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A MINERAL INVENTORY OF THE CALIENTE RESOURCE AREA,
CALIENTE DISTRICT, LINCOLN COUNTY, NEVADA

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Prepared for:

UNITED STATES DEPARTMENT OF THE INTERIOR,
BUREAU OF LAND MANAGEMENT, CALIENTE
DISTRICT OFFICE, CALIENTE, NEVADA,
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This information should be considered preliminary.
It has not been edited or checked for completeness
or accuracy.



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Summary of Work Performed
Mineral Inventory Caliente Resource Area
Contract #YA-553 CTI-1058
U.S. Bureau of Land Management

Work was completed on the Caliente Mineral Resource Inventory in two complementary stages. First, search of the literature was made, and data on mineral occurrences within the project area were compiled on short form Nevada CRIB forms. Courthouse records were then examined to obtain names and locations of active mining claims within the inventory area. All of the information was plotted on maps for field use. Folios were then prepared for each mining district, which included the CRIB forms, notes on mining claims, and pertinent references. This material provided the basis for planning the second stage of the inventory, the field examinations.

During the field stage of the project, every mining district within the Resource area was visited and selected properties were examined. Important properties as well as outlying prospects were examined and described in order to provide more complete and accurate information on the occurrences beyond that provided in the literature. During the examination, emphasis was placed on collecting geologic information on the mineral occurrences and on noting current activity.

Photos were taken in each area to document activity, type of mine workings, and geologic relationships. In addition, samples showing typical mineralization were collected from most of the visited properties. All of the samples were high-graded and usually taken from dumps, ore piles, or outcrops. Some samples of nearby intrusive rock or altered material were collected for comparison purposes.

The samples were prepared for analysis by the Nevada Analytical Laboratory, UNR, Reno, and analyzed for 31 elements (semi-quantitative spectrographic technique) by the Branch of Exploration Geochemistry, U.S. Geological Survey, Denver, Colorado. The analytical work was done through a cooperative agreement between the Branch of Exploration Geochemistry and the Nevada Bureau of Mines and Geology.

The information collected during the course of the Caliente project has been compiled and is presented in this report in the following form:

- 1) Summary report organized by mining district: includes location, history, field observations, and current mining status of each district. A list of selected references follows each individual district write-up. Sample description sheets and results of geochemical analysis are included in the appendix of the report.
- 2) Mining District folios:
 - a) Prospect forms describing each mine property examined in the field. Sample descriptions accompany forms of sampled properties.
 - b) CRIB forms containing location and brief description of mine

properties as gathered from literature sources and field information.

