up to 3 percent rutile is 500 ft long, as much as 300 ft wide and 50 ft thick (Jeffery and Woodhouse, 1931, p. 461) and occurs totally within the Cenozoic (?) White Mountains fault zone (McKee and others, 1982). The deposit is described by Melhase, (1925, p. 92), Kerr (1932, p. 618), Sampson and Tucker (1940, p. 149), and Gross and Parwel (1968, p. 494), as irregular stringers, lenses and segregations associated with a 200 ft wide quartz mass and bounded by hydrothermally altered sericite schist and quartz monzonite porphyry. The source of aluminum and the sequence of geologic events are unclear. Several rare minerals occur here.	Workings include a 500 ft long adit with stopes up to 100 ft long, 50 ft wide, and 75 ft high; a 400 ft adit and several pits. Between 1920 and 1945, about 26,457 tons averaging about 53 percent andalusite were mined for the Champion Spark Plug Company (Varley, 1968, p. 108; U.S. Bureau of Mines production records).	Two million tons may remain at the main workings, and as much as 250,000 tons averaging 40 percent andalusite are about 0.75 mi southwest (Varley, 1968, p. 108). Andalusite has been replaced in most of its uses by many substitutes. This deposit has a high potential for additional andalusite and rutile resources.
56	Bobbie D. Lode	A 300-ft-long, 3-ft-thick, quartz vein stockwork, strikes east and dips 32° N., in granodiorite.	One trench and one pit.	One of four chip samples across the stockwork contained a trace of gold. A select sample of stockpiled quartz contained 0.27 percent copper, 14 percent lead, 6 percent zinc, and 0.21 percent WO_3. The prospect has a low potential for lead-zinc-copper resources.
57	Harrington	A 15-ft-thick, 45-ft-long, limonitic shear zone delineates the contact between granodiorite and marble.	One 45-ft adit.	One of five chip samples across the shear zone contained 0.2 oz silver per ton.
58	White Phantom	Small amounts of uranium are in slightly altered, sheared quartz monzonite in contact with contorted metasedimentary rocks. The Bureau of Mines first examined this property in 1956 (Jones and Reeves, 1956, p. 1) and found "...a few scattered specks of scheelite..." in the metasedimentary rocks.	None.	Three samples from shear zones in quartz monzonite contained no significant values. Uranium ranged from 5 to 7 parts per million, which is average for granitic rock.
59 **	Inspiration	Hydrothermal alteration of metasedimentary and metavolcanic rocks has produced a zone up to 150-ft-wide and over 400 ft long containing sericite. The boundaries of a second apparently smaller, alteration zone of blocky sericite were not defined.	An open cut with three benches covering an area about 130 by 400 ft, and one 53 ft long adit. The open cut may have contributed to production recorded for the Colton Mine.	Nine samples were taken. In six samples, sericite is a major component; in all nine samples free quartz is a major component. The samples contain 52.1 to 74.6 percent SiO_2 and 10.1 to 35.4 percent Al_2O_3. The property has moderate potential for sericite resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
60	Churchill Iron Deposit	Two low grade magnetite occurrences are on this property. The lower one consists of six 20- to 180-ft-long pods of magnetite-rich quartzite. The upper occurrence is in a metamorphosed mafic dike 210 ft long and 3 to 10 ft thick, in granitic rock. Magnetite-rich veins within the dike are up to 4 in. thick and extend the length of the dike.	None.	The lower occurrence contains 180,000 tons averaging 16.6 percent iron, the upper occurrence contains 10,000 tons averaging 7.5 percent iron. There is no identified potential for iron resources.
61	Colton Mine	A 35- to 120-ft thick zone of hydrothermally altered metavolcanic and metasedimentary rocks contain blocky sericite and lenses up to 12 ft thick. The lenses are concordant with the bedding which strikes northwest and dips southwest.	One adit with 460 ft of workings, one caved shaft, two pits 30 and 80 ft in diameter, and about 1,600 ft of bulldozer cuts. A total of 6,762 tons of sericite were produced from 1948 to 1959 (U.S. Bureau of Mines production records).	The alteration zone contains 1.2 million tons of indicated and inferred marginal reserves of sericite. This property has a moderate potential for additional sericite resources.
62 **	Copper Queen Mine	North-trending shear zones cut north-northeast-striking metasedimentary and metavolcanic rocks and contain discontinous quartz veins up to 4 ft thick and 80 ft long. Siderite, chalcopyrite, and tetrahedrite occur as disseminations and fissure fillings within the quartz. Malachite, azurite, chrysocolla, and limonite occur as stains and coatings on veins and in fractures within the country rock.	Ten adits, 14 to 150 ft long, total 700 ft. Other workings include four pits and a trench.	Of 73 chip samples, 20 had from 0.5 to 4.1 oz silver per ton and from 0.11 to 0.84 percent copper. Nine grab samples contained from 0.3 to 3.0 oz silver per ton and from 0.14 to 2.52 percent copper. Two select samples from small stockpiles contained 4.9 oz silver per ton each and 2.29 and 3.72 percent copper. The quartz veins are short, discontinuous, and have widely different but generally narrow widths, and resources could not be determined. A moderate potential for copper-silver resources exists.
63	Little Blue Group	Discontinuous quartz veins and pods, locally malachite stained, crop out in a 100 by 200 ft area in phyllite. Most of the copper minerals are concentrated in the axial plane of a small north plunging syncline. Quartz filled the tension fractures, with no vein thicker than 3 ft. The total strike length of the mineralized rock is not exposed, but the known dimensions are 5 ft wide, 10 ft high, and 15 ft long. The massive to crystalline quartz contains blebs of chalcopyrite, and fracture coatings of chrysocolla, malachite, and azurite.	One 15-ft-long inclined adit.	Seven samples were collected from quartz veins. Three chip samples across the axial plane in the adit had 5.7, 1.0, and 0.9 oz silver per ton and 4.00, 0.44, and 1.04 percent copper, respectively. A random chip sample of numerous quartz veins in the area contained 0.5 oz silver per ton and 0.16 percent copper. A grab sample from a small stockpile had 34.6 oz silver per ton and 21.7 percent copper. The potential for copper-silver resources is moderate.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
64	Copper Kings Nos. 1 and 2	Phyllite and hornfels beds that strike N. 2° to 22° W. and dip 50° to 78° SW. contain at least two quartz pods that are as much as 3.5 ft thick and 10 ft long. The iron-oxide-stained quartz contains blebs of chalcopyrite and bornite and coatings of malachite and azurite.	Three pits and two trenches, 35 and 40 ft long.	Two random chip samples from a quartz pod contained 0.4 and 0.6 oz silver per ton and 0.09 and 0.20 percent copper. A sample from a nearby stockpile contained 24.7 oz silver per ton and 4.23 percent copper. A sample of a stockpile from the 35 ft trench had 11.0 oz silver per ton and 10.30 percent copper. Three samples from dumps had between 0.2 and 0.3 oz silver per ton and 0.4 percent copper. The property has a low potential for silver-copper resources.
