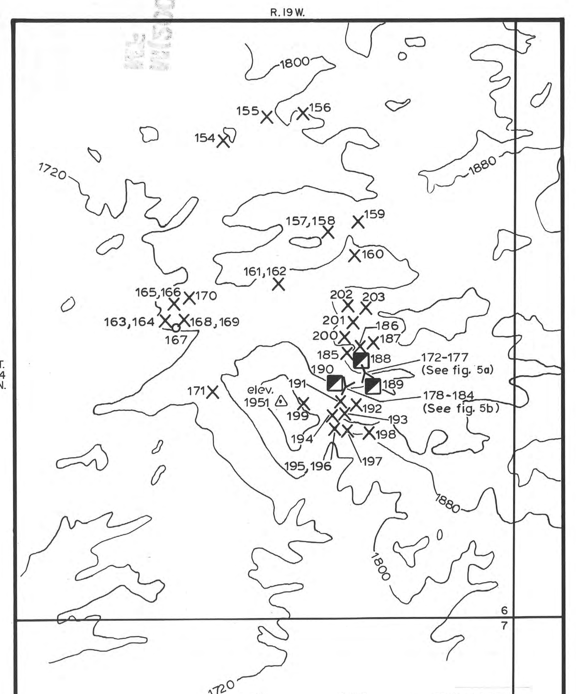


Figure 4.--Sample localities in the Wing mine area.

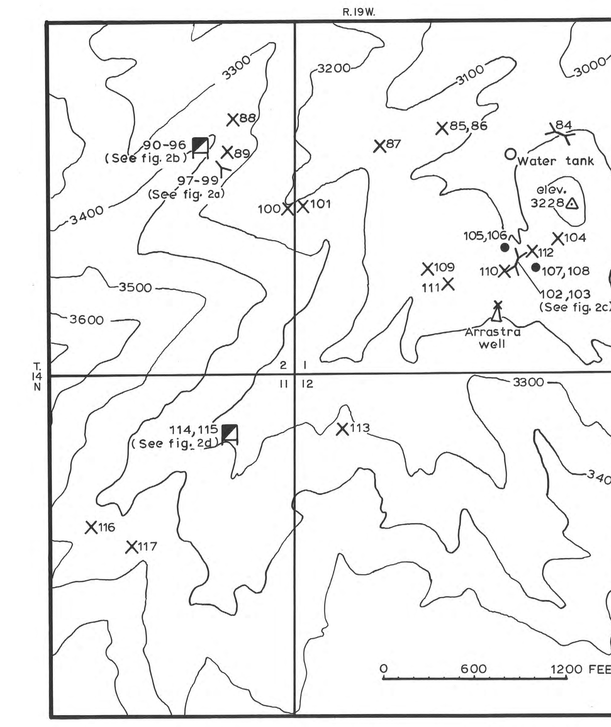


Figure 1.--Sample localities in the Arrastra Well area.

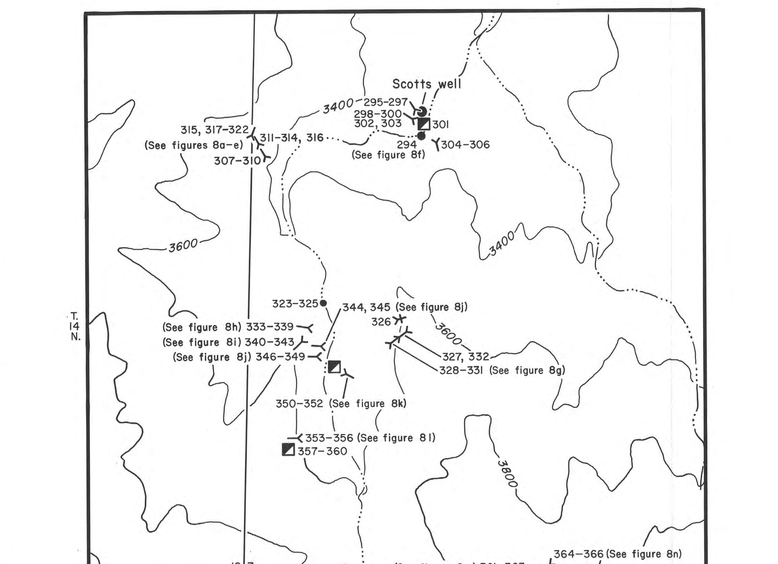


Figure 7.--Sample localities in the Scotts Well area.

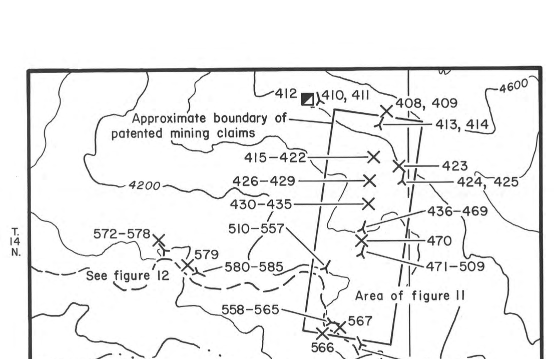


Figure 10.--Sample localities in the Sunrise mine area.

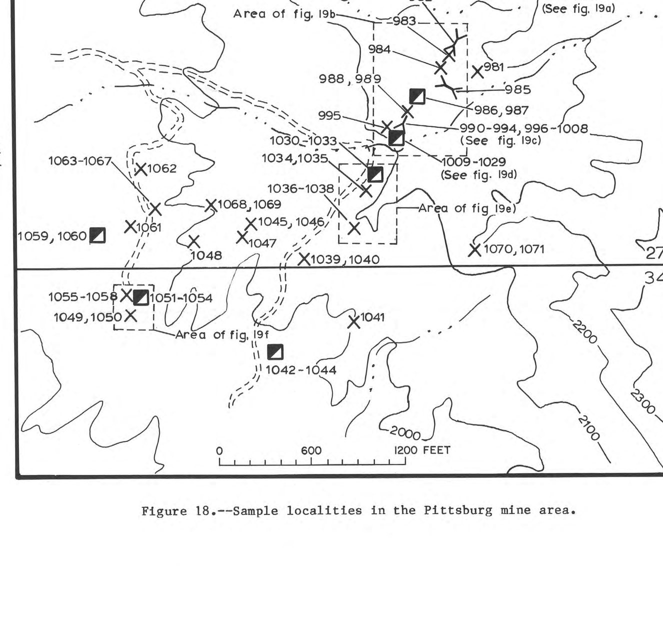


Figure 18.--Sample localities in the Pittsburg mine area.

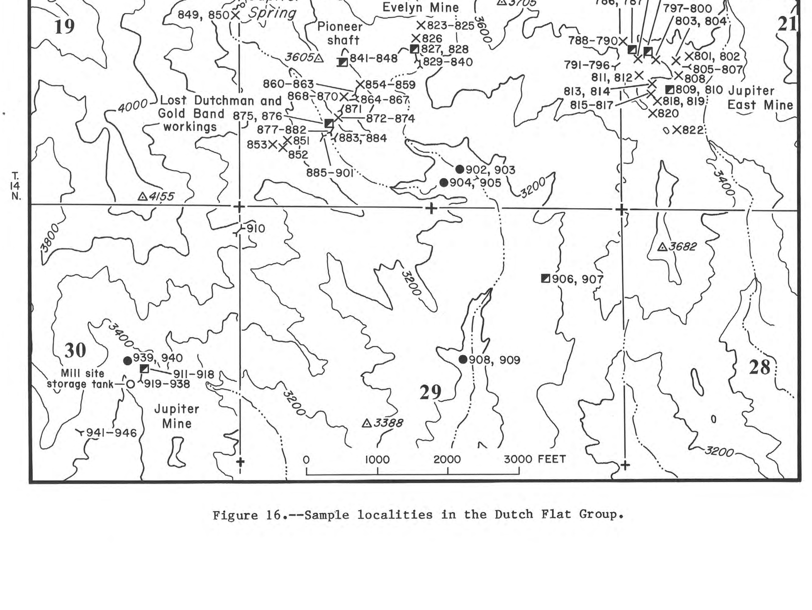
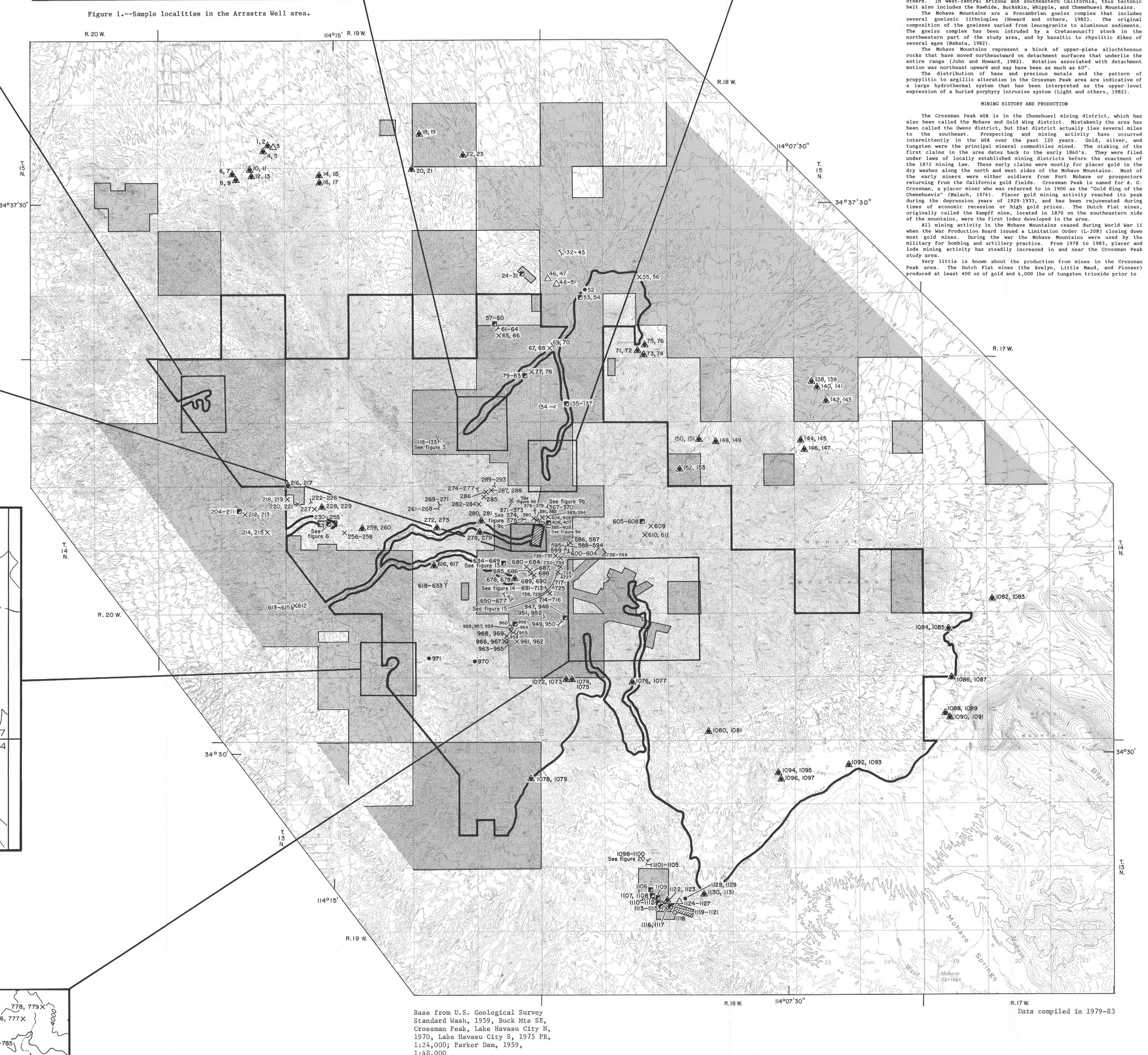


Figure 16.--Sample localities in the Dutch Flat Group.