3) Maps

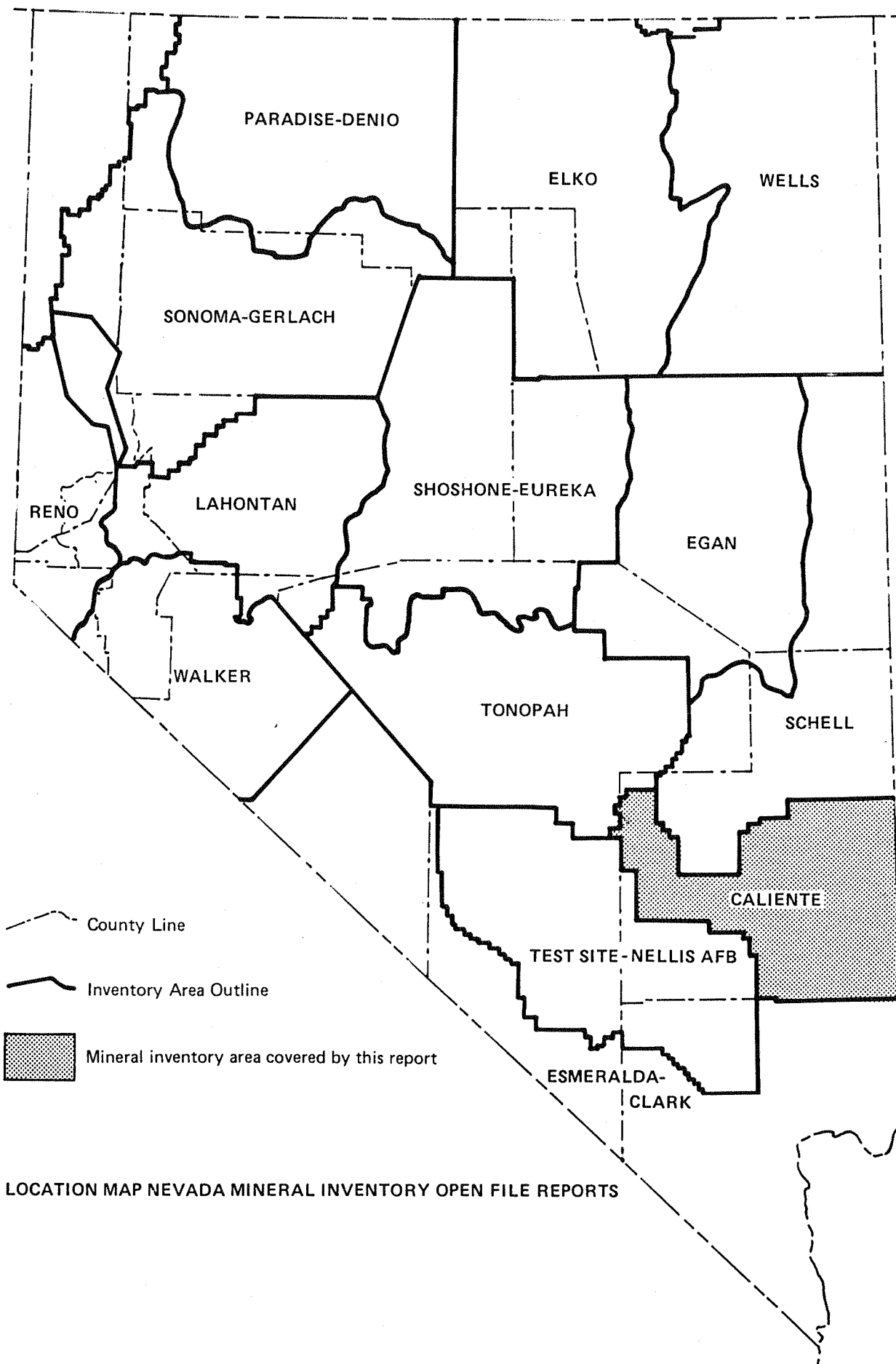
- a) Planimetric maps, 30' series, showing location of mining districts, and sample locations.
- b) USGS 7 1/2' and 15' topographic maps showing sample locations and prospect names.

4) Photo Album, organized by mining district, containing slides of visited properties and documentation of new work.

In addition to this information, topographic field sheets and field notes are on file at the Nevada Bureau of Mines and Geology. Also, splits of all the samples taken as well as selected hand specimens have been retained at the Nevada Bureau of Mines and Geology. This material may be useful for additional studies in selected areas.

In reporting on this project, no attempt has been made to compile detailed geologic information on the districts. Since this project was a mineral inventory, our efforts were confined to acquiring new information on prospects, and no time was available to collect new regional geologic data. Local or regional geologic interpretations were derived from published geologic maps or other pertinent literature sources.

The literature search and compilation of CRIB data for this project was done mainly by Daphne D. LaPoint. Field work was carried out by Jo L. Bentz and Peggy L. Smith during the summer and fall of 1983 and by J. V. Tingley and Jack Quade during the spring of 1984. The report was prepared by J. V. Tingley.



LOCATION MAP NEVADA MINERAL INVENTORY OPEN FILE REPORTS

BLACK HAWK DISTRICT

LOCATION

The Black Hawk or Queen City mining district is located in the low hills on the southwest end of the Quinn Canyon range in the vicinity of Queen City summit. The mines and prospects of the district are located mainly north of State Route 375 in portions of T2 and 3S, R63 and 64E, Nye County.