65	Green Rock	Small bodies of porphyritic dacite and a single quartz vein 0.3 ft thick, 7 ft long, and 2 ft wide, is in dark siliceous hornfels. The vein has nearly equal parts of quartz and massive chalcopyrite. A 2 or 3 ft diameter alteration halo of chrysocolla fracture coatings surrounds the vein.	Five small pits.	Six samples from all rock types were collected. One select sample from the vein contained 8.90 percent copper and a trace of lead. One sample from stockpiled hornfels had 5.6 oz silver per ton and 3.5 percent copper. A chip sample across chrysocolla-stained silicified hornfels contained 0.16 percent copper.
66	Mono Copper Nos. 1 and 2	Jointed, blocky phyllite and hornfels strikes N. 20° E., dips 40° SE., and is intruded by quartz monzonite on the east. Untraceable 0.4 to 5 ft thick fault zones and 10 to 40 ft thick intensly fractured zones have stains and botryoidal coatings of malachite, azurite, and chrysocolla. Quartz is associated with the structures, but is not the gangue of the copper minerals.	Two adits, 42 and 43 ft long, two pits, and one caved adit.	Nine chip samples from veins and mineralized rock contained between 0.21 and 1.91 percent copper. Two grab samples from 1 to 5 ton stockpiles contained 3.26 and 5.4 percent copper. Sampling indicated that the intensity of copper mineralization is inversely related to the distance from the granodiorite intrusive. This property has a low potential for copper resources.
67	White Mountain Copper Nos. 1 and 2	Quartz diorite forms an irregular contact with phyllite, hornfels, and quartzite that strikes N. 24° to 60° E. and dips 24° to 60° SE. Discontinuous quartz veins or pods, less than 1.0 ft thick and 10 ft long, are mostly in sedimentary rocks. A few outcrops of quartz have blebs of chalcopyrite; malachite stain is more widespread, especially in the sedimentary rocks near the intrusive contact.	Two trenches.	One chip sample of siliceous hornfels with minor quartz contained 0.47 percent copper. Four other chip samples of vein quartz and fracture zones contained a trace copper. One grab sample of a 4 ton stockpile of quartz contained 0.67 percent copper. The prospect has a low potential for copper resources.
68	Straight Canyon area prospects	Massive, jointed, granodiorite and quartz monzonite are cut by quartz veins and pods, 1 to 3 ft thick, with limonite. Some of the quartz contains randomly disseminated blebs of chalcopyrite and fracture fillings of malachite, azurite, and chrysocolla.	Four widely scattered pits.	The copper content of five grab, three chip, and one random chip samples were fairly consistent, ranging from 0.01 to 0.33 percent. Three samples also contained 0.12, 0.06, and 0.01 oz gold per ton.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
69	Unknown (30, 4, 34)	Quartz vein float in quartz monzonite colluvium.	Two trenches, the longest is 48 ft.	Two select samples of quartz contained no significant values.
70	Bismuthite Gold	Quartz vein float is in large, angular quartz monzonite colluvium.	One pit.	A select sample of iron-oxide-stained vein quartz float contained no significant values.
71	Iron Bell	Iron-oxide-stained quartz veins and pods up to 2 ft thick occur in and near dikes of schistose diabase. The diabase and quartz are in fine- to coarse-grained granodiorite.	Seven pits and four trenches 23 to 54 ft long.	Of 13 samples, one grab sample of iron-oxide-stained quartz contained 0.06 oz gold per ton.
72	Eva Belle Mine	Quartz monzonite is in contact with dolomite for at least 3 mi along a northerly trend. A lens of quartz-limonite boxwork occurs in a 30-ft-wide shear zone in dolomite. The lens is 100 ft long, 2.5 to 12.5 ft thick, and contains quartz, limonite, hematite, malachite, lead and zinc carbonates, and minor amounts of pyrite and galena. Similar material on dumps of workings suggest several lenses or pods may exist.	For 4,300 ft along a northwest trend are four adits (with 300 ft of workings) and eight pits. The mine produced a total of 607 tons of ore which yielded 303.7 oz gold, 11,826 oz silver, 6,629 lb copper, 55,284 lb lead, and 17,943 lb zinc in 1901, 1902, 1904, 1975, and 1976 (U.S. Bureau of Mines production records).	About 7,000 tons of indicated subeconomic resources containing 0.13 oz gold per ton, 1.2 oz silver per ton, 1.0 percent lead, 0.17 percent zinc, and 0.11 percent copper remain in the deposit. There is a high potential for additional gold-silver-lead-zinc-copper resources.
73	Mohawk	At least four widely spaced quartz veins, 2 to 8 in. thick and a few feet long, are in quartz monzonite and in a diabase intrusive. The veins strike northeast to northwest and dip 40° to 60° SE. and NE, respectively. The malachite-stained quartz veins contain disseminated chalcopyrite and pyrite.	One 38-ft-long adit, one caved adit, and seven pits.	Of five select samples of stockpiled quartz, four had as much as 0.01 oz gold per ton, a trace silver and 0.8 percent copper; the fifth contained 0.36 oz gold per ton, 1.0 oz silver per ton, and 0.99 percent copper. Two grab samples of a stockpile and dump had 0.02 and 0.05 oz gold per ton, a trace silver, and none detected to 0.39 percent copper. This property has a low potential for gold-copper resources.
74	G. B. and S. Mining and Milling Nos. 1-6	Quartz veins and veinlets up to 5 in. thick occur in diabase dikes within quartz monzonite. The dikes are from 2 to 10 ft thick, trend north, dip steeply east and crop out discontinuously for 3,000 ft. Locally, veins contain blebs of chalcopyrite, with alteration halos of malachite and chrysocolla. Limonite and hematite boxwork is commonly associated with quartz.	Nineteen adits (six caved), one 32-ft-deep shaft, ten trenches, and 13 pits. Total accessible underground development is 356 ft.	Six areas contained mineral occurrences which collectively represent about 1,000 tons of quartz and diabase with a weighted average grade of 0.14 oz gold per ton. Thirty-one of the 83 samples collected contained between 0.006 and 0.680 oz gold per ton; twelve samples contained between 0.2 and 1.0 oz silver per ton; and two had 1.15 and 1.30 percent copper. There is moderate potential for gold-silver-copper resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
75 **	Sacramento Canyon Pumice Deposit	A deposit of minus 2 in. pumice 135 ft long, 50 ft wide, and exposed to a depth of 66 ft is partly covered by granitic colluvium. Before mining, the deposit was reported to be 500 ft long and 200 ft wide (Sampson and Tucker, 1940, p. 152).	A 200-ft-long trench up to 100 ft wide and 66 ft deep. The deposit was intermittently mined from the mid-1920's to the early 1940's. A scraper moved the pumice to a small storage bin. The screened minus 5/8 in. material was hauled by truck to Bishop, California for local use (see Chesterman, 1956, p. 61). Production was not reported.	The deposit contains 7,600 tons of indicated and inferred subeconomic pumice resources. Potential is high for additional pumice resources at this property.