Base from U.S. Geological Survey Standard Wash, 1959, Buck Mts SE, Crossman Peak, Lake Havasu City N, 1970, Lake Havasu City S, 1975 PR, 1:24,000; Parker Dam, 1959, 1:48,000

Data compiled in 1979-83

LOCATION OF STUDY AREA

SCALE 1:48 000

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

EXPLANATION

- APPROXIMATE BOUNDARY OF CROSSMAN PEAK WILDERNESS STUDY AREA
- PATENTED MINING CLAIM
- UNPATENTED MINING CLAIM
- SAMPLE LOCALITY--Showing sample number
  - 118 Outcrop
  - 970 Bulk-grab stream sediment
  - 1127 Panned-concentrate stream sediment
  - 1, 2 Bulk-grab and panned-concentrate stream sediment
- SURFACE OPENINGS--Showing sample locality number; symbol may represent more than one working
  - 24 Shaft
  - 974 Inclined shaft
  - 1041 Prospect pit
  - 84 Trench
  - 134 Adit

MINE AND PROSPECT MAP OF THE CROSSMAN PEAK WILDERNESS STUDY AREA, MOHAVE COUNTY, ARIZONA

By
Thomas D. Light, U. S. Geological Survey
and
John R. McDonnell Jr., U. S. Bureau of Mines
1987

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STUDIES RELATED TO WILDERNESS
Bureau of Land Management Wilderness Study Areas

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and the U.S. Bureau of Mines to conduct mineral surveys on certain areas to determine the mineral values, if any, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a survey of the mines and prospects of the Crossman Peak Wilderness Study Area (AZ-050-007B), Mohave County, Ariz.

INTRODUCTION

The Crossman Peak Wilderness Study Area is 5 to 10 mi northeast of Lake Havasu City in southwestern Mohave County, Arizona. The study area encompasses 38,000 acres of rugged mountainous terrain in the Mohave Mountains. The area is readily accessible via State Highway 95 from the west and from several dirt roads that surround the Mohave Mountains.

From 1979 to 1982, the Bureau of Mines and the U.S. Geological Survey conducted field investigations to determine the mineral resources of the Crossman Peak Wilderness Study Area (WSA). Field studies included geological mapping, geochemical sampling, geophysical surveys, and a survey of mines, prospects, and mineralized areas. The results of these studies were presented in the mineral resource assessment of the Crossman Peak WSA by Light and others (1983). This map supplements the mineral resource assessment and presents detailed information concerning the mines, prospects, mining claims, and mineralized areas studied by the Bureau of Mines. Locations of mine workings, prospects, mineral occurrences, sample numbers, and a brief description of each are presented in table 1.

Records in the Mohave County courthouse in Kingman, Arizona, were searched for mining claim location notices and the Bureau of Land Management State Office in Phoenix, Arizona, was checked for records of patented claims and mineral leases. Claims that could be plotted accurately from location notices, in and around the WSA, are shown on this map. Many recorded claims were not plotted because of vague descriptions as to their locations and positions.

Field investigations by Bureau of Mines personnel focused on mine workings, prospects, and mineral occurrences. Areas of reported mining claims were examined and sampled when workings or mineralized rock was present. A total of 1,131 samples, including chip, select, stream-sediment, and panned concentrates was taken. Analytical data for samples containing high concentrations of gold, silver, copper, lead, or zinc are shown in table 2. Table 3 lists samples containing more than 0.10 percent tungsten. Detailed sample descriptions and analytical data for all samples are given by Light and McDonnell (1983) and are available for inspection at the Bureau of Mines, Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

Resource estimates were calculated for the larger deposits within and adjacent to the WSA. They show indicated or inferred resources of gold, silver, or tungsten. Estimates for the individual deposits were determined from detailed surveys of the workings. For resource calculations one-half of the measured length of mineralization was taken as its depth extent. The assays of all samples across the width of a mineralized structure were weighted with respect to the sample length, and all samples, including those which were not mineralized, were used to calculate the average grade (Light and McDonnell, 1983).

Geologic setting

The Mohave Mountains lie near the northwest end of a northwest-trending belt of metamorphic core complexes and detachment terranes as described by Rehrig and Reynolds (1980), Davis (1980), and Frost and Martin (1982), and others. In west-central Arizona and southeastern California, this tectonic belt also includes the Rawhide, Buckskin, Whipple, and Chemehuevi Mountains.

The Mohave Mountains are a Precambrian gneiss complex that includes several gneissic lithologies (Howard and others, 1982). The original composition of the gneisses varied from leucogranite to aluminous sediments. The gneiss complex has been intruded by a Cretaceous(?) stock in the northwestern part of the study area, and by basaltic to rhyolitic dikes of several ages (Nakata, 1982).

The Mohave Mountains represent a block of upper-plate allochthonous rocks that have moved northeastward on detachment surfaces that underlie the entire range (John and Howard, 1982). Rotation associated with detachment motion was northeast upward and may have been as much as 60°.

The distribution of base and precious metals and the pattern of propylitic to argillic alteration in the Crossman Peak area are indicative of a large hydrothermal system that has been interpreted as the upper-level expression of a buried porphyry intrusive system (Light and others, 1982).

MINING HISTORY AND PRODUCTION

The Crossman Peak WSA is in the Chemehuevi mining district, which has also been called the Mohave and Gold Wing district. Mistakenly the area has been called the Owens district, but that district actually lies several miles to the southeast. Prospecting and mining activity have occurred intermittently in the WSA over the past 120 years. Gold, silver, and tungsten were the principal mineral commodities mined. The staking of the first claims in the area dates back to the early 1860's. They were filed under laws of locally established mining districts before the enactment of the 1872 mining law. These early claims were mostly for placer gold in the dry washes along the north and west sides of the Mohave Mountains. Most of the early miners were either soldiers from Fort Mohave or prospectors returning from the California gold fields. Crossman Peak is named for A. C. Crossman, a placer miner who was referred to in 1900 as the "Gold King of the Chemehuevis" (Malach, 1974). Placer gold mining activity reached its peak during the depression years of 1929-1933, and has been rejuvenated during times of economic recession or high gold prices. The Dutch Flat mines, originally called the Kampff mine, located in 1870 on the southeastern side of the mountains, were the first lodes developed in the area.

All mining activity in the Mohave Mountains ceased during World War II when the War Production Board issued a Limitation Order (L-208) closing down most gold mines. During the war the Mohave Mountains were used by the military for bombing and artillery practice. From 1978 to 1983, placer and lode mining activity has steadily increased in and near the Crossman Peak study area.

Very little is known about the production from mines in the Crossman Peak area. The Dutch Flat mines (the Evelyn, Little Maud, and Pioneer) produced at least 400 oz of gold and 6,000 lbs of tungsten trioxide prior to 1959 (Dale, 1961). Although the value of production from the Pittsburg (Mohawk) mine is not known, the mine is reported to have shipped some ore averaging 126 oz silver per ton and 6.5 oz gold per ton (Arizona Department of Mineral Resources, file data). The J & J (Golden Gate) mine was reported to have produced ore averaging 1 oz gold per ton in 1934 (Malach, 1977). Other workings that probably had some production include the Sunrise, Scotts Well, Arrastra Well, Green Feather, Wing, Osiris, and Manitowoc, and mines in the Dutch Flat group.

MINES, PROSPECTS, AND MINERALIZED AREAS

Lode deposits containing gold, silver, and tungsten occur in northeast- to northwest-trending quartz veins and along faults in the Precambrian gneiss complex that forms the central part of the Mohave Mountains. Mineralized rock in these veins has been explored by prospect pits, shafts, and adits as long as several hundred feet. Many of the workings, however, had no recorded mining history and were not extensive enough to have produced more than a few tons of high-grade ore. Fifteen deposits had sufficient field and sample data to support resource calculations (table 1). These are the Arrastra Well, Green Feather, Scotts Well, Sunrise, Ra, Little Maud, Evelyn, Lost Dutchman, Pittsburg, and six unnamed prospects.

Buzzy Tail shaft

The Buzzy Tail (or Mohave Chief) shaft is about 1/3 mi north of the WSA boundary, along the north flank of the Mohave Mountains in SE1/4 sec. 25, T. 15 N., R. 19 W., at an elevation of 2,260 ft. The shaft was dug originally by Don Barron and others as the Mohave Chief, but was later renamed the Buzzy Tail. The shaft is nearly vertical for 15 ft, then declines 50°, at a bearing of S. 15° W., to a depth of 75 ft. It follows a northeast-striking, irregularly-dipping 4- to 33-in.-wide quartz vein in a fault zone in highly fractured and slightly altered Precambrian gneiss. The vein contains abundant limonitic and hematitic staining as well as boxwork textures indicating leached iron-bearing sulfide mineralization. Minor amounts of bornite and secondary copper staining were observed in some samples. Samples 24-31, collected from the Buzzy Tail shaft and dump, contained as much as 0.5 oz silver and 0.016 oz gold per ton (Light and McDonnell, 1983). Field observations indicate that several tens of tons of ore containing high grade gold may have been produced from this shaft.

Quail Placers

The Quail Placers comprise numerous pits and trenches dug on placer gold claims in secs. 29-32, T. 15 N., R. 18 W., along the north flank of the Mohave Mountains. Most of the workings are near the center of sec. 30 and are readily accessible via dirt roads along the northern boundary of the WSA.

Locally, piles of sorted gravel along drainages suggest that the area has been worked previously by dry washer techniques (Malach, 1977), perhaps during the 1930's depression. In 1980, the deposit was staked by John Pasak and associates. They explored the small drainages by dry washer techniques to define the areas of highest gold concentration. Several ounces of small flaky gold and several small nuggets, as large as 1/4 oz, have been recovered. In 1982, a backhoe was used to cut trenches and test pits to determine the reserves for establishing a several-hundred-ton-per-day pilot plant.

Panned concentrates, samples 32-51 from the Quail Placers each represent approximately 1/3 yd of stream gravels. Several samples contained 1 to 1 1/4 grains of visible gold (480 grains equal 1 ounce). The gold flakes, ranging from 0.02 to 0.10 in. in diameter, were separated by hand and the remainder of the heavy-mineral concentrate was fire assayed for gold content. Even after the removal of the visible gold, samples from the Quail Placers contained as much as 1.33 oz gold per ton (table 2), suggesting that much of the gold may be in fine particles or tied up with the heavy minerals.

Numerous placers, similar to the Quail Placers, exist along drainages throughout the WSA. These deposits have been worked intermittently at a small scale for the past 120 years and will probably continue to serve as a source for minor amounts of placer gold.

Arrastra Well area

The Arrastra Well area (fig. 1) is near the head of Arrastra Canyon in the SW1/4 sec. 1, SE1/4 sec. 2, NE1/4 sec. 11, and NW1/4 sec. 12, T. 14 N., R. 19 W. This area gets its name from an old arrastra that was reportedly used to crush ore from the lode mines.

There are no production records and it is not known who worked the lode deposits. In 1923, however, Al Knowland had a camp in Moon Wash at the fork to Arrastra Well, and reportedly worked several placer claims in the drainages (R. Eaton, oral communication, Yucca, Arizona, 1980). Significant production of placer gold from this area also occurred during the early 1930's (D. Barron, oral communication, Yucca, Arizona, 1980).

Lode production from the Arrastra Well area may have come from an adit and a decline in SE1/4 sec. 2 on the ridge approximately 1/4 mi northwest of Arrastra Well. The adit was driven 75 ft northwestward along a quartz vein in Precambrian garnetiferous gneiss (fig. 2a). The quartz vein, emplaced along a small fault, has minor gouge, abundant limonite, and minor copper carbonate staining. The decline was sunk at 36° to a depth of 75 ft, then drifts were driven 35 ft northwestward and 50 ft southeastward along the fault and quartz vein (fig. 2b). Samples 90-99 from the adit and the decline contained as much as 0.6 oz silver per ton, 0.328 oz gold per ton, 0.50 percent zinc (table 2), 0.25 percent tungsten trioxide (table 3), and minor copper and lead. Field observations and sample analyses indicate that several hundred tons of high-grade ore may have been produced from these workings.

Adjacent to Arrastra Well are numerous prospect pits and a 50-ft-long trench (fig. 2c) cut along a shear zone in Precambrian garnetiferous gneiss. An irregular quartz vein, as wide as 3 ft, is present in the shear zone. Locally the vein contains concentrations of galena, sphalerite, and pyrite, often accompanied by minor copper staining. Southwest of Arrastra Well is a 20-ft-deep shaft, inclined 34°, along a northwest-trending fault and quartz vein (fig. 2d).