HISTORY

Mercury was discovered in this area in 1929 by J. Mellon, and about 70 flasks of mercury were produced from the Black Hawk mine between 1930-1935 (Holmes, 1959). Sporadic activity was reported from the district during 1936-1943 and 1955-1957, but no additional production has been recorded. At the time of our examination (Fall, 1983) a large portion of the district had been recently staked and drilled. U.S. Minerals Exploration, Arvada, Colo., is the claim holder, and exploration is, no doubt, for gold.

GEOLOGIC SETTING

Paleozoic sedimentary rocks crop out on the west side of Queen City summit, and underlay the western portion of the district. Limestone of the Cambrian Nopah Formation is overlain on the east, near the summit, by a quartzitic sandstone. East of these Paleozoic outcrops, the remainder of the district is underlain by rhyolitic ash flow tuffs of Pliocene age (Cornwall, 1972).

ORE DEPOSITS

There is some confusion as to the location and geologic setting of the Black Hawk mine. Bailey and Phoenix, 1944, describe the Black Hawk occurrence as cinnabar found in botryoidal masses along the contact between sandstone and limestone. All other writers (Krall, 1951, Holmes, 1959, and our field crew, 1983) describe the Black Hawk occurrence as cinnabar found along shears in highly silicified volcanic rocks. Obviously there are two separate occurrences, Bailey and Phoenix saw one, all others saw the second. Krall, who was most familiar with local mine owners, placed the Black Hawk name on the occurrence in the tuffs, we will continue this useage. At the Black Hawk deposit, cinnabar occurs as blebs and veinlets in quartz and as coatings in vugs in silicified rhyolite tuff. Chalcedonic silica, jarosite, and fine-grained barite crystals were noted in the silicified rocks.

GEOCHEMICAL RELATIONSHIPS

The one ore sample from this district contained, along with visible cinnabar, high arsenic, barium, and moderate antimony. This association is similar to that found with gold in many other epithermal deposits.

SELECTED REFERENCES

- Bailey, E. H., and Phoenix, D. A., 1944, Quicksilver Deposits in Nevada: NBMG Bull. 41.
- Cornwall, H. R., 1972, Geology and Mineral Resources of Southern Nye County, Nevada: NBMG Bull. 77.
- Holmes, G. H., 1959, Preliminary Examination, Black Hawk Mercury Mine, Nye County, Nevada: USBM Unpub. Report.
- Krall, V. E., 1951, Mineral Resources of Nye County, Nevada: NBMG Bull. 50.

CHIEF (CALIENTE) DISTRICT

LOCATION

The Chief (Caliente) district is located on the southeastern tip of the Chief range, a southern extension of the Highland range southwest of Pioche. The major mines of the district are clustered in the northwestern quarter of T3S, R67E about six miles due north of the town of Caliente. The alternate name for this district, Caliente, reflects the inclusion in the district of several small prospects located within the city limits of the town of Caliente.

HISTORY

According to Tschanz and Pampeyan, 1970, deposits in the main Chief district (that portion in T3S, R67E) were probably discovered about 1868. The district was organized in 1870, and activity was reported for the years 1871, 1872, and 1886. Work was reported in the district again in 1907, and minor, intermittent operations continued up to 1953. Total production for the period 1870 through 1953 is given as only about \$93,740, mainly in gold and silver with some lead and copper.

No information is available on the old prospects located on the point just north of Meadow Valley wash, just south of the northern city limits of Caliente. These prospects may be the gold workings described in 1904 press clippings (NBMG Files) as being "at Caliente", but no production records are available on them. These workings consist of a fairly deep shaft and several cuts, tunnels and stopes. No work has been done on them in many years.

No recent work was in evidence in the main Chief district at the time of our examination (1983, 1984). Many current claims cover the district, some areas had been trenched and sampled within the past two-three years, and one area, north of the Lucky Hobo mine, had reportedly been drilled by Texas Gulf International about two years ago.

GENERAL GEOLOGY

The southern Chief range in the vicinity of the Chief district is composed of a thick sequence of Cambrian Prospect Mountain Quartzite which is locally overlain by small thrust sheet or slide block remnants of Late Cambrian Highland Peak Formation. The range is essentially an east tilted fault block, and the limestone remnants are exposed mainly in the east side of the block. Within the mine area, the small outcrops of carbonate rock are usually altered to a skarn containing wollastonite, some garnet and diopside.