76	Unknown (2, 5, 33)	Iron-oxide-stained discontinuous quartz veins up to 5 ft thick are exposed for 50 ft in an east-trending, 10-ft-thick zone of sheared siltstone and quartzite.	Three shallow pits.	Three chip samples from veins contained 0.02, 0.03, and 0.14 percent copper. A grab sample of quartz from stockpiles had 0.04 percent copper.
77	Sacramento Mine	A 1.7- to 2.0-ft-thick quartz vein, associated with an altered diabase dike in hornblende monzonite, is exposed for 380 ft along strike and 600 ft downdip in mine workings. The vein and dike trend north and dip 25° W. The north end of the vein is thinned and fragmented by shearing; the east side is partly overlapped and terminated by a reverse fault. Pyrite and chalcopyrite in the vein are partially oxidized. Gold and silver are associated mainly with limonite and secondary copper minerals. Discrete grains of visible gold were observed in quartz and in siliceous limonite-quartz.	There are four interconnected adits, with about 2,800 ft of drift and crosscut on four levels, and extensive stoping. Some of the stoped areas in the mine are backfilled. An inclined shaft and a 10-ft adit explore the southeast end of the vein. The mine produced 750.9 oz gold, 115.2 oz silver, 684 lb copper, and 3,804 lb lead from 1889 through 1950 (U.S. Bureau of Mines production records).	In the unmined portions of the vein there are 5,500 tons of measured and inferred marginal reserves averaging 0.47 oz gold per ton, 0.3 oz silver per ton, and 0.56 percent copper. An additional 11,000 tons of demonstrated subeconomic resources average 0.1 oz gold per ton, 0.1 oz silver per ton, and 0.32 percent copper. The potential is moderate for additional gold-copper-silver resources at this property.
78	Sacramento Canyon area prospects	Scattered milky quartz pods and lenses in monzonite contain blebs and streaks of siderite, limonite, and chalcopyrite. Quartz exposures are up to 17 ft long and 5 ft thick.	One short adit and two trenches, 24 and 31 ft long.	Ten samples were taken. One chip sample of quartz contained 0.04 percent copper. One grab sample of stockpiled quartz contained 0.3 oz silver per ton and 0.71 percent copper.
79	Ora Vista Group area prospects	Three subparallel diabase dikes in granodiorite trend northwest, dip 30° to 45° NE., and are exposed discontinuously for about 100 ft. Milky quartz veins within the dikes range from less than 1 in. to 5 ft thick, and contain patches of siderite, pyrite, chalcopyrite, bornite, and limonite boxworks. Many of the veins are barren; mineralization was erratic and restricted to small areas.	One 17-ft-deep inclined shaft, two adits (each 20 ft long), and 18 pits.	About 120 tons of mineralized quartz contains 0.24 oz gold per ton and occurs in one of the dikes. A total of 26 chip, six select, and one grab samples were collected from the veins in the area. Two select samples from a 4 ton stockpile of iron-oxide-stained quartz by a pit contined 0.094 and 0.015 oz gold per ton, 6.8 and 18.2 oz silver per ton, and 5.3 and 23.0 percent copper. This property has a moderate potential for gold-silver-copper resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
80	Sacramento No. 2	A 35-ft-thick zone of highly fractured and sheared hornfels with secondary iron and copper mineral stain and minor quartz veinlets is intruded by granodiorite along a contact that trends north and dips steeply. A 1- to 2-ft-thick quartz vein in the silicified hornfels strikes N. 20° E. and dips 60° SE.	One 50-ft-long adit and one caved adit are 60 ft apart.	One chip sample from the fractured zone yielded 0.01 oz gold per ton, 1.5 oz silver per ton, and 1.42 percent copper. A chip sample of the largest quartz vein and silicified hornfels yielded a trace gold and 0.05 percent copper.
81	Hannah No. 1	A calcareous and carbonaceous shale pendant in quartz monzonite trends northerly for 150 ft and is 2 to 17 ft thick.	One 72-ft-long adit and three pits.	Two chip samples of shale contained no significant values.
82	Chalfant Valley Claim	A pod of gypsum, approximately 5 ft wide, 12 ft long, and 2 ft thick is in green calcareous shale.	One small pit.	One grab sample contained no significant values.
83	Ray Tom Group	A sequence of phyllite, argillite, slate, and marble is intruded by diorite and aplite. The quartz veins are from a few inches to 7 ft thick, 1 to 36 ft long, trend N. 20° to 45° W., and dip south. Blebs of chalcopyrite and stains of malachite, chrysocolla, and limonite occur in quartz veins and shear zones in metasediments.	One 10-ft-long adit, two trenches, and ten pits are scattered over an area of 1/2 sq mi.	One chip sample of an iron-oxide-stained zone in marble contained 0.41 oz gold and 3.6 oz silver per ton. One select sample from a stockpile of the same material contained 1.9 oz silver per ton. One grab sample of calcite-healed, fractured phyllite contained 0.13 oz gold per ton and 3.4 oz silver per ton. Ten of 19 samples ranged from 0.01 to 0.77 percent copper. There is a low potential for silver-gold-copper resources.
84 **	Comstock Pumice Deposit (Piute Mine)	The massive, moderately consolidated pumice deposit is exposed only in the open pit; elsewhere it is covered with fanglomerate at least 10 ft thick. Particles making up this subaqueous deposit vary from fine sand to pebble size. A screen analysis by Chesterman (1956, p. 61) shows that 76.5 percent is minus 1/4 in. to plus 30 mesh in size.	An open pit, 400 ft long, 100 ft wide, and 30 ft deep. The property was mined intermittently from 1941 to 1945. A bulldozer removed overburden and pushed pumice into a storage bin. The minus 1/8 in. undersize, removed by screens, was mostly silica sand. The oversize material was crushed by rollers to pass a 5/8 in. screen and sold at Bishop and other markets in southern California (Chesterman, 1956, p. 61).	From outcrop exposures, at least 110,000 tons of indicated and inferred marginal reserves of pumice remain. Compaction, permeability, and porosity tests confirm its suitability for lightweight aggregate products. This property has a high potential for additional pumice resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
85	Moulas Mine Group	Slate and hornfels are in contact with a granodiorite pluton. The sedimentary rocks are faulted and sheared in northeast to northwest directions and filled with various amounts of quartz or gouge. The quartz veins range from 0.1 to 7.0 ft thick and 10 to 400 ft long. The longest vein averages about 2 ft thick. It is massive, brittle, often banded with limonite and siliceous limonite. Some areas of the vein have blebs or masses of pyrite, specular hematite, chalcocite, or chalcopyrite and associated malachite stain.	Eleven adits (six caved), three shafts (two caved), 11 trenches, and 20 pits are in a 0.5 by 2.5 mi area. The adits are 20 to 100 ft long, except for the main inclined adit which has over 800 ft of drifts and stoped areas.	In a trench adjacent to the main inclined adit is a quartz vein with 22,000 tons of indicated and inferred marginal reserves, averaging 0.23 oz gold and 0.2 oz silver per ton. In the unmined portion of the inclined adit is 9,600 tons of indicated subeconomic resources averaging 0.08 oz gold and 0.5 oz silver per ton. Of the 184 samples collected from this property, 34 had 0.1 to 1.78 oz gold per ton, 24 had 1.0 to 11.2 oz silver per ton, and 20 had 1.0 to 3.98 percent copper. This property has a high potential for additional gold-silver-copper resources.