Samples 84-117, collected from the Arrastra Well area, contained as much as 1.9 oz silver per ton, 0.328 oz gold per ton, 0.95 percent lead, 2.2 percent zinc, and minor copper (table 2). Calculated inferred resources are approximately 350 tons containing an average of 0.21 oz gold per ton and 0.32 oz silver per ton.

Green Feather mine

The Green Feather mine, of the Green Feather Mining Co., is at an elevation of about 4,000 ft near the crest of a ridge, about 1/2 mi southwest of Arrastra Well, in the NW1/4 sec. 11, T. 14 N., R. 19 W. The company built a steep road to the claims, and did most of the development work. Records of how much ore was produced from the property were not found. Workings at the mine include an adit with 150 ft of drift, a 35-ft-deep shaft inclined at 44° (fig. 3), and several prospect pits. The workings are in a gently-dipping, northwest-trending quartz vein containing abundant limonite and minor malachite and galena. Samples 118-133 were collected from the Green Feather mine. Sample 125, a 16-in.-long chip sample across the quartz vein contained 0.407 oz gold per ton (table 2). Field observations and analytical data indicate an estimated 300-400 tons of high grade, gold-bearing ore may have been produced from the mine. Calculations suggest approximately 210 tons of inferred resources containing 0.05 oz gold per ton.

Wing mine

The Wing mine is near the northwest corner of the WSA in SE1/4 sec. 6, T. 14 N., R. 19 W., at an elevation of about 1,800 ft. In 1981, the claims were being worked by Allen and Bobbie Burditt, Lake Havasu City. Some placer gold has been recovered from the claims, but no production records were located for lodes of the Wing mine.

The mine workings include a shaft (now inaccessible), two adits, and numerous prospect pits (fig. 4). The workings are extensive enough to suggest minor production in the past. The shaft is at least 40 ft deep, but the dump has been eroded, making questionable any estimate of the extent of the shaft and workings. The north and south adits are 75 and 55 ft long, respectively (figs. 5a and 5b). Field observations indicate that a few hundred tons of high-grade ore may have been produced from the workings.

The north adit and shaft were driven and sunk on a northwest-trending quartz vein in Precambrian gneiss. The quartz vein has abundant limonite and boxwork textures, and minor remnant crystals of chalcocite, wulfenite, galena, and secondary malachite. Samples 154-203 were collected from the Wing mine area. Sample 174, a 34-in.-long chip across the quartz vein at the portal of the north adit, contained 0.092 oz gold per ton and was the only gold value detected. Sample 198 from a prospect pit southeast of the main workings contained 1.0 oz silver per ton and several other samples contained detectable silver values (table 2).

J & J (Golden Gate) mine

The J & J (originally the Golden Gate) mine is in the western part of the WSA in the SE1/4 sec. 16, T. 14 N., R. 19 W. at an elevation of 2,200 ft. Gold ore from this mine ran 1 oz gold per ton in 1934 (Malach, 1977), but there is no record of the total production. The claims were being prospected in 1981 by Jack Cutting of Lake Havasu City.

Workings of the J & J mine were dug on faults containing irregular and discontinuous quartz veins and lenses. Locally the Precambrian gneiss is highly sheared and altered. Limonite and hematite are abundant; lesser amounts of pyrite, malachite, bornite, chalcocite, and galena are also present. One shaft is at least 40 ft deep and may have a drift at the base. An adit and connecting shaft (figs. 6a and 6b) and winze were the largest accessible workings. The adit comprises 150 ft of the drift; the winze is 130 ft deep.

Samples 230-258 were taken from the J & J workings. Sample 255, a 15-in.-long chip from a trench near the mine contained 0.362 oz gold per ton, 1.6 oz silver per ton, 0.26 percent copper, 0.21 percent lead, and 0.57 percent zinc (table 2). A select sample (number 241) of sulfide-bearing quartz from the dump contained 0.158 oz gold per ton, 9.3 oz silver per ton, 1.64 percent copper, 4.30 percent lead, and 0.57 percent zinc. Field observations and analytical data indicate that the J & J mine may have produced several hundred tons of high-grade ore containing as much as 1 oz gold per ton and several oz silver per ton.

Scotts Well area

The Scotts Well area is near the head of a drainage, locally called Moon Wash, in the W1/2 sec. 7, T. 14 N., R. 18 W. and the E1/2 sec. 12, T. 14 N., R. 19 W. Although there are no production records the area is reported to have had a significant production from both lode and placer deposits. In the early 1930's, Don Barron recovered an 8.5 oz gold nugget from a placer shaft in Moon Wash, near Scotts Well (Don Barron, oral communication, 1980).

Workings in the Scotts Well area consist of 13 adits, ranging from 10 to 130 ft long, and numerous prospect pits and trenches (figs. 7 and 8). Most of the workings were cut on faults or fault zones usually containing quartz veins and lenses. The veins are irregular in thickness and discontinuous along strike. Locally they swell or pinch out, and contain abundant limonite and hematite and some pyrite, galena, malachite, and sphalerite.

Samples 294-366, from the Scotts Well area, contained as much as 4.0 oz silver per ton, 1.702 oz gold per ton, 11.0 percent lead, and minor copper and zinc. Calculations for a group of workings in the western part of the Scotts Well area (fig. 8a-e) revealed approximately 770 tons of inferred resources containing an average of 0.19 oz gold per ton and 0.62 oz silver per ton.

Sunset (Lead Bullet) mine area

The Sunset mine (formerly Lead Bullet) area is in the E1/2 of sec. 13, T. 14 N., R. 19 W., and the W1/2 of sec. 18, T. 14 N., R. 18 W., at 4,500 ft elevation. The Sunset mine is on strike with the fault and vein system that extends through the Scotts Well area.

The Sunset mine area is accessible by trail from the Sunrise mine on the south, or by following Moon Wash to the head of the drainage. There is no record of production from the workings in the Sunset mine area, but field observations and local reports indicate that there may have been some high-grade ore hauled out by mule. In 1981, the Sunset claims were held by Homer Fancher and others, of Bullhead City, Arizona.

Workings in the Sunset mine area include several prospect pits and five adits ranging from 10 to 110 ft in length (fig. 9). Most of the workings are along a north- to northeast-trending mineralized fault zone. Minerals along the quartz vein include abundant limonite, hematite, pyrite, galena, chalcopyrite, and malachite. Samples 367-370 and 374-407 were collected from the Sunset mine area. Sample 387 from a small stockpile of quartz vein material near the main adit of the Sunset workings contained 2.2 oz silver per ton, 2.05 percent lead, and minor gold. Sample 406, cut across a small quartz vein in a 22-ft-deep inclined shaft several hundred feet east of the main workings, contained 0.578 oz gold per ton, 0.6 oz silver per ton, 0.14 percent copper, 1.85 percent lead, and 0.11 percent zinc.

Sunrise mine

The Sunrise mine comprises the largest accessible group of mine workings in the Crossman Peak area (fig. 10). The patented claim is approximately 2,000 ft west of and 700-900 ft below Crossman Peak, in the SE1/4 sec. 13, T. 14 N., R. 19 W. and SW1/4 sec. 8, T. 14 N., R. 18 W., and is completely surrounded by the WSA. Access is by a 4-wheel drive road that follows Falls Springs Wash.

The original claims were located in 1890 and patented in 1900 by Edith Beckner; the mine was operated in 1903 by J. Rogers. The Sunrise mine is reported to have been worked exclusively for gold (Roy Eaton, Yucca, Arizona, oral communication, 1980). Although no records of production were located, the extent of workings indicate that approximately 10,000 tons of ore were mined. Several adits were driven, and numerous pits and trenches were cut on a quartz vein in a fault zone striking N. 10-30° E., and dipping vertical to 65° SE. (fig. 11). The main adits were driven at three levels, each having from 750 to 1,000 ft of workings (fig. 11a-c). Ore chutes, raises, and stopes from the lower level indicate that at least one inaccessible drift was driven from the raises between the lower and middle adits.

A 140-ft-long adit, south of the main workings, was driven into and along a northwest-trending cross fault (fig. 11d). This fault may not be related to the main northeast-trending Sunrise fault/vein system; sample analyses did not reflect mineralized rock in the main workings.

The quartz vein and fault at the Sunrise mine are exposed northeastward, over the ridge extending northwest from Crossman Peak to the Sunset mine. The exposed length of the structure is about 1 1/2 mi. The relationship of the mineralization at the Sunrise, Sunset, and Scotts Well mines is not known. However, the relative positions, consistency of strike of structural features, and similarity of mineralization indicate that they may be related.

Samples 408-571 were from the Sunrise mine area. Of these 164 samples, 101 contained from trace to 2.182 oz gold per ton and 33 contained from 0.2 to 4.0 oz silver per ton. The highest concentrations of other metals in the Sunrise mine area included 8.5 percent lead, 2.50 percent zinc, and 0.20 percent copper. Resources of gold, silver, and lead are present at the Sunrise mine, but claim owners have retained the resource information as confidential.

Two adits, a trench, and two prospects were cut along a northwest trending quartz vein along a fault zone about 1/4 mi west of the main Sunrise workings (fig. 12). The vein contained abundant pyrite and galena. Samples 572-585 were collected from the workings and all contained gold values that ranged from trace amounts to 2.04 oz per ton. Four samples contained from 0.2 to 2.0 oz silver per ton. Two samples also contained 3.50 percent and 2.50 percent lead. Inferred resources of approximately 480 tons containing 0.20 oz gold per ton and 0.18 oz silver per ton were calculated from these samples.

R & R mine

The R & R mine comprises an inclined shaft and a caved adit (fig. 13) in the NW1/4 sec. 24, T. 14 N., R. 19 W., at an elevation of approximately 3,400 ft. The workings are accessible by a 2-mi-long unmaintained dirt road. No production records from the R & R mine were located, however the amount of workings and analytical data suggest that some ore could have been produced.

The 55° inclined shaft is 40 ft deep, has a 15-ft-long drift at 10 ft deep and has 70 ft of drift at the bottom. A 65-ft-long adit was driven southeast, from a site 30 ft southeast of the shaft. The workings intersect a northwest-trending fault zone in Precambrian gneiss. Precious-metal concentrations in samples 634-649 were as much as 1.0 oz silver per ton and 0.063 oz gold per ton.

Osiris (Schoolmarm?) and Ra mines

The Osiris mine (formerly Schoolmarm?) is about 3/4 mi south of Crossman Peak in the SW1/4 sec. 19, T. 14 N., R. 18 W. at 3,900 ft of elevation. The mine location is similar to that described by Malach (1974) as the Schoolmarm mine, and it may be the same mine. Access is from the Falls Springs Wash road by 2 mi of jeep road and 1/2 mi of foot trail.

The history and production records of the Osiris mine are not known, but gold and scheelite, associated with a quartz vein (Wilson, 1941), were reportedly produced by Charles Bly, who ran a stamp mill at the mine (Roy Eaton, oral communication, 1980).

The mine consists of an adit with about 700 ft of workings (fig. 14). The main drift follows a fault zone on or near a contact between Precambrian gneiss and Tertiary diorite and dacite. Although the mine was reportedly worked for gold (Wilson, 1941), no gold values were detected in samples 691-713 collected from the mine. This lack of values would indicate that the gold has been mined out or, if it is associated with the fault or contact as reported, it must be very irregular and discontinuous.

The Ra mine is on the ridge above the Osiris mine, at an elevation of 4,300 ft in the SW1/4 sec. 19, T. 14 N., R. 18 W. and consists of a 90-ft-long adit driven on a north-trending quartz vein that dips westward at 35-52° (fig. 15). An inclined winze was sunk westward along the dip of the vein but is flooded at a depth of 45 ft and its total depth is not known. Samples 717-725 from the Ra mine contained some gold and (or) silver, as well as pyrite, chalcopyrite, galena, and minor sphalerite. Sample 720, an 18-in.-long chip across the sulfide bearing quartz vein, contained 3.2 oz silver per ton, 0.058 oz gold per ton, 1.30 percent copper, 5.6 percent lead, and 0.65 percent zinc. Approximately 490 tons of indicated and 330 tons of inferred resources containing 0.01 oz gold per ton and 0.57 oz silver per ton were calculated. In 1982, both the Osiris and Ra claims were held by Michael Ferdik, Lake Havasu City.