Several small bodies of diorite, in the form of plugs, sills, and dikes, intrude the sedimentary formations. Many of these bodies are quite small and some appear to occur along older fault zones (Callaghan, 1936). On the map of Tertiary rocks of Lincoln County (Ekren, et al, 1977), a large outcrop of altered intrusive rock is shown to lie just to the south of the main Chief district.

Regionally, the Chief district lies just to the north of the northern margin of the Caliente caldron complex. The Tempahute lineament (Ekren, et al, 1977) is described as passing through the Chief district in an east-west direction and the intrusive body south of Chief is one of the elements which define the trace of the lineament. The altered area at Caliente, to the south of the Chief mines, is located on the margin of the Caliente caldron complex and it may be inferred that the gold prospects there as well as the Caliente hot springs may be related to the volcanic activity of the caldron complex.

ORE DEPOSITS

Mineral deposits in the central Chief district are of two general types, fissure veins or mineralized breccia zones in the carbonate-quartzite thrust or slide block contacts. The breccia zones are from 10 to 40 feet thick and are generally cemented by mylonitic material and iron oxides or by quartz and other vein minerals. The principal metals in both types of occurrences are gold, silver, and lead. All of the ore is oxidized, and galena is the only residual sulfide. Most of the ores are very high in arsenic, and the dump materials consist mainly of masses of gossan composed of silica, iron and manganese oxides and arsenic minerals. Cerussite and mimetite are present, and barite crystals were seen in gossan at the Gold Chief property. At the Advance mine, a vein deposit in quartzite, the wall rock is highly silicified and contains fine-grained disseminated sulfides.

The prospects to the south, at Caliente, explore stockworks quartz veins which occur in altered andesite. The stockworks are concentrated at the intersection area of a N20°E and a N10°W shear zone. Rock in the intersection area is laced with narrow quartz veinlets. The only minerals visible are iron and manganese oxides and some jarosite.

GEOCHEMICAL RELATIONSHIPS

With the exception of two samples from the Gold Chief area on the north edge of the district, all samples were high to very high in arsenic. Most samples were also high in antimony, lead, and zinc. Copper was low in most samples, low molybdenum values were reported in some, and four samples reported tin present. Barium was reported present in all samples but was high in only three.

SELECTED REFERENCES

- Callaghan, E., 1936, Geology of the Chief District, Lincoln County, Nevada: NBMG Bull. 26.
- Ekren, E. B., Buchnam, R. C., Carr, W. J., Dixon, G. L., Quinlivan, W. D., 1976, East-Trending Structural Lineaments in Central Nevada: USGS Prof. Paper 986.
- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS Map I-1041.
- Lincoln, F. C., 1922, Mining Districts and Mineral Resources of Nevada: Nevada Newsletter Publishing Co.
- Tschuz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

COMET DISTRICT

LOCATION

The Comet district is located on the west side of the southern Highland range and is restricted to the area south of latitude 37° 55' North. The mines of the district extend along the front of the range west of Highland Peak from the Pan American mine on the south to the Log Cabin mine on the north. The Forlorn Hope mine to the north in the Highland district is sometimes included in the Comet district as its mode of occurrence is more similar to the Comet district mines than it is to mines in the Highland district.

HISTORY

According to Lincoln, 1923, discoveries were made in the Comet district in 1882, but no production was recorded until 1895. Silver-lead ore was shipped intermittently from the district between 1895 and 1898 and between 1913 and 1920, mainly from the Schodde mine. The Comet mine was relocated in 1906 and silver, lead, zinc, gold, and tungsten were produced from this mine between 1925 and 1951. Ore from the Pan American mine was mined between 1947 and 1955. The Pan American was reactivated in 1964 and operated for several years after that date. Production of the district through 1952 is given as \$764,100 (Tschanz and Pampeyan, 1970) but this figure does not include the last production of the Pan American mine. At the time of our examination (summer 1983), a large portion of the district was controlled by Nerco Exploration Co. and mapping, sampling and other examination work was underway in several areas. No mining was in progress at any of the properties, however.