86	Monoco Mine	Slate, argillite and hornfels associated with diorite dikes are cut by 1 to 6 ft thick shear zones. They contain white clay, limonite, hematite, and manganese oxide coatings, some gypsum, and calcite. Quartz veins and blebs, associated with diorite dikes, range from 0.5 to 4.5 ft thick, and are up to 100 ft long. Veins and dikes trend N. 30° E., and dip 60° SE. to 87° NW. Silicified hornfels near quartz veins contains limonite boxwork, and manganese staining along fractures.	Two adits, 5 ft and 178 ft long, four caved adits, one open cut, and five pits.	Thirty-four samples were collected. Of 15 chip samples, one contained 0.19 oz gold per ton and 0.8 oz silver per ton. One select sample of stockpiled vein quartz had 0.1 oz gold per ton and 0.6 oz silver per ton.
87	Z and S Mine (Tramway Z and S Mine)	A bedding plane shear zone strikes N. 45° W., dips 30° to 50° NE. and is exposed for 340 ft underground in argillite and hornfels. A discontinuous quartz vein within the shear zone pinches and swells, but averages 1.0 ft thick.	A 270-ft tunnel, three short adits, and two pits are on the shear zone. Other workings include three pits and a short adit. Sixteen tons yielded 14 oz gold and 8 oz silver from 1940 to 1950 (U.S. Bureau of Mines production records).	About 18,000 tons of the quartz-rich shear zone averages 0.05 oz gold and 0.3 oz silver per ton. Thirty-three samples were collected, including 21 chip samples. Sixteen of these assayed between 0.006 and 0.161 oz gold per ton; 13 between 0.2 and 1.4 oz silver per ton. This property has a moderate potential for gold-silver resources.
88	Unknown (18, 5, 34)	Massive phyllitic hornfels strikes N. 4° to 15° W., dips 50° to 55° NE., and hosts a 0.6- to 3-ft thick discordant shear zone at least 150 ft long. It is comprised of hornfels, iron-oxide-stained gouge, and discontinuous fractured quartz veins with blebs of chalcopyrite and fracture fillings of malachite.	Two adits, 149 ft and 21 ft long, and one small pit.	Of 11 chip samples, three contained 1.02 to 1.98 percent copper and six contained from 0.1 to 0.59 percent copper. Two grab samples from stockpiles had 0.23 and 0.38 percent copper. The property has a low potential for copper resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
89	Unknown (18, 5, 34)	Milky quartz pods up to 3 ft long and 0.5 ft thick occur in a 3-ft-thick, 8-ft-long shear zone in slate that strikes northwest and dips steeply.	One 35-ft-long adit.	Chip samples of the quartz, shear zone, and a select sample from the dump yielded no significant values.
90	Robin (Longwalk)	A 5-ft-thick shear zone in hornfels trends N. 40° W. to N. 85° W. The zone contains blebs of specular hematite, limonite boxworks, gouge, and discontinuous quartz stringers and veins up to 2 ft thick.	One 360-ft-long adit, three adits 25 to 35 ft long, and one 23-ft-long trench.	Of ten chip samples, two contained 0.01 and 0.04 oz gold per ton and 0.2 oz silver per ton; two contained 0.2 to 0.4 oz silver per ton and 1.72 and 0.21 percent zinc.
91 **	Unknown (13, 5, 34)	The country rock is fine-grained, white dolomite.	Two shallow bulldozer cuts.	Two grab samples of dolomite contained 0.2 and 0.4 oz silver per ton.
92 **	Leota	Small northwest-trending shear zones with gouge occur in shale and limestone.	One 57-ft-long trench and two pits.	Of three samples collected, one grab sample of iron-oxide-stained, fractured shale and limestone contained a trace gold.
93 **	Golden Siren (Gladys)	Quartz monzonite is in contact with dolomite for at least 3 mi along a northerly trend. Outcrops are few and overburden in the area is thick. Material from dumps indicate gold is associated with thin quartz veins and silicified dolomite. The quartz contains disseminated oxidized pyrite and magnetite.	Eight pits, four adits (one caved) totalling 200 ft, and three shafts (two caved). The open shaft is partly water-filled and reported to be 90 ft deep (Knopf, 1914, p. 113). The workings are widely spaced along a 3,000 ft portion of the quartz monzonite-dolomite contact. Six tons yielded 6.0 oz gold and 2 oz silver in 1912 (U.S. Bureau of Mines production records).	Nine of the 22 chip and grab samples showed at least a trace gold; the three highest grade samples, from stockpiles, assayed from 0.29 to 0.56 oz gold per ton. Gold values were found at widely spaced locales near the igneous-sedimentary rock contact. This property has a low potential for gold resources.
94	Campito Mountain Prospect	Quartz veinlets stained with secondary iron and copper minerals and a north-trending, 3- to 4-ft-thick fracture zone occur in interbedded siltstone and quartzite. Quartz and gouge contain chalcopyrite, bornite, and pyrite.	One 58-ft-long adit.	Of four chip samples, one of gouge with quartz contained 2.71 percent copper and three of the fracture zone contained 0.01 to 0.38 percent copper. One grab sample of quartz from a small stockpile contained a trace of gold, 0.4 oz silver per ton, and 0.98 percent copper. A low potential for copper resources exists.
95	Climax	Several widely-spaced, discontinuous, north-trending milky quartz veins 0.5 to 5 ft thick occur in shale, argillite, phyllite, hornfels, and slate. A few of the veins contain chalcopyrite, malachite, pyrite, hematite, and limonite.	One caved adit, one caved shaft, one open cut, and 11 pits are scattered over 200 acres.	Of eight chip samples of quartz, one contained 0.01 oz gold per ton, four contained 0.2 to 0.4 oz silver per ton and 0.03 to 0.07 percent copper. Of 12 select samples of quartz, one had 0.01 oz gold per ton, six had 0.2 to 0.8 oz silver per ton, and three contained 0.02 to 0.15 percent copper. Three grab samples of quartz assayed 0.4 to 0.8 oz silver per ton.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
96 **	Twenty Grand Mine	Northwest-trending, gently dipping faults and shear zones in metasedimentary rocks and quartz monzonite are partially filled by quartz veins 1 to 2 ft thick and 100 to 200 ft long. Quartz is massive to vuggy and brecciated, and contains gold, galena, chalcopyrite, hematite, pyrite, brochanthite, antlerite, malachite, and azurite.	Twelve adits, three caved, one caved shaft, 41 pits and trenches. Forty-eight tons produced in 1936 yielded 11.8 oz gold, 909 oz silver, 1,213 lb copper, 9,100 lb lead (U.S. Bureau of Mines production records). Sampson and Tucker (1940, p. 139-140) reported that five carloads shipped from this property had ore valued at $60 per ton.	Two veins have 12,000 tons of indicated and inferred subeconomic resources with 0.03 oz gold and 1.4 oz silver per ton, and 8,000 tons of indicated and inferred subeconomic resources with 0.06 oz gold per ton and 1.0 oz silver per ton. Of 141 samples, 17 had 0.1 to 1.0 oz gold per ton, 52 had 1.0 to 10 oz silver per ton, six had 1.0 to 5 percent copper, 25 had 1.0 to 5 percent lead, and eight exceeded these ranges. There is low to moderate potential for copper-lead resources, as well as additional gold-silver resources.