Dutch Flat group

The Dutch Flat group comprises properties in secs. 19, 20, 21, 29, and 30, T. 14 N., R. 18 W., including the Little Maud, Jupiter East, Evelyn, Pioneer, Lost Dutchman, Gold Band, and Jupiter mine workings (fig. 16). Access is by jeep trails from the dirt road in Standard Wash.

The mines were first worked in 1870, and in 1911 produced about 1,500 oz of gold (Malach, 1977). A. V. Kampff worked the properties for gold and tungsten in the 1930's, but during the early 1940's, Kampff leased out the properties. Ore from the various workings was crushed and separated to recover the gold and scheelite. The concentrate was shipped to the Boriana Mining Company mill 60 mi away. By 1942, production from the Dutch Flat properties totaled at least 6,000 lbs of WO_3 and 400 oz of gold (Bishop, 1942).

Mining operations ceased during World War II when the Mohave Mountains were used as an artillery range. In the early 1950's, Sheldon Heath leased the property from Julius Eaton and applied for a tungsten exploration loan from the Defense Minerals Exploration Administration. The loan was denied because of small tonnage and low grade of calculated reserves (Farnham, 1951). In 1959, the claims were owned by Z. Soldinske and L. M. Donnell (Dale, 1961).

Little Maud mine

Three adits at the Little Maud mine were driven on a vein that trends S. 40° W. The adits were driven in east-facing slopes about 3/4 mi south of Crossman Peak in the NE1/4 sec. 19. Adit 1, southwesternmost of the three adits, was driven 220 ft on a fault-bounded quartz vein in Precambrian gneiss (fig. 17a). The vein continues northeast over the next ridge at least 600 ft where adits 2 and 3 were driven. Adit 2 is 125 ft long (fig. 17b) and adit 3 is 75 ft long (fig. 17c). In adits 2 and 3 the vein is dissected by numerous crosscutting diabase and dacite dikes.

Samples 745-769 were collected from adits at the Little Maud mine. Sample 763, a select sample of vein quartz and sulfides taken from a 10-ft-deep winze in adit 2, contained 2.0 oz silver per ton, 0.285 oz gold per ton, 5.30 percent lead, 0.14 percent tungsten trioxide, 2.11 percent zinc, and minor copper. Sample 754, a 6 in.-long chip across a quartz stringer in adit 1, contained abundant limonite staining and minor sulfides. This sample contained 1.0 oz silver per ton, 0.618 oz gold per ton, 0.31 percent lead, and 0.43 percent zinc. Ton and grade calculations show an inferred resource of approximately 5,600 tons containing 0.05 oz gold per ton. Farnham (1951) estimated inferred resources at the Little Maud to be about 100 tons containing 2,000 to 3,000 lbs of tungsten trioxide.

Jupiter East mine

The Jupiter East mine comprises three shafts, two adits, and a dozen or so prospect pits in the SW1/4 sec. 21, T. 14 N., R. 18 W. at an elevation of 3,500 to 3,650 ft. The workings were originally accessible from the Burro Canyon road on the north via a steep jeep trail that climbs up the ridge in sec. 16, T. 14 N., R. 18 W. then turns westward along the crest of the range. A steep road, now just a trail, drops down from the crest in the N1/4 sec. 21 to the workings. The history of this mine is not known, but some production can be inferred from the size of the workings and dumps. These workings are included in the Dutch Flat group, and are herein called the Jupiter East mine, but they may have been worked independently.

The main working is a flooded shaft, at least 100 ft deep. The size of the dump indicates that the shaft is deeper than 100 ft and (or) that drifts may have been driven from the shaft. An inclined shaft was sunk in a drainage east of the main shaft. The incline bears S. 5° W. and dips 37° to a depth of 120 ft (fig. 17d). A third shaft, down the drainage from the inclined shaft, was flooded but the size of its dump indicates that it may also be at least 100 ft deep.

To the southwest of the 120-ft-deep inclined shaft, an adit was driven N. 60° E., to a depth of 165 ft in gneiss (fig. 17e). To the southeast of this shaft, another adit was driven due west for 60 ft through gneiss and diabase to a shear zone in the gneiss (fig. 17f). Analytical data for samples 780-822 from Jupiter East workings showed minor silver in ten samples. Fourteen samples contained trace to 0.005 oz gold per ton, and sample 782 contained 0.536 oz gold per ton and 1.25 percent lead. Copper content exceeded 1 percent in 9 of the 43 samples; the highest value was 7.80 percent in sample 812 taken from a pit northwest of the main shaft.

Evelyn (Gold Crown) mine

The Evelyn mine is in the SW1/4 sec. 20, T. 14 N., R. 18 W., at an elevation of about 3,400 ft. The northeast trending vein was originally called the Gold Crown by A. V. Kampff. The workings were leased to J.E. Smith in the early 1940's (Bishop, 1942).

Mining workings consist of two interconnected adits, an inaccessible 90-ft-deep shaft, and several prospect pits. The main adit on the Evelyn vein is 190 ft long with a 50 ft crosscut. From 20 to 100 ft in from the portal, the back has been stoped up to 35 ft. At 60 ft from the portal a raise breaks through to a 90-ft-long upper level adit (fig. 17g).

Metal content in samples 823-840 from the Evelyn mine was as high as 2.0 oz silver per ton, 0.060 oz gold per ton, 1.16 percent lead, 1.02 percent tungsten trioxide, and 0.29 percent zinc. Field observations and analytical data suggest that approximately 1,500-2,000 tons of ore, with locally high-grade gold and tungsten zones, could have been produced from the Evelyn adits. A resource estimate was not calculated for tungsten at the Evelyn mine because of the discontinuous nature of the tungsten mineralization, and the fact that only a few widely spaced samples contained more than 0.01 percent tungsten. However, Farnham (1951) estimated inferred resources to be approximately 210 tons containing 5,600 lbs of tungsten trioxide.

Pioneer shaft

The Pioneer shaft, approximately 1,000 ft west of the Evelyn mine, is at an elevation of 3,400 ft in the SW1/4 sec. 20, T. 14 N., R. 18 W. The shaft is inclined 30° at a bearing of S. 60° W. It follows a diabase gneiss fault contact for at least 100 ft (fig. 17h). The shaft is flooded below the 90-ft level, and the total depth is not known; Dale (1961) listed it at 135 ft.

Samples 841-848 are from the Pioneer shaft. Sample 842, a select from the most highly mineralized dump material contained 1.4 oz silver per ton, 0.013 oz gold per ton, 0.60 percent lead, 0.08 percent tungsten, and 0.45 percent zinc. Sample 841 contained 0.027 oz gold per ton, which was the highest gold value for the Pioneer shaft. The highest tungsten trioxide value was 0.15 percent in sample 848.

Lost Dutchman and Gold Band workings

The Lost Dutchman and Gold Band workings are southwest of the Evelyn mine in the SW1/4 sec. 20, T. 14 N., R. 18 W. The workings are accessible by an unmaintained 4-wheel-drive road that branches off the road to the Evelyn mine. The locations of workings on the Lost Dutchman and Gold Band claims are shown in figure 17c. The Lost Dutchman comprises three shafts, four adits, and numerous pits and trenches. Shaft 1 is inclined 24° bearing N. 10° E. for 60 ft, then changes to 11° bearing N. 45° W. for 80 ft along a fault (fig. 17j). Shaft 2 is inaccessible. Adit 1 was driven southwest for 25 ft and intersects a quartz vein in gneiss (fig. 17k). Adits 2 and 3 were driven northeast along a quartz vein. Adit 2 (fig. 17i) is 25 ft long and 25 ft above adit 3 (fig. 17m). A 45° inclined shaft in the opencut leading to adit 2, intersects the level of adit 3 approximately 60 ft in from the portal. Adit 3 is caved beyond 70 ft and the extent of the adit is not known. Adit 4 was driven northeast for 45 ft along a fault zone (fig. 17n). The Gold Band adit was driven southwest for 370 ft along a fault zone in gneiss (fig. 17p). The fault is truncated by several north to northwest-trending diorite and dacite dikes. The amount of production from the mine is not known, but field observations suggest that approximately 800 to 1,000 tons of ore may have been produced.

Samples 851-901 were collected from the Lost Dutchman and Gold Band workings. Sample 884, a 2 1/2-ft-long chip at the face, across the vein of Lost Dutchman adit 4 contained 6.2 oz silver per ton. Gold was detected in 30 of the 51 samples, with the highest value being 8.82 oz per ton in sample 880, a 2-ft-long chip from Lost Dutchman adit 3. Other samples contained as much as 0.31 percent zinc, 0.54 percent tungsten trioxide, and 1.35 percent lead. Approximately 140 tons of inferred resources, containing an average of 0.02 oz gold per ton and 0.2 oz silver per ton, have been calculated for the Lost Dutchman adit 1, and 470 tons containing 1.74 oz gold per ton and 0.47 oz silver per ton were calculated for the Lost Dutchman adit 3. The exceptionally high average gold content of the resources in the Lost Dutchman adit 3 are due to one sample that contains 8.82 oz gold per ton and that was projected over an interval of influence of 10 ft. Overall grades for resources from the Lost Dutchman adit 3 would be expected to average considerably less. The occurrence of such a large variation in gold content illustrates the discontinuous nature of the mineralization, and shows that the greatest gold concentrations would occur in high grade pockets in the quartz veins.

Jupiter mine

The Jupiter mine comprises five shafts and an adit in the NE1/4 sec. 30, T. 14 N., R. 18 W., and is accessible from the south via an unmaintained dirt road. The workings (fig. 17q) are all on a series of northeast-trending quartz veins in faults in Precambrian gneiss.

The only accessible working at the Jupiter mine at the time of this study was a 390-ft-long adit, driven along a quartz vein (fig. 17r). The vein and gneiss have been cut by Tertiary dacite. Four of the shafts shown in figure 17q intersect the adit. Some stoping has been done in the back of the adit, which was used as a haulage level for ore stoped from high-grade zones in the quartz vein. The total production from the workings is not known, but approximately 1,000 tons of ore may have been mined.

An adit 1,000 ft southwest of the Jupiter mine may have been driven as part of the Jupiter working (fig. 17s). This adit is at least 100 ft long and has a raise to the surface and a flooded winze. The adit follows a quartz vein for about 80 ft.

Samples 911-946 were collected from the Jupiter mine. Sample 911, from the dump of the upper shaft, contained 2.0 oz silver per ton. Gold was detected in 20 samples with the highest value being 0.168 oz per ton in sample 923, a 9-in.-long chip across a quartz vein in a stope. Sample 941 contained 1.35 percent lead, the only anomalous lead value.

Pittsburg (Mohawk) mine

The Pittsburg (formerly Mohawk) mine is about 3 mi northeast of Lake Havasu City in S1/2 sec. 27, and N1/2 sec. 34, T. 14 N., R. 19 W. along the western boundary of the WSA. The mine is readily accessible via dirt roads from the south and west.

The Pittsburg mine was discovered in 1933 by a Mr. Hutt. During the period from 1933 to 1939 a shaft was sunk 210 ft and several hundred feet of lateral drift were driven. Before the mine shut down in 1939, the ore reportedly had a high silver to gold ratio and ran $15 per ton. (Note: 1939 prices were $35 per oz for gold and $0.90 per oz for silver.) High grade shipments to the smelter contained as much as 126 oz silver per ton and 6.5 oz gold per ton (Arizona Department of Mineral Resources, file data, Phoenix, Arizona). The workings of the Pittsburg mine are currently covered by the Hotspot lode claims.

Mineralization at the Pittsburg mine is concentrated in a northeast-trending fault zone with a discontinuous quartz vein. This zone can be traced for approximately 1/2 mi. Samples 972-1071 collected from the workings along and adjacent to this trend are discussed collectively as the Pittsburg mine (fig. 18).

The northernmost workings along the Pittsburg trend consist of two prospect pits and a 20 ft-deep decline approximately 1,000 ft northeast of the main shaft (fig. 19a). The workings were cut on the northeast trending fault zone in gneiss, diorite, and dacite. Sample 972-980 from these workings contained as much as 4.3 oz silver per ton, 0.180 oz gold per ton, 0.92 percent barium, 0.44 percent copper, 1.35 percent lead, and 1.45 percent zinc. Sample 977 contained 0.008 percent molybdenum.