GEOLOGIC SETTING

Rocks within the Comet district consist of a homoclinal series of Cambrian rocks that strike north and dip gently east. From west to east, the rocks include the Prospect Mountain Quartzite, the Pioche Shale, the Lyndon Limestone, and the lower part of the Highland Peak Formation. The mineral deposits occur in the lowest three formations below a major overthrust plate of Upper Cambrian rocks (Highland thrust plate) that is inferred to extend beneath alluvium all along the west flank of the Highland range (Tschanz and Pampeyan, 1970).

ORE DEPOSITS

Two types of ore deposits occur in the Comet district, quartz vein deposits and bedded replacement deposits. The major vein occurrences were developed at the Comet mine in the central part of the district. There, four northeast-striking quartz veins can be traced on surface for about 1400 feet. These veins dip nearly vertically and are as wide as 13 feet in the quartzite but narrow to mere veinlets in the shale (Tschanz and Pampeyan, 1970). The best ore bodies occupy the wider parts of one major vein, the Comet vein. The Comet vein averages 6 feet in width and contains four ore shoots in its wider parts. All

of the major shoots dip steeply north although much of the vein dips steeply south. The vein filling consists chiefly of breccia fragments of quartzite recemented with clear and milky quartz. The primary ore contains galena, sphalerite, pyrite, wolframite, scheelite (minor), argentite, and gold (Stager, in prep.).

Bedded replacement deposits, 10 to 15 feet thick, occur in the lower part of the Combined Metals Member of the Pioche Shale at the Pan American mine and in or near the base of the Lyndon Limestone at the Schodde mine. Drill hole information (Trengrrove, 1949) indicates that the Combined Metals Member is mineralized at depth below the Schodde mine, and Tschanz and Pampeyan, 1970, infer that the CM bed could be continuously mineralized between the Pan American and Schodde mines. Vein mineralization occurs in several deposits north of the Comet as well as in the Highland district to the north. In this same area the Pioche Shale and the included Combined Metals Member can be projected along strike to the north for several miles along the front of the Highland range. This is the general area now being explored by Nerco Exploration Co.

GEOCHEMICAL RELATIONSHIPS

Of the eight ore samples taken in the Comet district, one was of vein ore from the Comet mine, the rest were of bedded replacement ore from each of six occurrences. The vein sample contained moderate manganese, silver, high arsenic and barium, high lead, zinc, and copper, moderately high antimony and tin. The replacement ores contained very high manganese, zinc and lead but only low to moderate arsenic, antimony, and tin and low barium. None of the samples reported tungsten or molybdenum.

SELECTED REFERENCES

- Gemmill, P., 1968, The Geology of the Ore Deposits of the Pioche District, Nevada: Ore Deposits of the Western States, AIME Graton-Sales Volume, v. 2.
- James, L. P., and Knight, L. H., 1979, Stratabound Lead-Zinc-Silver Ores of the Pioche District, Nevada - Unusual "Mississippi Valley" Deposits: RMAG-UGA-1979 Basin and Range Symposium.
- Lincoln, F. C., 1923, Mining District and Mineral Resources of Nevada: Nevada Newsletter Publishing Co.
- Merriam, C. W., 1964, Cambrian Rocks of the Pioche District, Nevada: USGS Prof. Paper 469.
- Stager, H. K., in prep., Tungsten Deposits of Nevada: NBMG Bull.
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.
- Westgate, L. G., and Knopf, A., 1932, Geology and Ore Deposits of the Pioche District, Nevada: USGS Prof. Paper 171.

DELAMAR DISTRICT

LOCATION

The Delamar or Ferguson mining district is centered around the ghost town of Delamar on the western slope of the northern Delamar Mountains. The main portion of the historic mining district is located in the area between Monkey Wrench Wash and Cedar Wash in the southeastern portion of T5S, R64E and the northeastern portion of T5S, R65E. For the purpose of this report, the limits of the Delamar district have been expanded to include all of the northern Delamar Mountains between Meadow Valley Wash, Delamar Valley and extending between T4S and T7S.