97	Moon Group area prospects	Several widely-spaced northwest-trending fault and shear zones in metasedimentary rocks are filled with dikes of diabase, diorite, quartz monzonite, gouge, and quartz veins, lenses, or pods. The longest quartz vein is about 150 ft; the thickest pod or lens is about 5 ft. Gold, galena, pyrite, chalcopyrite, and related secondary minerals are in restricted portions of the quartz, mostly on the north side of Coldwater Canyon.	A total of 1,200 ft of underground development is in 12 adits; the main adit has over 700 ft of drifts and stopes. Other workings include nine shafts, 50 trenches, and 29 pits in a 2.5 sq mi area.	Of 212 samples, 15 had 0.05 to 0.386 oz gold per ton, 20 had 1.0 to 5.2 oz silver per ton, eight had 1.0 to 3.41 percent copper, and 13 had 1.0 to 7.25 percent lead. The metals are localized and erratically distributed in quartz; structures were not sufficiently continuous to determine resources. The potential for gold-silver-copper-lead resources is moderate.
98	Keystone	Interbedded argillite and limestone, strike N. 25° to 30° W. and dip 45° to 62° SW., and are crosscut by discontinuous quartz and siderite veins up to 0.5 ft thick. Minor amounts of chalcopyrite and secondary copper minerals occur in the siderite veins and fractured wallrock margins.	One 12-ft shaft and one 15-ft-long trench.	Two select samples of stockpiled quartz and argillite contained a trace and 0.03 oz gold per ton, 5.0 and 4.0 oz silver per ton, 10.9 and 8.0 percent copper, and 0.13 and 0.10 percent zinc. Two grab samples of argillite contained 0.42 and 0.28 percent copper.
99	Joyce and Mark	Quartzite, limestone, calcareous siltstone, and argillite trend northwest and dip northeast. Discontinous quartz and siderite veins up to 2.5 ft thick and shear zones up to 1.5 ft thick cut the rocks. Quartz veins contain galena and chalcopyrite; siderite veins also contain blebs of galena and calcite veinlets.	Three adits, 9, 10, and 25 ft long, one caved adit, and 13 pits.	Of five chip samples, three had traces of gold, five contained 0.2 to 0.6 oz silver per ton, and two contained 0.8 and 2.65 percent lead. Of ten select samples, three assayed from 0.02 to 0.06 oz gold per ton, four contained 1.0 to 5.4 oz silver per ton and 0.95 to 5.2 percent lead; one contained 16.8 percent lead. Of five grab samples, two contained 3.2 and 4.0 oz silver per ton and three had 0.9, 6.9 and 12.0 percent lead. Potential is low for silver-lead resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
100	Hobo Nos. 1-8	Lenses and irregular bodies of barite up to 120 ft long and 80 ft thick have intruded limestone and marble beds, near slate contacts. Much of the barite is in gradational contact with the strata. Barite occurs in two locations 4,700 ft apart. This property was known as the Cliff property in 1940 (Sampson and Tucker, 1940, p. 151).	Four adits, 20, 37, 40, and 120 ft long, two caved adits, a caved shaft, and two trenches 70 and 100 ft long. The longest adit has about 75 ft of stopes. In 1940, about 275 tons of barite, valued at $1,450, was produced (U.S. Bureau of Mines production records).	A total of 26,000 tons of barite and barite-rich sedimentary rocks contain an average of 58 percent $BaSO_4$, at two locations. Some of the 46 samples from the properties contained other metals. The highest assays were 0.6 percent copper, 1.75 percent lead, and 0.8 oz silver per ton. The property has a moderate potential for barite resources.
101	* Saratoga, Lexington, and Ranger	A mineralized shear zone, 4 to 5 ft thick, in interbedded limestone and argillite is exposed for 60 ft on the surface and to a depth of 80 ft in the workings. The zone contains from 70 to 90 percent limonite and siderite with discontinuous veins and pods of quartz up to 1.5 ft thick, and veins of chalcedony and calcite. Various amounts of hematite, pyrite, pyrolusite, malachite, chalcopyrite, gold, and silver also occur in the zone.	Four adits totaling 700 ft, one shaft 29 ft deep, and five pits. Production data was reported with the Southern Belle Mine and cannot be separated.	Eight hundred tons of indicated and 800 tons of inferred marginal reserves averaging 0.41 oz gold per ton, 0.54 oz silver per ton, and 0.06 percent copper remain in the deposit. Road access and processing facilities near the property are factors that influence the classification of this small resource. There is a moderate potential for additional gold-silver-copper resources.
102	* Southern Bell Mine	Intensely folded and faulted argillite, hornfels, phyllite, shale, and marble are broken by steeply-dipping tensional faults that trend N. 30° to 70° W. The 0.1- to 2.9-ft-thick quartz veins that fill these faults contain gold, copper sulfides, and iron oxides.	The main working has several portals, connected by more than 3,900 ft of drifts, stopes and winzes. Surface workings include numerous pits. On the south end of the property are 11 adits, six trenches, four shafts and three pits. The New Year shaft is reported to be 260 ft deep with development on three levels. Combined production from 1893 through 1937 was 1,024 oz gold and 182 oz silver (U.S. Bureau of Mines production records).	Twelve of 24 samples contained 0.016 to 0.216 oz gold and 0.2 to 1.0 oz silver per ton. Six samples contained 0.06 to 3.10 percent copper. Only a cursory examination was performed, mainly to determine if mineralized structures would trend into the study area. The potential for gold-silver-copper resources is high.
103	* Bullion	A lenticular body of gold-silver-bearing siderite, quartz, and iron oxide occupies the intersection of a northeast-striking limestone-phyllite contact and a northwest-striking tensional fault. The body dips 45° W., extends 390 ft along strike, and about 585 ft down dip, and has an average thickness of 20 ft.	The main working is a 405-ft-long, 45° inclined shaft with seven sublevels 20 to 100 ft long, and areas of extensive stoping. A second shaft intersects this shaft 30 ft below the surface. Other workings include a 110 ft deep shaft with a drift to the surface, a 10 ft adit, and two pits. Bureau of Mines records indicate 800 tons yielded 145.1 oz gold and 44 oz silver in 1906. Other production was combined with the Southern Bell output.	From the analyses of 80 samples, there are 240,000 tons of indicated and 130,000 tons inferred subeconomic resources, containing 0.07 oz gold per ton and 1.2 oz silver per ton. The potential for additional gold-silver-copper resources is high.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
104	Pine Flat Barite	Discontinuous barite pods and lenses up to 0.5 ft long occur in limestone and shale.	One 80-ft-long trench and two pits.	Two chip samples across barite lenses and country rock contained 18.7 and 24.6 percent $BaSO_4$. Two samples from a stockpile and a dump contained 30.6 and 32.3 percent barium sulfate, and two grab samples from a dump contained 0.59 and 19.2 percent.