The main workings of the Pittsburg mine consist of a 210-ft-deep shaft, a 50-ft-long adit, a 100-ft-deep decline, a 56-ft-deep shaft from which drifts of 45 and 60 ft were driven, and several prospect pits (fig. 19b). The 210-ft-deep shaft was inaccessible, but all the other workings were mapped and sampled. The 50-ft-long adit was driven northeast along the fault to where the fault was truncated by a Tertiary dacite dike (fig. 19c). Fifty feet southwest of the portal is the decline and shaft (fig. 19d). The decline extends about 100 ft to the southwest along the fault. The shaft is 56 ft deep and has drifts at 30 and 55 ft that extend northeastward toward the main shaft. Sample 981-1029 taken from these workings contained as much as 52.4 oz silver per ton, 3.75 oz gold per ton, 9.0 percent barium, 1.1 percent copper, 9.0 percent lead, 0.5 percent tungsten trioxide, and 3.1 percent zinc. Resource calculations based on mapping and sampling of the main workings at the Pittsburg mine suggest an inferred resource of approximately 8,000 tons averaging 0.06 oz gold per ton, 3.1 oz silver per ton, 0.8 percent lead, and 0.6 percent zinc.

Southwest of the Pittsburg portal eight prospects have been dug along the trend of the fault (figs. 19e-f). Samples 1030-1067 from these pits contained as much as 1.6 oz silver per ton, 1.457 oz gold per ton, 0.21 percent lead, and 1.12 percent zinc. Resource calculations for these workings show the presence of approximately 1,120 tons of inferred resources containing approximately 0.64 oz silver per ton. If the vein is continuous between the pits, the inferred resources would be approximately 6,300 tons.

El Campo mine

The El Campo mine, near Gold Spring, is in the SE1/4 sec. 8, T. 13 N., R. 18 W., approximately 3/4 mi outside the WSA boundary. The workings are readily accessible via dirt road from Standard Wash.

The El Campo mine was worked during the depression in the early 1930's for placer gold. The underground workings consist of a tunnel and horseshoe-shaped adit, 85 ft long, cut along the contact between a pebble conglomerate and Precambrian granodiorite in a paleochannel (fig. 20). Sample 1105, taken across the contact contained 0.89 oz gold per ton. There is no record of how much gold was produced from the mine. The presence of gold indicates some flakes and small nuggets may have been recovered from the contact.

Approximately 300 ft north of the El Campo adit a 10-ft-long adit has been cut in Tertiary diorite to prospect a small northeast trending fault. Minor copper staining is associated with the fault, but no mineral concentrations were detected in the samples.

Manitowoc mine

The Manitowoc mine property comprises three patented lode mining claims with numerous shafts in SW1/4 sec. 16 and E1/2 sec. 17, T. 13 N., R. 18 W., at an elevation between 1,600 and 1,800 ft. Access to the mine is via the dirt road in Standard Wash. Although the shafts are inaccessible, the size of the dumps indicate that the extent of the underground workings is from several hundreds to several thousands of feet. The amount of ore taken from the mine is unknown, but several hundred to a few thousand tons of ore may have been produced. The claims were patented in 1910 by Casper Taylor, and in 1981 were owned by Mr. K. J. Bartels, Lake Havasu City, Arizona.

Samples 1106-1121 were collected from the Manitowoc mine. Gold was detected in nine samples with the highest value being 0.462 oz per ton in sample 1120, a 26-in.-long chip across quartz monzodiorite fault gouge. Silver was detected in 12 samples with the highest value being 2.2 oz per ton in sample 1114, a dump grab sample. All but one sample contained minor amounts of either lead or zinc.

Miscellaneous workings

Numerous shafts, adits, and prospect pits have been excavated on quartz veins and faults throughout the WSA. No information was available on who worked the properties, when they were worked, or if there was any production. Six of these unnamed prospects had sufficient field and sample data to support resource calculations and are briefly described in table 1. A more detailed description of the workings and complete analytical data for samples from these localities were given by Light and McDonnell (1983).

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Table 1.--Mineral deposits and occurrences in and near the Crossman Peak Wilderness Study Area, Arizona

[Ag, silver; Au, gold; Ba, barium; Cu, copper; Mo, molybdenum; Pb, lead; W, tungsten; Zn, zinc. P, prospect; M, mine; A, active (exploration, development, or production since 1978); I, inactive (no exploration, development, or production since 1978).]

Sample nos.	Name	Location	Commodities	Deposit type	Development category	Description
24-31	Buzzy Tail (Mohave Chief).[1]	SE1/4 sec. 25, T. 15 N., R. 19 W.	Au, Ag	Lode	P/A	Inclined shaft, 75 ft deep. Boxwork with minor silver in quartz vein formed along fault in gneiss.
32-51	Quail Placers[1]	Sec. 29-32, T. 15 N., R. 18 W.	Au	Placer	M/A	Placer gold concentrated on caliche and bedrock.
53, 54	G. I.	NE1/4 sec. 31, T. 15 N., R. 18 W.	Au	Placer	P/A	Shaft, 10 ft deep in alluvium. Minor silver and barium values, no gold values in samples analyzed.
55, 56	Unnamed prospect.	SE1/4 sec. 29, T. 15 N., R. 18 W.	Ag, Cu, Pb	Lode and placer	P/A	Prospect pit in highly weathered gneiss. Minor silver, copper, and lead values.
57-66	Unnamed prospects.	W1/2 sec. 36, T. 15 N., R. 19 W.	Au, Ag, Cu, Pb, Zn	Lode	P/I	Inclined shaft, 35 ft deep; adit, 10 ft long; opencut, 10 ft long; and trench, 30 ft long. Locally moderate gold and silver values, and minor copper and lead values.
67-70	Jet	SW1/4 sec. 31, T. 15 N., R. 18 W.	Ag, Cu	Lode and placer	P/A	Adit, 11 ft long; and prospect pit. Minor silver and moderate copper values; abundant malachite and azurite staining.
77-83	Crystal	NE1/4 sec. 1, T. 14 N., R. 19 W.	Au, Ag, Pb, Zn	Lode	P/A	Shaft, about 60 ft deep, and prospect pit. Minor gold, silver, lead and zinc values in northeast-trending quartz vein.
84-117	Arrastra Well[1]	SW1/4 sec. 1, SE1/4 sec. 2, NE1/4 sec. 11, and NW1/4 sec. 12, T. 14 N., R. 19 W.	Au, Ag, Pb, Zn	Lode and placer	M/I, P/A	Inclined shafts, 75 and 20 ft deep; adit, 75 ft long; and numerous prospect pits. Locally high gold and minor silver, lead, and zinc values in quartz veins and faults; high concentrations of gold and silver in placer deposits. Inferred resources of approximately 350 tons averaging 0.21 oz gold per ton and 0.32 oz silver per ton.
118-133	Green Feather[1]	NW1/4 sec. 11, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb	Lode	M/I, P/A	Adit, 150 ft long; shaft, 35 ft deep; and several prospect pits. Locally high gold with minor silver and lead values in quartz veins. Inferred resources of approximately 210 tons averaging 0.05 oz gold per ton.
134-137	Unnamed prospects.	SW1/4 sec. 6, T. 14 N., R. 18 W.	Au, Ag	Lode	P/I	Adit, 25 ft long, and shaft, 15 ft deep. Minor silver and copper values in small northwest-trending faults.
154-203	Wing[1]	SE1/4 sec. 6, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb, Zn, MO	Lode and placer	M/I, P/A	Shaft, inaccessible; adits, 55 and 75 ft long; and numerous prospect pits. Gold, silver, copper, lead, zinc, and molybdenum associated with sulfides in northeast-trending quartz veins.
204-213	Unnamed prospects.[2]	NW1/4 sec. 17, T. 14 N., R. 19 W.	Au, Ag, Ba, Zn	Lode	P/I	Shaft, 12 ft deep with 30-ft-long drift, and several prospect pits. Anomalous gold and silver values disseminated in host rhyolite. Inferred resources of approximately 5,500 tons averaging 0.03 oz gold per ton and 0.19 oz silver per ton.
214, 215	Unnamed prospects.	SE1/4 sec. 17, T. 14 N., R. 19 W.	Au, Cu, Zn, Ba	Lode	P/I	Prospect pit cut in porphyritic andesite with calcite veins and anomalous silver and copper values.
218-227	Unnamed prospects.	NW1/4 sec. 16, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb, Zn	Lode	P/I	Adit, 35 ft long, and several prospect pits. Anomalous gold, silver, copper, lead and zinc values in quartz vein along fault zone.
230-258	J and J (Golden Gate).[1]	SE1/4 sec. 16, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb, Zn	Lode	M/I, P/A	Adit, 150 ft long with winze 130 ft deep; shaft, approximately 50 ft deep; and several prospect pits. Anomalous gold, silver, copper, lead, and zinc values in a fault zone.
261-271	Unnamed prospects.[2]	NW1/4 sec. 14, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb	Lode	P/I	Adits, 110 and 90 ft long. Locally high gold, silver, copper, and lead values in northwest-trending quartz vein. Inferred resources of approximately 610 tons averaging 0.41 oz gold per ton and 1.3 oz silver per ton.
274-277, 282-293	Unnamed prospects.[2]	SW1/4 sec. 12, NW1/4 sec. 13 and NE1/4 sec. 14, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb, Zn	Lode	P/I	Adits, 45 and 30 ft long, and several prospect pits. Anomalous gold, silver, copper, lead, and zinc values along fault and quartz vein. Inferred resources of approximately 120 tons averaging 0.24 oz gold per ton and 0.45 oz silver per ton.
294-366	Scotts Well (Moon Wash).[1]	W1/2 sec. 7, T. 14 N., R. 18 W., and E1/2 sec. 12, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb, Zn	Lode and placer	M/I, P/A	Thirteen adits, 10 to 130 ft long, numerous prospect pits, and inaccessible shaft. Locally high gold, silver, lead, and minor zinc values in quartz veins and fault zones. Inferred resources of approximately 770 tons averaging 0.19 oz gold per ton and 0.62 oz silver per ton.
367-407	Sunset (Lead Bullet).[1]	W1/2 sec. 18, T. 14 N., R. 18 W., and E1/2 sec. 13, T. 14 N., R. 19 W.	Au, Ag, Pb, Zn, Ba	Lode	M/I, P/A	Five adits, 10 to 110 ft long, and numerous prospect pits. Locally high gold, silver, and lead with minor copper and zinc values in quartz veins.
408-585	Sunrise[1]	SE1/4 sec. 13, T. 14 N., R. 19 W., and SW1/4 sec. 18, T. 14 N., R. 18 W.	Au, Ag, Pb, Zn, W, Ba	Lode	M/I, P/A	Eleven adits, 15 to 800 ft long, numerous prospect pits. Locally high gold, silver, and lead with minor copper and zinc values in quartz veins. Inferred resources for workings just west of Sunrise property (samples 572-585) are approximately 480 tons averaging 0.20 oz gold per ton and 0.18 oz silver per ton.
586-604	Unnamed prospects.[2]	SW1/4 sec. 18, T. 14 N., R. 18 W.	Au, Pb, Zn	Lode	P/I	Adits, 35, 45, and 110 ft long. Gold with minor lead and zinc in quartz vein along fault zone. Inferred resources of approximately 750 tons averaging 0.08 oz gold per ton.
605-611	Unnamed prospects.	SE1/4 sec. 17, T. 14 N., R. 18 W.	Cu	Lode	P/I	Shaft, 21 ft deep, and several prospect pits. Anomalous copper values associated with diabase dike intruded along fault.
612-615	Unnamed prospect.	SW1/4 sec. 21, T. 14 N., R. 19 W.	Au	Placer	P/A	Adit, 25 ft long, driven on bedrock-alluvium contact in search of placer gold. Trace of gold observed in one sample.
618-633	Unnamed prospects.	Cent. sec. 23, T. 14 N., R. 19 W.	Au, Ag, Ba	Lode	P/I	Adits, 100 and 120 ft long. Minor gold and silver along fault in Precambrian gneiss.
634-649	R and R[1]	NW1/4 sec. 24, T. 14 N., R. 19 W.	Au, Ag, W	Lode	M/I, P/A	Shaft, 40 ft deep, and adit, 65 ft long. Locally high gold and silver with minor lead and zinc values.
650-677	Unnamed prospects.[2]	S1/2 sec. 24, T. 14 N., R. 19 W.	Au, Cu	Lode	P/A	Adits, 135, 125, and 70 ft long; and several prospect pits. Anomalous gold values, with minor copper in quartz veins and fault zones. Inferred resources of approximately 920 tons averaging 0.14 oz gold per ton.
680-690	Unnamed prospects.[2]	NE1/4 sec. 24, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb, W	Lode	P/A	Adit, 15 ft long, and several prospect pits containing anomalous gold and minor silver values in quartz veins. Inferred resources of approximately 1,330 tons averaging 0.05 oz gold per ton.
691-725	Osiris & Ra (Schoolmarm).[1]	SW1/4 sec. 19, T. 14 N., R. 18 W.	Au, Ag, Cu, Pb Zn, W	Lode	M/I, P/A	Adits, 700 and 90 ft long, and a prospect pit. Locally high gold, silver, copper, lead, and zinc values in quartz veins. Ra mine contains approximately 490 tons of indicated resources and 330 tons of inferred resources average 0.01 oz gold per ton and 0.57 oz silver per ton.
726-744	Unnamed prospects.	NW1/4 sec. 19, T. 14 N., R. 18 W.	Au, Ag, Cu, Pb, Zn, W	Lode	P/I	Several prospect pits containing anomalous gold, silver, copper, lead and zinc, with minor tungsten in quartz veins.
745-769	Little Maud[1, 3]	NE1/4 sec. 19, T. 14 N., R. 18 W.	Au, Ag, Pb, Zn, W	Lode	M/I, P/A	Adits, 75, 125, and 220 ft long. Gold, silver, lead, zinc and tungsten in quartz veins in faults. Inferred resources of approximately 5,600 tons averaging 0.05 oz gold per ton and 100 tons containing 2,000-3,000 lbs of WO_3.[4]
770-775	Unnamed prospects.[1, 3]	NW1/4 sec. 20, T. 14 N., R. 18 W.	Au, W, Zn	Lode	P/I	Prospect pits with locally anomalous values of gold and zinc in quartz veins.
776-779	Green Water Spring.[1, 3]	NW1/4 sec. 21, T. 14 N., R. 18 W.	Cu	Lode	P/I	Prospect pits with anomalous copper values in quartz vein in fault.
780-822	Jupiter East[1, 3]	SW1/4 sec. 21, T. 14 N., R. 18 W.	Au, Cu, Pb	Lode	M/I, P/A	Shafts 100 and 120 ft deep; adits, 60 and 165 ft long; plus numerous prospect pits. Abundant anomalous copper values with minor gold and lead associated with quartz veins in faults and fractures.
823-840	Evelyn (Kampff)[1, 3]	SW1/4 sec. 20, T. 14 N., R. 18 W.	Au, Ag, Pb, Zn, W, Ba	Lode and placer	M/I, P/A	Adits, 190 and 90 ft long; shaft, 90 ft deep; and numerous prospect pits. Gold, silver, lead, zinc, and tungsten with minor copper, and barium values in quartz veins and faults. Inferred resources of approximately 210 tons containing 5,600 lbs of WO_3.[4]
841-848	Pioneer Shaft[1, 3]	SW1/4 sec. 20, T. 14 N., R. 18 W.	Au, Ag, Pb, W, Zn	Lode	M/I, P/A	Shaft, flooded below 90 ft. Moderate silver and gold, with minor lead, tungsten, and zinc values, from diabase-gneiss fault contact.
851-901	Lost Dutchman and Gold Band.[1, 3]	SW1/4 sec. 20, T. 14 N., R. 18 W.	Au, Ag, Pb, W, Zn	Lode	M/I, P/A	Adits 25, 45, 70, and 370 ft long and numerous shafts, pits, and trenches. Several high gold values, with moderate to low values of silver, lead, tungsten, and zinc from quartz veins and faults in gneiss. Lost Dutchman Mine inferred resources of approximately 610 tons averaging 1.35 oz gold per ton and 0.41 oz silver per ton.[5]
906, 907	Unnamed prospect.[3]	NE1/4 sec. 29, T. 14 N., R. 18 W.	Au, Cu	Lode	P/A	Shaft, inaccessible with minor gold and copper values in quartz vein.
911-946	Jupiter[1, 3]	NE1/4 sec. 30, T. 14 N., R. 18 W.	Au, Cu, Pb, Zn, Ba	Lode and placer	M/I P/A	Five shafts, and adits, 390 and 100 ft long. Anomalous values of gold, silver, copper, lead, and zinc in quartz veins and fault zones.
947-952	Unnamed prospects.	NW1/4 sec. 30, T. 14 N., R. 18 W.	Au, Cu, Pb	Lode	P/A	Shaft, flooded; adit, 40 ft long; and trench 15 ft long. Minor silver and lead values in quartz veins.
953-969	Unnamed prospects.	N1/2 sec. 25, T. 14 N., R. 19 W.	Au	Lode	P/I	Five adits, 15 to 55 ft long, one shaft, and numerous prospect pits. Minor gold values in quartz veins.
972-1071	Pittsburg (Hot Spot).[1]	S1/2 sec. 27, and N1/2, sec. 34, T. 14 N., R. 19 W.	Au, Ag, Cu, Pb, Zn, W, Ba	Lode	M/I, P/A	Adit 50 ft long, five shafts, 20 to about 210 ft deep, and numerous prospect pits. Locally high values of silver, lead, and gold with barium, copper, and zinc in quartz vein. Inferred resources for the main workings are approximately 8,000 tons averaging 0.06 oz gold per ton, 3.1 oz silver per ton, 0.8 percent lead, and 0.6 percent zinc, plus 1,120 tons of inferred resources averaging 0.64 oz silver per ton in a deposit to the southwest.
1098-1105	El Campo[1]	SE1/4 sec. 8, T. 13 N., R. 18 W.	Au, Ag	Placer	P/I	Tunnel, 85 ft long, driven on bedrock-alluvium contact in search of placer gold. Anomalous gold observed in one sample.
1106-1121	Manitowoc[1]	SW1/4 sec. 16, and E1/2 sec. 17, T. 13 N., R. 18 W.	Au, Ag, Pb, Zn, Ba	Lode	M/I, P/A	Shafts, 26, 51, and 150 ft deep, and several caved shafts; adit 40 ft long; and several prospect pits. Gold, silver, lead, zinc, and barium values in quartz veins and fault zones.