HISTORY

According to the account given in Callaghan, 1937, the first discoveries at Delamar were made in 1891 near Monkey Wrench Wash in the northern part of the district. Claims were located at the Magnolia mine, about one mile to the south of the Monkey Wrench, in March 1892, and the Delamar - April Fool area was staked about one month later. The district was originally named for its discoverers, John E. and Alvin Ferguson, farmers from Pahranaagat Valley. In 1893, most of the claims in the district were acquired by Capt. J. R. De Lamar, a mining entrepreneur who was associated with many other mining ventures in the west. De Lamar carried the Delamar and April Fool mines to production, and the Delamar district was the premier producer of gold in Nevada in 1894. Between that time and 1902, the Delamar mines produced \$9,500,000 in gold and silver. In 1902, De Lamar sold his interest in the Delamar mines to a group of eastern investors, and a new operating company, Bamberger-Delamar Gold Mining Co., was formed. This group resumed production in 1903 and operated in the district until 1909 when the mines were permanently closed. During this second period of operation, \$3,400,000 in gold and silver was produced. The district was idle until 1932 when retreatment of old mill tailings began. Between 1932 and 1940, an additional \$781,500 in gold was recovered. Total production of the Delamar district through 1950 is \$14,983,700 in gold, silver, and minor lead and copper. Delamar's gold production has always been emphasized at the expense of its silver output. The district is, however, a silver-gold district as the average ratio of gold to silver has been about 1:3 (Callaghan, 1937, p. 47).

At the time of our examination (1983, 1984), there was little evidence of activity in the district. Many recent claim posts were in evidence and several properties have been trenched, sampled, and drilled within the past one or two years, but no work was in progress when we were in the area.

GEOLOGIC SETTING

The Delamar district is largely within an outcrop area of Cambrian sediments which form the western flank of a lobe of the large Caliente caldron complex. Within the caldron complex to the east, rocks are mainly thick sequences of ash flow tuffs and rhyolitic flows. The western, resurged (Ekren, et. al., 1977)

lobe of the caldron lies just to the north of the productive part of the Delamar district, and the major mines are within an arc of altered rocks which generally parallel the caldron margin.

The Cambrian rocks at the Delamar consist mainly of a thick section of Prospect Mountain Quartzite capped to the north, east, and southeast by Chisholm Shale, Lyndon Limestone, Pioche Shale, and limestone of the Highland Peak Formation. All of the major mines of the district are in Prospect Mountain Quartzite, but a few prospects are in the shale or limestone units and one property, the Easter or Taylor mine, is within the tuff sequence east of Delamar, within the resurged caldron. Within the mine area, and apparently associated with the ore deposits, several sets of rhyolite dikes have been described which cut the Cambrian section. Callaghan, 1937, p. 27, describes three separate sets of dikes which extend in a general east-west direction through the district. Some of the dikes are described as pre-mineral, some are thought to be post-mineral. The trend of the dikes (NBMG Bull. 73, p. 137, Fig. 23) closely parallels the general trend of the caldron margin to the immediate north, and the association of the caldron margin, dikes, and the Delamar silver-gold deposits points to a common origin for all of these features.

ORE DEPOSITS

The detailed relationships of the ore deposits at Delamar are very well described by Callaghan in this 1937 NBMG Bulletin on the geology of the district. Callaghan describes four types of epithermal gold deposits at Delamar; quartzite breccia ore, cherty quartz ore, bedded quartzite ore, and volcanic breccia ore. Cemented quartzite breccia ore accounted for most of the production in the main deposit of the district, the Delamar mine. Cherty quartz ore was mined in the April Fool, Jumbo, Hog Pen mines, and the Magnolia mine ore was volcanic breccia. Bedded quartzite ore apparently occurred in quartzite wall rock in areas within the mines, but was not extensive. The three main types of ore have many common features which include brecciation, cementation of breccias by comb quartz, silicification of wall rocks, the presence of free gold, and low base metal content. Adularia is reported present at the Magnolia mine, and barite is reported from the April Fool and Jumbo deposits.