105	* Ira O. Clark	Discontinuous quartz veins, less than 40 ft long and 1 to 2 ft thick, are sporadically distributed in beds of dolomite that are intercalated with phyllite. The veins contain limonite boxwork and siderite, with limonite, malachite and azurite along fractures, and isolated concentrations of galena, pyrite, chalcopyrite, bornite and chrysocolla.	Four adits, 14 to 94 ft long, two caved adits and six pits, are scattered for 700 ft along an east trend.	Sixteen chip and 11 select samples were taken. Three chip samples from veins contained 1.0, 2.2, and 2.0 oz silver per ton; 0.03, 1.83 and 0.09 percent copper, and 2.36, 0.05 and 3.3 percent lead. The remaining chip samples contained less than 0.8 oz silver per ton and 0.27 percent lead. Select samples of mineralized vein material contained up to 6.5 oz silver per ton, up to 5.13 percent copper and up to 12.0 percent lead. This property has a moderate silver-lead-copper resource potential.
106	* Gunter Canyon Barite Mine	Barite filled the fractured apex of an anticline comprised of schist and slate for about 400 ft. Westerly cross cutting veins are 1 to 3 ft thick and less than 50 ft long. At the fault intersections thicknesses of barite reach 8 ft (Bateman, 1956, p. 83). The structure parallels the study area boundary.	Bateman (1956, p. 83) reported a 200 ft inclined shaft, five short adits, several pits and trenches, and an open cut 30 ft across. Bureau of Mines production records list seven owners or operators that produced 3,074 tons of barite valued at $20,000 from 1928 to 1931. Tucker (1931, p. 545) reported that a former owner indicated production of 62,000 tons.	This mine is adjacent to the study area and was not evaluated. A preliminary Bureau of Mines examination by Johnson (1961, p. 5) estimated "...a deposit of 29,000 tons of indicated reserves...a grab sample contained 95.9 percent $BaSO_4$ and 4.49 specific gravity..." Tucker and Sampson (1938, p. 481) reported 94 percent $BaSO_4$ and 4.2 specific gravity. The potential for barite resources is high.
107	Silver Hill	Fractured, limonitic quartz vein float is in weathered shale.	One small pit.	One select sample of quartz contained 0.17 oz gold per ton, 4.6 oz silver per ton, and 13.5 percent lead.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
108	* Gunter Canyon area pumice deposits	Seven subaqueous, pumice deposits, each about 20 ft thick, are interbedded with layers of pumicite and silica sand. Pumice fragments are angular and 1/16 to 3 in. in diameter (see Chesterman, 1956, p. 60). The limits of most of these deposits are covered by alluvium and colluvium. Most of the workings are on four patented claims owned by the U.S. Gypsum Company.	Eight large pits, 78 shallow pits and trenches, and four large stockpiles of pumice. A total of 23,000 tons worth $310,000 was produced from 1937-1947 (U.S. Bureau of Mines production records).	An estimated 9.6 million tons of indicated and inferred marginal reserves of pumice are in four stockpiles and seven deposits covering about 180 acres. Tests performed on bulk samples indicated that specific gravity ranged from 2.02 to 2.04; bulk dry density ranged from 69.3 to 74.5 lbs per cu ft; and permeability ranged from 2.05 to 2.49 X 10^{-3} centimeters per second. The pumice is suitable for abrasives, light weight concrete and for other related uses. The Gunter Canyon deposits have a high potential for additional pumice resources.
109	Unknown (7, 6, 34)	Interbedded shale and sandstone are cut by 2- to 3-ft-thick iron-oxide-stained quartz veins with carbonate-filled boxworks, and a shear zone that strikes N. 32-53° W. and dips 40-to 50° NE.	Two bulldozer trenches, 25 and and 200 ft long, and five pits.	Three of four chip samples of quartz contained 0.03 to 0.04 oz gold per ton and 0.2 to 0.4 oz silver per ton. Nine grab and select quartz samples ranged from 0.02 to 0.4 oz gold per ton and 0.1 to 0.5 oz silver per ton.
110	Unknown (13/24, 6, 34)	Fractured slate and hornfels contain siderite veinlets and vuggy, iron-oxide- and chrysocolla-stained quartz veins up to 5 ft thick.	One 135-ft-long adit, two shallow shafts, five pits, and several bulldozer trenches.	One grab sample of slate, hornfels, and quartz contained 0.02 oz gold per ton. Fifteen other samples contained 0.2 to 0.8 oz silver per ton. One select sample of slate contained 0.09 percent copper.
111	Unknown (18, 6, 34)	Iron-oxide-stained, vuggy, fractured quartz veinlets in slate.	One 30 ft long trench.	No significant values in two samples.
112	Silver Canyon area prospects	North trending quartz veins, veinlets, and pods up to 3 ft thick, and dikes of aplite and diabase are associated with faults in shale and dolomite. Some of the quartz was stained with malachite and chrysocolla.	Three adits up to 22 ft long, one 17-ft deep shaft, one 22 ft long trench, and seven pits.	Nineteen chip, random chip, select, and grab samples were collected from fault zones and quartz veins. Four chip samples contained 0.4 oz silver per ton; two of these also had 0.01 percent copper and 0.45 percent lead. Another chip sample had 0.02 percent copper.
113	Unknown (21, 6, 34)	A 9-in.-thick discontinuous barite vein strikes N. 15° E., dips 43° NW., and is exposed for 200 ft. Minor amounts of pyrite, chalcopyrite, and malachite stain occurs with the barite. A 1.7-ft-thick zone of iron-oxide-stained, silicified argillite with minor quartz veins also occurs.	One caved adit, one 19-ft-long trench, and two small pits.	Six samples were collected from barite and quartz veins. One chip sample of argillite and quartz vein contained 0.04 oz gold per ton, 1.2 oz silver per ton, and 0.03 percent copper. Two chip samples of barite contained 63 and 88 percent $BaSO_4$.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
114 **	Rogers Limestone Deposit	Limestone strata are abundant in the southern end of the range. Quartz veins, as long as 48 ft and 1.2 to 4.8 ft thick, occur along northeast- to northwest-trending faults in shale and limestone. Chalcopyrite is disseminated and in patches in quartz veins.	Two adits, 35 and 7 ft long, one 19-ft-deep shaft, and a 61-ft long trench. Before 1926, an unspecified amount of reported high-purity limestone was processed into carbon dioxide at soda plants near Owens Lake (Logan, 1947, p. 245).	Two of the six chip and one select samples, mostly from quartz veins, contained 0.31 and 0.79 percent copper. A sample of limestone contained 50.0 percent CaO, 4.5 percent SiO_2, 1.42 percent Fe_2O_3, 1.59 percent MgO, and 0.92 percent Al_2O_3. The limestone analysis does not indicate high purity (Bowen and others, 1973, p. 15). There is moderate potential for limestone resources.