[1] Discussed in text.
[2] Unnamed prospects containing inferred resources.
[3] Included in Dutch Flat Group.
[4] Inferred resource figures for WO_3 from Farnham (1951).
[5] High gold average is due to one sample assaying 8.82 oz gold per ton.

Table 2.--Assay data for samples containing more than 0.040 ounces gold per ton; 0.5 ounces silver per ton; 0.50 percent copper; or 1.00 percent lead or zinc

[Stsed, stream sediment; Speci, specimen; Pan con, panned concentrate; NA, not analyzed; ---, analyzed but not detected; Au and Ag by fire assay with lower detection limits of 0.005 and 0.2 oz/ton, respectively; Cu, Pb, and Zn by atomic absorption analysis with lower detection limits of 0.01 percent]

Sample no.	type	length	Au (oz/ton)	Ag (oz/ton)	Cu (percent)	Pb (percent)	Zn (percent)	Remarks
5	Stsed..	Pan con..	0.048	NA	---	---	0.01	Recent stream sediment.
8	Stsed..	Pan con..	.059	NA	---	---	.01	Do.
9	Stsed..	Bulk.....	.080	NA	---	---	.02	Do.
15	Stsed..	Bulk.....	---	---	1.15	0.04	6.50	Do.
35	Stsed..	Pan con..	.216	---	---	.03	.03	Do.
36	Stsed..	Pan con..	---	0.9	---	.02	.02	Do.
37	Stsed..	Pan con..	.082	.5	---	.03	.05	Do.
38	Stsed..	Bulk.....	.828	---	---	.02	.03	Do.
39	Stsed..	Pan con..	1.232	2.2	---	.02	.02	Do.
40	Stsed..	Pan con..	1.330	---	---	.03	.02	Do.
41	Stsed..	Pan con..	---	2.5	---	.06	.02	Do.
42	Stsed..	Pan con..	.148	.6	---	.02	.01	Do.
43	Stsed..	Pan con..	.090	.4	---	---	.02	Do.
44	Stsed..	Pan con..	.081	.6	.01	---	.02	Do.
54	Chip...	3.0 ft...	---	.6	.01	.01	.02	Alluvium at bedrock.
56	Grab...	Select...	---	.6	.78	.03	---	Dump, fault zone in alluvium.
58	Chip...	1.5 ft...	.233	.2	---	.01	.02	Quartz vein in gneiss.
59	Chip...	1.0 ft...	.078	.6	.08	.24	.03	Do.
60	Grab...	Select...	.102	.8	.14	1.92	.39	Dump, quartz vein and gneiss.
62	Chip...	3.0 ft...	---	2.5	---	.01	.01	Fractured gneiss.
67	Grab...	Select...	---	.5	1.55	.01	---	Quartz with calcite, pyrite, and limonite staining.
68	Grab...	Select...	---	---	1.45	---	.02	Quartz veinlets with copper mineralization.
71	Stsed..	Pan con..	.096	NA	---	---	---	Recent stream sediment.
73	Stsed..	Pan con..	.106	NA	---	---	.01	Do.
77	Chip...	0.8 ft...	---	2.0	.03	6.80	.14	Quartz vein in gneiss with pyrite and galena.
78	Grab...	Select...	---	4.9	.03	5.00	.07	Stockpile, quartz vein and gneiss.
80	Grab...	Select...	---	.9	.03	1.40	.19	Do.
85	Chip...	3.0 ft...	.087	---	---	---	.02	Quartz vein in shear zone in garnetiferous gneiss.
91	Chip...	1.2 ft...	.217	.6	.01	.04	.07	Do.
92	Chip...	0.9 ft...	.328	.2	---	.01	.03	Do.
95	Chip...	0.8 ft...	.166	.2	.04	.03	.50	Do.
97	Chip...	0.8 ft...	.111	.2	---	.01	---	Do.
98	Chip...	0.8 ft...	.115	.2	---	.01	---	Do.
99	Chip...	0.5 ft...	.093	.4	---	---	---	Do.
100	Chip...	1.4 ft...	.044	.2	---	---	.01	Do.
101	Chip...	0.6 ft...	.072	---	---	.01	---	Do.
103	Chip...	2.3 ft...	.167	.2	---	.04	.05	Do.
107	Stsed..	Pan con..	.116	NA	---	---	.01	Recent stream sediment.
108	Stsed..	Pan con..	Trace	1.9	---	.01	.01	Do.
109	Grab...	Random...	.005	.2	---	.36	1.5	Dump, quartz vein and gneiss.
111	Chip...	2.2 ft...	.008	.2	---	.95	2.2	Quartz vein in shear zone in garnetiferous gneiss.
114	Chip...	0.3 ft...	.047	---	.02	.21	.04	Do.
118	Chip...	0.4 ft...	.100	---	---	.04	---	Quartz vein in gneiss.
125	Chip...	1.3 ft...	.407	.2	---	.32	.01	Do.
133	Chip...	0.9 ft...	.071	.6	---	.05	.01	Fault gouge with limonite staining in gneiss.
159	Grab...	Random...	---	.6	.02	.04	.04	Dump, quartz vein and gneiss.
160	Grab...	Random...	---	.6	.02	---	.03	Do.
173	Chip...	1.3 ft...	---	.6	.21	.01	.33	Quartz pod in gneiss with copper mineralization.
174	Chip...	2.8 ft...	.092	.4	.01	.26	.01	Quartz vein in gneiss with copper mineralization.
176	Chip...	3.2 ft...	---	.6	---	---	.01	Do.
182	Chip...	3.0 ft...	---	.6	.01	.02	---	Quartz stringers in gneiss with copper mineralization.
198	Chip...	2.0 ft...	---	1.0	---	---	.02	Do.
207	Chip...	2.5 ft...	.115	.2	---	---	.01	Fractured quartzite.
208	Grab...	Select...	.070	1.2	.02	.01	.04	Dump, fractured quartzite.
214	Grab...	Select...	---	4.9	5.80	.01	.01	Dump, dacite with azurite.
215	Chip...	3.2 ft...	---	.6	.70	.01	.02	Andesite with calcite, drusy quartz, and copper minerals.
219	Chip...	1.8 ft...	Trace	1.0	.06	.04	.03	Quartz vein in fault zone in gneiss with pyrite and galena.
220	Chip...		.065	.2	.06	---	.05	Quartz vein in shear zone in gneiss with copper minerals.
221	Chip...	0.3 ft...	.006	1.6	.10	.10	.13	Do.
235	Chip...	1.3 ft...	.051	.2	.01	.02	.06	Quartz in sheared gneiss with minor copper mineralization.
241	Grab...	Select...	.158	9.3	1.64	4.30	.57	Dump, quartz vein and gneiss.
243	Chip...	2.3 ft...	.053	---	.02	.26	.17	Quartz vein in fault zone in gneiss.
251	Chip...	0.3 ft...	.047	.4	.05	.05	.05	Do.
255	Chip...	1.3 ft...	.362	1.6	.26	.21	.57	Do.
256	Grab...	Select...	---	.2	.54	8.0	.03	Dump, gneiss with copper staining.
261	Chip...	1.5 ft...	.095	.2	.04	.40	---	Vuggy quartz vein in gneiss with abundant pyrite and galena.
262	Chip...	2.2 ft...	.271	2.4	.07	1.34	---	Do.
263	Chip...	1.8 ft...	.340	.2	.05	.47	.01	Do.
264	Chip...	2.0 ft...	1.584	2.0	.18	1.80	.04	Do.
265	Chip...	1.1 ft...	.017	1.2	.89	1.75	---	Do.
266	Chip...	1.6 ft...	.295	2.0	.05	1.42	.01	Do.
267	Chip...	1.8 ft...	.180	.6	.40	2.05	.01	Do.
268	Chip...	1.7 ft...	.711	2.0	.32	4.00	---	Do.
274	Grab...	Select...	---	.8	---	.16	.01	Dump, high-grade quartz vein.
283	Grab...	Select...	.079	2.7	.02	8.20	---	High-grade from quartz vein talus.
288	Chip...	2.0 ft...	.103	.6	.03	.01	.05	Shear zone with quartz stringers in gneiss.
289	Grab...	Select...	---	.7	.24	1.31	.25	Dump, quartz stringers and gneiss.
291	Chip...	1.3 ft...	.24	.7	.03	.38	.33	Shear zone with quartz stringers in gneiss.
292	Chip...	1.6 ft...	.872	.5	.04	.32	.16	Do.
294	Chip...	3.7 ft...	.045	.2	.01	---	.03	Fault zone with quartz in gneiss.
305	Chip...	2.4 ft...	.359	.9	.02	.02	.03	Do.
309	Chip...	0.4 ft...	.510	.3	.01	.03	.06	Do.
315	Grab...	Random...	1.44	2.4	.40	2.73	.36	Dump, quartz vein and gneiss.
317	Chip...	0.4 ft...	.111	---	.02	.02	---	Quartz vein in fault zone in gneiss.
318	Chip...	1.1 ft...	1.37	4.0	.13	3.11	.40	Do.
319	Chip...	0.7 ft...	.497	---	---	.01	.01	Do.
320	Chip...	0.6 ft...	.005	1.0	.02	.23	.05	Do.
322	Chip...	0.9 ft...	.118	---	.01	.13	.06	Do.
331	Chip...	0.7 ft...	.470	.3	.03	.16	.07	Do.
332	Grab...	Select...	.046	.2	---	.29	.02	Dump, quartz vein and gneiss.
337	Chip...	0.3 ft...	.178	2.5	.16	11.0	.37	Quartz vein in fault zone in gneiss.
338	Chip...	0.5 ft...	1.702	.5	.01	.16	.08	Quartz vein in diabase.
350	Chip...	2.6 ft...	.283	.4	---	.05	.02	Fault zone with quartz vein in gneiss.
352	Chip...	1.1 ft...	.686	1.3	.02	2.00	.02	Do.
360	Grab...	Select...	.795	.4	---	.41	.02	Dump, quartz vein and gneiss.
367	Grab...	Select...	.307	.4	.01	.03	.03	Stockpile, quartz vein and gneiss.
368	Chip...	1.0 ft...	---	.8	.01	.07	.02	Quartz vein in fault zone in gneiss.
370	Chip...	1.9 ft...	.083	.3	---	.03	.04	Do.
371	Grab...	Select...	---	.6	.02	.03	.06	Dump, quartz vein and gneiss.
372	Chip...	0.6 ft...	---	.6	---	.01	---	Quartz vein in fault zone in gneiss.
375	Chip...	0.7 ft...	.027	1.7	.01	.56	.01	Do.
380	Chip...	3.0 ft...	.102	---	.01	.01	.32	Gneiss-porphyry fault contact.
383	Chip...	1.5 ft...	.066	---	.02	.10	.21	Quartz vein in fault zone in gneiss.
385	Chip...	1.0 ft...	.014	.8	.07	.68	.02	Do.
386	Chip...	1.5 ft...	.019	.8	.09	.71	.03	Do.
387	Grab...	Select...	.008	2.2	.05	2.05	.02	Dump, quartz vein and gneiss.
398	Chip...	2.7 ft...	---	.6	.04	5.00	.01	Gneiss-diorite fault contact.
402	Chip...	2.5 ft...	---	.8	.04	4.30	.87	Do.
405	Chip...	0.3 ft...	.120	---	.01	---	.06	Quartz vein in gneiss.
406	Chip...	---	.578	.6	.14	1.85	.11	Do.
407	Chip...	1.5 ft...	.218	.2	.04	.19	.02	Do.
408	Chip...	2.5 ft...	.154	---	---	.38	.06	Do.
410	Chip...	1.5 ft...	.064	---	---	.07	.01	Do.
414	Chip...	1.2 ft...	.500	---	---	.03	.03	Quartz vein in fault zone in gneiss.
415	Chip...	1.3 ft...	.059	3.4	---	.08	.01	Do.
421	Chip...	1.4 ft...	.046	---	---	.01	.04	Do.
424	Chip...	1.2 ft...	.063	.2	.01	.08	.02	Do.
427	Chip...	1.3 ft...	.211	.2	---	.20	.03	Do.
431	Chip...	0.8 ft...	.176	.2	---	.11	.04	Do.
434	Chip...	1.7 ft...	.062	---	.01	.05	.05	Do.
441	Chip...	0.8 ft...	.116	---	---	---	.02	Do.
471	Chip...	1.2 ft...	.075	---	.01	.25	.01	Do.
472	Chip...	0.6 ft...	1.57	1.2	---	.48	.05	Do.
473	Chip...	2.0 ft...	.854	.6	---	.50	.20	Do.
476	Chip...	0.9 ft...	.056	---	.04	.25	.21	Do.
478	Chip...	1.0 ft...	1.09	.4	.01	.35	.83	Do.
481	Chip...	1.0 ft...	.662	.4	.02	.46	.52	Do.
485	Chip...	1.1 ft...	.605	.2	---	.79	.31	Do.
486	Chip...	2.0 ft...	.186	---	---	.28	.52	Do.
487	Chip...	0.3 ft...	2.182	.6	.20	1.40	2.50	Do.
488	Chip...	2.1 ft...	1.97	1.4	.06	.60	.61	Do.
489	Chip...	1.0 ft...	.348	---	.02	.10	.27	Do.
490	Chip...	1.0 ft...	.922	---	.01	.10	.11	Do.
491	Chip...	1.3 ft...	.401	---	---	.05	.12	Do.
492	Chip...	0.2 ft...	.513	---	---	.13	.18	Do.
494	Chip...	0.6 ft...	.253	---	.04	.05	.14	Do.
496	Chip...	1.3 ft...	.265	---	---	.14	.08	Do.
498	Chip...	1.0 ft...	1.18	.6	.01	.20	.43	Do.
499	Chip...	1.7 ft...	.120	---	---	.03	.06	Do.
500	Chip...	0.8 ft...	.125	---	---	.03	.04	Do.
501	Chip...	0.7 ft...	.053	---	.01	.05	.12	Do.
511	Chip...	1.0 ft...	.380	.2	.03	.41	.10	Do.
513	Chip...	2.0 ft...	.042	---	.01	.15	.06	Do.
514	Chip...	0.2 ft...	.057	---	---	.08	.08	Do.