The Magnolia volcanic breccia ore contains abundant manganese oxides while breccia fragments and vugs at the April Fool mine to the south contain coatings of crystalline jarosite.

Perhaps the most interesting relationship noted within the the Delamar district is the close association of the various rhyolite dikes with the productive mines. The Magnolia mine was developed along a vein in volcanic breccia associated with a rhyolite dike. The ore chutes at the Delamar mine appear to have been located along the margins of a large, altered rhyolitic dike. In this dike rock phenocrysts of resorbed quartz occur in a fine-grained groundmass along with crystals of altered sanadine and plagioclase.

GEOCHEMICAL RELATIONSHIPS

The two separate parts of the Delamar district show distinctly different

geochemical signatures. Samples from the Monkey Wrench Wash - Magnolia mine area are very high in manganese, lead, zinc, and have the highest silver contents reported from the district. To the south, samples from the Delamar-April Fool area have anomalous antimony, bismuth, and have much lower silver contents. Arsenic, tin, and gold were found in samples from both areas, and two samples contained weakly anomalous molybdenum. Barium was found in all samples.

Although only a few samples were taken within the Delamar district, the work appears to have outlined a rough zonal pattern to the mineral deposits. The deposits to the north have a Mn-Ag-Pb-Zn-Au-As-Sn association while the deposits to the south display a Ag-Au-As-Sb-Bi-Sn association. These associations may indicate that the deposits at Delamar-April Fool represent the more central or deeper portion of the mineral system while those deposits to the north represent peripheral or shallower portions of the system.

GENERAL COMMENTS

The Delamar district presents the interesting picture of a "volcanic" type precious metal occurrence where the host rock is not a volcanic rock. It is inferred that the mineral system is related to the large caldron complex to the east, and that the mineralization is localized along regional structures related to the caldron margin. Geochemical sampling of areas along extensions of these structures could lead to the development of other deposits similar to Delamar. The Taylor or Easter mine to the east of Delamar is also located along one of the regional caldron-related structures. Its mineralization is similar to that at Delamar. The area between the Taylor mine and Delamar, and the entire margin of the resurged lobe of the Caliente caldron would be good targets for exploration.

SELECTED REFERENCES

- Callaghan, Eugene, 1937, Geology of the Delamar District, Lincoln County, Nevada: NBMG Bul. 30A.
- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS map I-1041.
- Emmons, S. F., 1902, The Delamar and Horn Silver Mines: Trans. AIME, vol. 31, p. 658-675.
- Hewett, D. F., Callaghan, E., Moore, B. N., Nolan, T. B., Rubey, W. W. and Schuller, W. T., 1936, Mineral Resources of the Region around Boulder Dam: U.S.G.S. Bul. 871.
- Lincoln, F. C., 1923, Mining Districts and Mineral Resources of Nevada: Nevada Newsletter Pub. Co.
- Paher, S. W., 1970, Nevada Ghost Towns and Mining Camps: Howell-North Books.
- Smith, A. M., 1938, Preliminary Examination of the Easter Mine: NBMG File 167, item 8.
- Tschanz, C. M. and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

DON DALE DISTRICT

LOCATION

The Don Dale district is located on the north end of the Groom range, and generally includes the area southwest of Coyote Summit, extending between State Route 375 and the Test Site boundary. Most of the mines and prospects are in the southern portion of T4S, R55E.

HISTORY

No information is available on the earliest discoveries in this area. The Andies mercury property was discovered in 1919 by C. A. Anderson, but he apparently did not return to locate the property until 1955 (Melbye, 1956). The Don Dale district was organized about 1945, indicating some activity was underway at that time. Tschanz and Pampeyan, 1970, report that 200 tons of silver-lead-copper ore were shipped from the Don Dale mine. Two flasks of mercury were produced from the Andies mine in 1956 (Melbye, 1956). Other than assessment work, very little activity has taken place in the district since the 1950's.