115 **	Unknown (3, 5, 36)	A steeply-dipping, 7-ft-thick shear zone, bordered by two quartz veins up to 3 in. thick, strikes northerly in quartz monzonite.	One 40-ft-long adit.	One of three chip samples contained 0.4 oz silver per ton.
116	Wedge Nos. 1-8	A 0.6-ft- and a 1.4 ft thick quartz vein are in biotite quartz monzonite. The thicker vein is nearly vertical, strikes N. 70° W., and is exposed for about 175 ft.	Three trenches and two pits.	Six samples were collected. One chip sample of quartz contained 0.02 oz gold per ton; another assayed 0.4 oz silver per ton.
117	Hardluck Nos. 1-4	Chalcopyrite- and pyrite-bearing quartz veins and pods in granitic rocks are up to 1 ft thick. The veins trend north-northwest and dip northeast.	Two trenches and seven pits.	Three chip samples of quartz and granitic rock contained a trace to 0.02 oz gold per ton and a trace to 0.4 oz silver per ton. Three grab samples of stockpiled quartz and granitic rock had as much as 0.08 oz gold per ton and 1.4 oz silver per ton.
118	Zisiszit	Discontinuous quartz veins up to 2.5 in. thick occupy shear zones in biotite quartz monzonite. Veins are locally malachite stained, and contain small blebs of pyrite, chalcopyrite, and galena. Veins and shear zones strike N. 86° E. and dip 18-37° SE.	Two adits, 12 and 200 ft long, and one pit.	Four of nine chip samples contained 0.02 to 0.28 oz gold per ton; three of these contained 0.2 to 0.4 oz silver per ton. One grab sample from a stockpile of quartz contained 0.38 oz gold per ton, 0.6 oz silver per ton, 0.10 percent copper, and 2.30 percent lead. One grab sample of quartz contained 0.02 oz gold per ton. Most samples had traces of lead. A low potential for gold resources exists.
119	Iron Cap	A 5-ft-thick siliceous, limonite- and malachite-stained shear zone strikes north and dips 60° east in porphyritic quartz diorite. A stockpile contains vein quartz.	One 25-ft-deep shaft.	One select sample from the stockpile contained 0.80 oz gold per ton, 1.2 oz silver per ton, and 0.26 percent copper. Two chip samples of the shear zone contained no significant values.
120	Unknown (15, 5, 36)	Thin shears and joints occur in iron-oxide-stained fine-grained biotite-hornblende-quartz monzonite. Malachite- and limonite-stained vein quartz with boxworks was found in a stockpile but not in place.	One 26-ft long adit, two caved adits, and two pits.	One chip sample of a shear zone contained 0.05 oz gold per ton. One random chip sample of fractured quartz monzonite contained 0.19 oz gold and 0.4 oz silver per ton. Four grab or select samples from stockpiles contained up to 0.47 oz gold and 0.4 oz silver per ton. The select sample also contained 0.10 percent copper. A low potential for gold resources exists.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
121	Double Surprise	A 0.3-ft-thick quartz vein strikes north and dips 10-21° east in quartz monzonite. The vein extends 40 ft down dip to a fault and may persist 400 ft along strike. It consists of quartz with limonite, galena, and oxidized pyrite.	Two adits with a total of 430 ft of workings, and two caved adits.	The vein is estimated to contain 400 tons averaging 0.18 oz gold per ton. Five of 11 samples from the vein contained 0.02 to 3.4 oz silver per ton, and ten contained 0.08 to 24.0 percent lead. The property has a low potential for gold-silver-lead resources.
122	Unknown (20, 5, 36)	Porphyritic quartz monzonite hosts a 3-ft-thick, iron-oxide-stained shear zone which strikes N. 60° E., dips 57° NW., and contains gouge and quartz stringers.	One 32-ft-long adit and one pit.	Two chip samples from the shear zone contained 0.4 and 0.2 oz silver per ton; one had 0.01 oz gold per ton. A grab sample contained 0.05 oz gold per ton and 0.6 oz silver per ton.
123	Golden Skyline	Two northwest-trending quartz veins, 1 to 2 ft thick, are in sheared contact with altered granite. The veins are not exposed for more than 2 ft.	One caved adit, one 50-ft-long trench, and one small pit.	Two select samples of stockpiled quartz contained 0.01 and 0.06 oz gold per ton. Two grab samples of quartz from a dump contained 0.50 and 0.46 oz gold per ton. One chip sample across the shear zone and quartz vein had no significant values. This property has a low potential for gold resources.
124	Gold Mine in the Sky	Iron stained, fractured quartz stringers occur in massive, blocky quartz monzonite. Quartz was not found in place.	Two trenches and one pit.	Of four grab samples from dumps, three contained from trace to 0.03 oz gold per ton. A select sample of quartz from a stockpile contained 0.75 oz gold per ton.
125	Unknown (34, 5, 36)	A five-ft-thick iron-oxide-stained, fractured, massive quartz vein is exposed for 200 ft in sheared and altered granite. The vein strikes east and dips steeply to the north.	One 200-ft-long adit.	Six samples of quartz and one of granite contained no significant values.
126	Cold Springs (placer)	Alluvium in a narrow stream drainage is comprised of medium to coarse subangular sand with a few layers and lenses of subrounded pebbles.	One 30-ft-long trench.	Two 14-in. pan samples contained no gold or other economic mineral values.
127	Crooked Creek Placers	Gold-bearing alluvium along a 2-mi-long, 3,200-ft-wide early (?) Tertiary stream channel was deposited on granite bedrock and capped by Tertiary basalt flows. The alluvium, as thick as 200 ft, is well indurated and contains clay and secondary calcite. The gold consists of very small particles.	A "T" shaped adit 450 ft long is in the upper section of gravel. Surface workings include 15 trenches and nine widely spaced pits. About 500 ft east of the adit a bench cut was developed and mined. A 60 cu yd per day gravity concentrating plant operated there in 1981. The production is unrecorded, and assumed small.	Thirty-two of the 35 channel and bulk samples collected from workings contained from 0.4 to 180.8 mg, but averaged 10 mg gold per cu yd. Based on $400 per oz gold, the upper strata contains about 13 cents gold per cu yd, with no other mineral values. Greater concentrations of gold are likely to be found at or near bedrock. Too few exposures of the lower gravel interval precludes a resource estimate. The alluvium has a low potential for placer gold resources.

Table 4.--Summary of mines and prospects in the White Mountains RARE II area--Continued

Property number (pl. 1)	Name	Summary	Workings and production	Resource/sample data
128	Ridge Runner Nos. 1-5	The country rock is massive, jointed, quartz monzonite. Several fissure veins and irregular masses of quartz outcrop in an area 1,500 ft by 800 ft. Most of the veins are 0.5 to 2 ft thick and less than 20 ft long; the largest mass is 5 ft by 8 ft. Some of the quartz contains streaks and masses of white to honey colored scheelite. The largest mass observed was 2 in by 6 in. Some of the quartz also contains minor amounts of finely disseminated cubic galena. There are approximately 10 tons of 1 to 2 percent scheelite in scattered stockpiles. This is a visual estimate, determined with an ultraviolet light. Hand sorting could produce 10 to 20 tons of direct shipping ore.	Eight trenches and eight pits.	Of three chip samples of quartz; two contained a trace and 0.02 oz gold per ton, 0.4 and 1.0 oz silver per ton. Of 18 grab samples of vein quartz, three had traces of gold, 1.0 to 4.0 oz silver per ton, and 0.02 to 0.11 percent lead. Tungsten assays do not confirm estimates determined by fluorescence under ultraviolet light. Daylight sampling apparently missed areas with tungsten content. The property has a low potential for tungsten-silver resources.