515	Chip...	0.2 ft...	1.62	4.0	.09	8.50	.82	Do.
517	Chip...	0.3 ft...	.070	---	---	.02	.06	Do.
520	Chip...	0.5 ft...	.256	.2	.02	.50	.40	Do.
522	Chip...	0.3 ft...	.317	.4	.03	1.42	.64	Do.
525	Chip...	0.3 ft...	.044	.2	---	.03	.09	Do.
533	Chip...	0.3 ft...	1.39	.4	.02	2.40	.13	Do.
550	Chip...	0.8 ft...	.010	1.0	.01	2.4	.77	Do.
563	Chip...	1.0 ft...	---	---	.01	3.65	.31	Do.
572	Chip...	Select...	.366	---	---	.18	.01	Dump, high-grade quartz vein.
577	Chip...	0.4 ft...	2.04	2.0	.04	3.50	.02	Quartz vein in fault zone in gneiss.
579	Chip...	0.3 ft...	.088	---	---	.02	.01	Do.
580	Speci...	Select...	.533	---	.01	.21	---	Dump, high-grade quartz vein.
581	Chip...	0.4 ft...	.554	.2	---	.03	.01	Quartz vein in fault zone in gneiss.
582	Chip...	0.4 ft...	.699	1.0	.01	2.50	.01	Do.
583	Chip...	2.5 ft...	.079	---	.01	.08	.03	Do.
584	Chip...	0.4 ft...	.533	.4	---	.04	.05	Do.
586	Chip...	1.2 ft...	.161	---	.02	.26	.11	Do.
588	Chip...	3.0 ft...	.294	---	.02	.06	.39	Do.
590	Chip...	2.0 ft...	.044	.2	.04	.51	.13	Do.
609	Chip...	1.3 ft...	Trace	.2	1.20	---	.02	Do.
610	Chip...	1.5 ft...	-	-	.75	---	.01	Do.
624	Grab...	Select...	.342	.4	.01	---	.01	Dump, gneiss, dacite and diorite.
628	Chip...	1.3 ft...	.076	.3	---	---	.01	Very fractured gneiss, with dacite and diorite dikes.
635	Chip...	1.3 ft...	---	1.0	---	.01	.01	Quartz vein in fault zone in gneiss.
643	Chip...	1.5 ft...	.063	.4	.03	---	---	Do.
657	Chip...	0.8 ft...	.078	---	---	---	---	Do.
666	Chip...	2.8 ft...	.278	---	---	---	---	Do.
668	Chip...	2.0 ft...	.475	.2	---	---	---	Do.
669	Chip...	1.3 ft...	.190	---	---	---	---	Do.
671	Speci...	Select...	.566	---	.06	---	.02	Dump, high-grade quartz and gneiss.
672	Speci...	Select...	.815	.2	.39	---	.09	Do.
678	Stsed..	Pan con..	.117	---	---	.02	.01	Recent stream sediment.
680	Chip...	2.0 ft...	.088	---	.02	.11	.03	Quartz vein in gneiss.
681	Chip...	0.3 ft...	.55	.4	.02	.03	.01	Do.
683	Grab...	Select...	.380	.2	.02	.06	.04	Stockpile, quartz vein.
685	Grab...	Select...	.267	.2	.02	.17	.05	Dump, quartz vein and gneiss.
687	Chip...	1.3 ft...	.265	.2	.02	.03	.01	Quartz vein in gneiss.
688	Grab...	Select...	.048		.13	.15	.09	Stockpile, quartz vein.
689	Chip...	1.0 ft...	.277	.2	.02	.06	.03	Do.
690	Grab...	Select...	1.346	1.4	.04	.74	---	Dump, quartz vein and gneiss.
703	Chip...	3.3 ft...	---	.6	.01	.01	.03	Fault zone in diorite.
707	Chip...	4.5 ft...	---	.8	---	---	.02	Fault zone between gneiss and dacite.
719	Chip...	2.0 ft...	Trace	---	.02	2.03	.01	Do.
720	Chip...	1.5 ft...	.058	3.2	1.30	5.60	.65	Quartz vein in fault zone in gneiss.
722	Chip...	1.0 ft...	.018	.8	.11	1.15	.02	Do.
723	Chip...	1.1 ft...	.013	.8	.75	---	.13	Do.
735	Chip...	1.2 ft...	.303	.8	.05	.51	.17	Do.
736	Chip...	0.7 ft...	.144	.2	.04	.02	.03	Do.
737	Chip...	0.5 ft...	.075	---	.02	.04	.08	Do.
738	Chip...	0.7 ft...	.012	2.0	.29	.11	.02	Do.
739	Chip...	0.7 ft...	Trace	3.2	.04	.14	.01	Do.
740	Grab...	Select...	.008	5.0	.94	.18	.01	Dump, quartz vein and gneiss.
741	Chip...	1.2 ft...	Trace	3.2	.10	.14	.01	Quartz vein in fault zone in gneiss.
742	Chip...	1.5 ft...	.012	.4	1.80	.05	.03	Do.
748	Chip...	---	.107	---	.02	---	.01	Do.
754	Chip...	0.5 ft...	.618	1.0	.02	.31	.43	Do.
757	Grab...	Select...	.036	.7	.08	1.68	.66	Dump, quartz vein and gneiss.
760	Chip...	4.0 ft...	.046	.6	---	.01	.03	Quartz vein in fault zone in dacite.
761	Chip...	1.3 ft...	.064	1.0	.07	1.69	.53	Quartz vein in gneiss.
762	Chip...	1.0 ft...	.10	---	.03	.40	.45	Fault gouge in gneiss.
763	Chip...	Select...	.285	2.0	.06	5.30	2.11	Sulfide pod in quartz vein.
764	Chip...	1.3 ft...	---	.4	.08	1.92	.71	Fault gouge in gneiss.
772	Chip...	0.7 ft...	.006	---	.21	.05	4.10	Altered limonitic vein.
776	Grab...	Select...	---	---	1.00	---	---	Dump, quartz vein and gneiss.
779	Grab...	Select...	---	---	4.90	---	---	Do.
782	Chip...		.536	.4	.20	1.25	.03	Granitic gneiss with copper mineralization.
789	Chip...	3.0 ft...	Trace	.2	3.70	---	---	Do.
790	Chip...	2.3 ft...	---	0.4	1.35	---	---	Do.
799	Chip...	4.0 ft...	---	---	1.14	---	.01	Quartz vein in fault zone in gneiss.
800	Grab...	Select...	Trace	---	2.25	---	.02	Dump, quartz vein and gneiss.
803	Grab...	Select...	Trace	---	5.00	---	.01	Do.
809	Grab...	Select...	---	---	1.21	---	.01	Do.
812	Grab...	Select...	---	---	7.80	---	.01	Do.
813	Grab...	Select...	---	---	1.15	---	---	Do.
816	Chip...	2.0 ft...	---	---	1.46	---	.01	Quartz vein in fault zone in gneiss.
830	Chip...	3.0 ft...	.050	---	.01	.05	.02	Do.
833	Grab...	6-ft grid	.060	---	.01	.01	.02	Dump, quartz vein and gneiss.
835	Chip...	0.5 ft...	.008	.2	.01	1.16	.29	Quartz vein in fault zone in gneiss.
838	Chip...	Select...	.005	2.0	.03	.30	.04	Spot chip, high-grade along vein.
842	Grab...	Select...	.013	1.4	.05	.60	.45	Dump, quartz vein and gneiss.
848	Speci..	Select...	Trace	1.0	.10	.36	.04	High-grade of quartz vein.
849	Grab...	Select...	.021	.8	.01	.54	.15	Stockpile, high-grade.
850	Grab...	Grid...	.057	---	.02	.44	.06	Stockpile, grid.
855	Grab...	Random...	.050	---	---	.01	.05	Pit dump, quartz vein and gneiss.
860	Chip...	1.0 ft...	.108	---	.01	.06	.07	Quartz vein in fault in gneiss.
872	Chip...	2.0 ft...	.114	.2	---	.01	.02	Do.
877	Chip...	2.5 ft...	.117	.2	.02	.06	.05	Do.
879	Chip...	0.5 ft...	.705	.4	.07	.29	.18	Do.
880	Chip...	2.0 ft...	8.82	2.0	.02	1.35	.16	Do.
881	Chip...	2.5 ft...	.099	---	.01	.03	.04	Do.
884	Chip...	2.5 ft...	---	6.2	---	---	.02	Do.
894	Chip...	3.5 ft...	---	.6	---	---	.02	Do.
911	Grab...	Grid....	Trace	2.0	---	.01	.01	Dump, quartz vein and gneiss.
918	Grab...	5-ft grid	.097	---	.01	.06	.11	Do.
923	Chip...	0.8 ft...	.168	---	.02	.03	.07	Quartz vein in fault in gneiss.
932	Chip...	0.8 ft...	.043	---	.02	.04	.02	Do.
938	Grab...	Select...	.065	---	.04	.30	.13	Residual silt in mill thickener tank.
941	Grab...	Random...	.030	---	.01	1.35	.03	Dump, quartz vein and gneiss.
954	Grab...	6-ft grid	.076	---	.01	.01	.03	Do.
955	Grab...	Select...	.363	---	.03	.03	.04	Do.
959	Chip...	0.5 ft...	.077	---	.05	---	.05	Altered granitic rock.
968	Grab...	6-ft grid	.044	---	.01	---	.02	Dump, altered gneiss.
976	Grab...	Select...	.023	4.3	.38	1.35	1.45	Do.
977	Chip...	1.7 ft...	.180	---	.02	.15	.34	Fault zone in gneiss.
979	Chip...	4.0 ft...	.016	2.8	.23	.39	.30	Gneiss-diorite fault contact.
980	Chip...	4.0 ft...	.014	.5	.44	.77	1.15	Do.
982	Chip...	2.0 ft...	---	1.4	.01	.04	.05	Quartz vein in fault zone in gneiss.
983	Chip...	1.1 ft...	---	.7	.01	.01	.03	Do.
990	Chip...	1.7 ft...	---	---	.18	2.40	1.70	Do.
991	Chip...	2.0 ft...	---	---	.15	1.45	.75	Do.
992	Chip...	0.7 ft...	.010	1.2	.01	.19	.39	Do.
993	Chip...	1.5 ft...	---	---	.19	1.35	2.60	Do.
994	Chip...	1.5 ft...	.069	23.7	.40	9.00	2.6	Do.
996	Chip...	3.0 ft...	---	1.2	---	.03	.10	Do.
997	Chip...	2.0 ft...	.212	22.6	.26	1.20	.58	Do.
999	Chip...	0.8 ft...	---	---	1.10	1.20	.61	Fault gouge in gneiss.
1000	Chip...	0.8 ft...	.083	---	.06	.10	1.65	Do.
1001	Chip...	1.2 ft...	---	---	.29	5.50	.15	Do.
1002	Chip...	2.7 ft...	Trace	.6	---	.06	.13	Do.
1003	Chip...	0.8 ft...	Trace	.2	.64	.08	1.1	Do.
1004	Chip...	3.2 ft...	---	4.7	.10	.60	.35	Do.
1005	Chip...	0.6 ft...	.013	.6	---	---	.10	Gneiss-diabase fault contact.
1008	Chip...	3.3 ft...	---	1.3	.04	.05	.48	Quartz vein in fault zone in gneiss.
1009	Grab...	5-ft grid	.020	5.8	.08	.68	1.4	Dump, quartz vein and gneiss.
1010	Grab...	5-ft grid	.006	2.0	.01	.20	.25	Do.
1011	Grab...	5-ft grid	.011	7.2	.05	.44	.80	Do.
1012	Chip...	3.3 ft...	.084	4.9	.08	1.60	NA	Quartz vein in fault zone in gneiss.
1014	Chip...	2.9 ft...	---	---	.13	1.60	.17	Do.
1015	Chip...	1.8 ft...	---	---	.37	1.50	.10	Do.
1016	Chip...	2.3 ft...	---	---	.06	4.90	.08	Do.
1019	Chip...	0.4 ft...	---	---	.70	1.00	1.70	Do.
1021	Chip...	0.8 ft...	3.75	52.4	.29	2.29	2.5	Fault gouge in gneiss.
1023	Chip...	2.9 ft...	.021	11.4	.11	.40	2.1	Do.
1024	Chip...	2.3 ft...	---	---	.17	.55	1.05	Do.
1025	Chip...	1.3 ft...	.007	3.0	.02	.16	2.9	Do.
1026	Chip...	2.3 ft...	---	5.2	.02	.13	.35	Do.
1027	Chip...	1.0 ft...	.005	1.8	---	.18	.50	Do.
1028	Chip...	2.3 ft...	Trace	1.8	.02	.09	2.0	Do.
1029	Chip...	Select...	.380	17.0	.37	1.41	3.1	Do.
1030	Chip...	0.8 ft...	---	1.6	.24	.19	.50	Quartz vein in fault zone in gneiss.
1031	Chip...	1.3 ft...	---	.6	.02	.20	.45	Fault zone in diorite.
1033	Chip...	0.8 ft...	.064	1.4	.01	.21	.11	Quartz vein in fault zone in gneiss.
1034	Chip...	1.3 ft...	---	.4	.09	---	1.12	Do.
1041	Chip...	1.0 ft...	---	.6	.01	---	---	Fractured dacite.
1042	Grab...	Select...	1.457	.3	.01	.05	---	Fault zone in granitic rock.
1043	Chip...	3.0 ft...	.072	.3	---	---	---	Quartz vein in granitic gneiss.
1044	Chip...	0.3 ft...	.220	.3	.01	.02	---	Do.
1052	Chip...	Select...	---	.6	.01	.16	---	Dump, granitic gneiss.
1063	Chip...	1.0 ft...	.087	---	.01	.01	.01	Quartz vein in granitic rock.
1079	Stsed..	Bulk.....	Trace	1.6	.01	---	---	Recent stream sediment.
1105	Chip...	1.0 ft...	.890	.5	---	---	.02	Diorite gravel contact.
1107	Chip...	1.3 ft...	.065	.4	---	.01	.01	Faulted diorite.
1111	Chip...	2.0 ft...	.225	.1	.02	.15	.04	Do.
1112	Grab...	Select...	.369	.5	.03	.11	.16	Dump, diorite and quartz.
1113	Grab...	Select...	---	1.0	.04	.23	.29	Do.
1114	Grab...	5-ft grid	.030	2.2	.03	.01	.03	Do.
1119	Grab...	5-ft grid	.121	---	.02	.01	.01	Do.
1120	Chip...	2.2 ft...	.462	---	.01	---	.03	Faulted diorite.
1121	Grab...	Select...	---	1.0	.02	.29	.01	Dump, diorite and quartz.