129	Unknown (9/11, 6, 36)	Iron-oxide-stained granitic rocks, decomposed locally, and a roof pendant of alternating beds of shale and sandstone hosts a poorly exposed, east-trending quartz vein system for about 2.3 mi. The fractured vuggy quartz veins are as thick as 5 ft and contain pyrite, pyrolusite, galena, chlorite, and malachite and limonite stain.	Twenty-two pits.	Sixteen select samples of quartz contained from 0.01 to 0.06 oz gold per ton. Of these, ten had 1.2 to 5.2 oz silver per ton and six had 0.1 to 0.8 oz silver per ton. Seven grab samples of quartz contained up to 0.014 oz gold per ton and 1.0 oz silver per ton. Only eight samples contained lead, ranging from 0.3 to 0.80 percent. A low potential for silver-gold resources exists.
130 *	Unknown (2, 6, 36)	Galena and pyrite in a 0.6- to 2.5-ft-thick quartz vein, which strikes N. 35° E., and dips gently east in granite. The vein is disrupted by folding, and by normal faults which generally strike northwest and dip southwest.	The main working is a 380-ft-long adit, including a 21-ft-deep winze and about 40 ft of sublevel drift. Other workings include two inclined shafts with 64 ft of drift, one caved inclined shaft, one trench, and three pits.	There are 8,300 tons of indicated and inferred subeconomic resources with a weighted average of 0.12 oz gold per ton, 0.37 oz silver per ton, and 1.4 percent lead. Forty-one of the 49 samples collected were chip samples. The potential for additional gold-silver-lead resources is high.
131	High Bar	A 0.5- to 6-in.-thick galena-bearing, hematite-stained quartz vein strikes N. 73° W., dips 78° NE. and is exposed for 58 ft in hornblende-biotite quartz diorite.	A 24-ft deep shaft with a 58-ft long drift.	Two chip samples of quartz contained 0.6 and 3.6 oz silver per ton, 1.2 and 23.0 percent lead, and a trace gold. One select sample of quartz from the dump contained 5.4 oz per ton silver, 11.5 percent lead, and a trace gold. The potential for silver-lead resources is low.

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NUMERICAL LIST OF MINES AND PROSPECTS

1 Buckley Nos. 1-6
2 Double Lucky
3 Wall Door
4 Orchard Spring Prospect
5 White Cloud No. 1
6 Apex-Fawn
7 Blue Type No. 1
8 Queen Canyon Mine (Overlay Nos. 7 and 10)
9 Buffalo Canyon Prospect
10 Overlay No. 9
11 Unknown (4,1,33)
12 Ruth E.
13 Cinna-Belt Nos. 1 and 2
14 Canyon Nos. 1-12
15 Unknown (13,1,33)
16 Golden Star No. 1
17 Unknown (18,1,34)
18 White Rock
19 Picture Rock
20 Montana Nos. 1 and 2
21 Allen
22 Middle Creek area prospects
23 Silver King
24 Silver Button
25 Silver Mule
26 Bristlecone
27 Silver Pile
28 Silver Tiger - S and J Nos. 1-6
29 Black Warrior Mine area
30 Unknown (24,1,32)
31 Russell Nos. 1-17
32 Unknown (23,1,32)
33 Neptune, Phenix, and Creekside Quartz Mine
34 Silver Piñon
35 Unknown (35,1,32)
36 Unknown (7,2,34)
37 Argentite Maid
38 Mollini Mine (Good Willie Nos. 1-4)
39 Green Monster Mine
40 Silver Consolidated Mining Claims
41 Evergreen Mine (C and C)
42 Out of Sight
43 Calvada
44 Claw Nos. 1-3
45 Mountain View and Proctor Mine
46 Copper Queen Nos. 1-3
47 Birch Creek area prospects
48 Stairway Copper Nos. 1-16
49 Little Dipper Group
50 Unknown (21,3,34)
51 Heine B. Nos. 1 and 2
52 New York No. 1 - Mono No. 1
53 Pacific Mine
54 Unknown (10,4,33)
55 Champion Mine
56 Bobbie D. Lode
57 Harrington
58 White Phantom
59 Inspiration
60 Churchill Iron Deposit
61 Colton Mine
62 Copper Queen Mine
63 Little Blue Group
64 Copper King Nos. 1 and 2
65 Green Rock
66 Mono Copper Nos. 1 and 2
67 White Mountain Copper Nos. 1 and 2
68 Straight Canyon area prospects
69 Unknown (30,4,34)
70 Bismuthite Gold
71 Iron Bell
72 Eva Belle Mine
73 Mohawk
74 G. B. and S. Mining and Milling Nos. 1-6
75 Sacramento Canyon Pumice Deposit
76 Unknown (2,5,33)
77 Sacramento Mine
78 Sacramento Canyon area prospects
79 Ora Vista Group area prospects
80 Sacramento No. 2
81 Hanna No. 1
82 Chalfant Valley Claim
83 Ray Tom Group
84 Comstock Pumice Deposit (Piute Mine)
85 Moulas Mine Group
86 Monoco Mine
87 Z and S Mine (Tramway Z and S Mine)
88 Unknown (18,5,34)
89 Unknown (18,5,34)
90 Robin (Longwalk)
91 Unknown (13,5,34)
92 Leota
93 Golden Siren (Gladys)
94 Campito Mountain Prospect
95 Climax
96 Twenty Grand Mine
97 Moon Group area prospects
98 Keystone
99 Joyce and Mark
100 Hobo Nos. 1-8
101 Saratoga, Lexington, and Ranger
102 Southern Belle Mine
103 Bullion
104 Pine Flat Barite
105 Ira O. Clark
106 Gunter Canyon Barite Mine
107 Silver Hill
108 Gunter Canyon area pumice deposits
109 Unknown (7,6,34)
110 Unknown (13/24,6,34)
111 Unknown (18,6,34)
112 Silver Canyon area prospects
113 Unknown (21,6,34)
114 Rogers Limestone Deposit
115 Unknown (3,5,36)
116 Wedge Nos. 1-8
117 Hardluck Nos. 1-4
118 Zisiszit
119 Iron Cap
120 Unknown (15,5,36)
121 Double Surprise
122 Unknown (20,5,36)
123 Golden Skyline
124 Gold Mine in the Sky
125 Unknown (34,5,36)
126 Cold Springs (placer)
127 Crooked Creek placers
128 Ridge Runner Nos. 1-5
129 Unknown (9/11,6,36)
130 Unknown (2,6,36)
131 High Bar

Plate 1.—Mines, prospects, and mineralized areas in and adjacent to the White Mountains RARE II area.