Table 3.--Samples containing more than 0.10 percent tungsten, Crossman Peak WSA

[Determined by atomic absorption analysis as W, converted to WO_3 by 1.26 x W. Values given in percent. Stsed, stream sediment; pan-con, panned concentrate]

Sample no.	type	length	WO_3	Remarks
39	Stsed	Pan-con	0.20	Holocene stream sediment.
41	Stsed	Pan-con	.14	Holocene stream sediment.
96	Grab	6 ft grid	.25	Gneiss and diabase with minor quartz vein.
471	Chip	1.2 ft	.15	Fractured quartz vein.
529	Chip	2.5 ft	.28	Quartz vein in fault zone in gneiss.
683	Grab	Select	.43	Stockpile of quartz vein material.
731	Chip	0.5 ft	.20	Quartz vein in gneiss.
763	Chip	Select	.14	Sulfide pod in gneiss.
837	Chip	2.0 ft	.16	Quartz vein in gneiss.
838	Chip	Select	1.02	Area of fluorescence in gneiss.
848	Chip	Select	.15	Quartz vein fault gouge.
900	Chip	1.0 ft	.54	Quartz, feldspar, and calcite veinlets.
997	Chip	2.0 ft	.5	Quartz vein in gneiss.

M(200)
MF-1602-C
SHEET-1
c1

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