GEOLOGIC SETTING

The northern end of the Groom Range is composed of Cambrian and Ordovician rocks intruded by many granitic dikes and small stocks. The lower flanks of the range are covered by volcanic rocks which are cut by andesite porphyry dikes (Tschanz and Pampeyan, 1970). The volcanic rocks on the west flank of the range are intruded by masses of rhyolite that may be the same age as the intensely altered rhyolite tuffs that crop out near the Andies mine on the east flank of the range. Ekren, et al, 1977, infer that the volcanics on the north end of the Groom Range may have originated in the Bald Mountain caldera, located in the central part of the range about 7 miles to the south of the Don Dale district.

ORE DEPOSITS

Two very different types of mineral occurrences have been developed in the Don Dale district. The Don Dale mine follows a quartz vein that cuts shaley limestone and quartzite. The vein follows and is probably related to a quartz porphyry contact. Mineralization appears to occur mainly in the intrusive rock but some fine-grained sulfides were seen in vein material and in quartzite. Ore minerals consist of pyrite, chalcopyrite, galena, tetrahedrite, and copper carbonates.

At the Andies mine, cinnabar occurs as scattered crystals, thin veinlets, and coatings on fracture surfaces in a highly altered rhyolite tuff. Meta-cinnabar was observed in silicified-opalized rhyolite breccia in one area on the property, and a small pyrite micro-breccia was seen in another area of silicified tuff west of the old mine camp. The Andies mine occurs within an

extensive area of argillically altered, silicified rhyolite tuffs and flows, and other mineral deposits (mercury or gold) could be found in this area.

GEOCHEMICAL RELATIONSHIPS

Samples taken in this district reported very low values. Samples from the Don Dale mine area contained some lead, zinc, and copper as would be expected. The Andies mine samples were moderate to high in barium, but appear to contain little else (mercury analyses were not made).

SELECTED REFERENCES

- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS Map I-1041.
- Melbye, C. E., 1956, Geological Evaluation of the Andies Mercury Property, Tempiute District, Nevada: NBMG File 176, item 3.
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

EAGLE VALLEY

LOCATION

Several small mining areas scattered along the Nevada-Utah border in the Mahagony Mountains, east of Ursine, Nevada are gathered under the general name Eagle Valley district. In Nevada, the areas include the Fay mining area south of Deerlodge Canyon, the Deerlodge area, north of Deerlodge Canyon, and the Stateline Canyon area several miles north of Deerlodge Canyon. Also included in the Eagle Valley district is the Horsethief Spring area in the southern Wilson Creek Range, east of Eagle Valley reservoir. This area has had no recorded production and has not been historically included in the Eagle Valley district. No other mining areas are close, however, and the prospects here most logically fit into the Eagle Valley district. Across the Utah state line to the east, the extensions of the Fay-Deerlodge area are included in the Gold Springs district and the Stateline Canyon area extends over into the Stateline district. A large portion of the Deerlodge-Fay-Gold Springs district is within Nevada while most of the Stateline district mineralization is in Utah. Access to the Nevada side of this district is not good, The Deerlodge-Fay area is best reached from the south via a road across Big Summit. The northern area is accessible from the Reed's Cabin Summit road.

HISTORY

According to Perry (1976), prospecting was done near Gold Springs, Utah as early as the 1870's, but discoveries in the Stateline and Deerlodge areas were not made until about 1896 (Tschanz and Pamyeyan, 1970). The largest mine on the Nevada side, the Horseshoe mine near Fay, reported its greatest production between the years 1900-1903. Some production is reported for years up to 1911, then nothing is reported until 1932 when a revival period began which lasted until WW II. Production during this second period was not great, however, and an attempt at post-war revival in 1949-51 produced only a few thousand dollars. Total Eagle Valley district production is recorded at \$423,000 for the period between 1900 and 1951. Production statistics shown in Tschanz and Pampeyan (1970) show a silver-gold ratio of about 3.5 to 1 for the period 1903-1932. For the years after 1932, however, the silver-gold ratio was over 35 to 1, a very substantial difference. Other than the mention that some veins in the district are gold-silver and others are silver-gold, the literature has no explanation for the dramatic difference in silver-gold content of recovered bullion during the two production periods. It is possible that some of the problem may be the differences in recovery techniques for the two periods.

Exploration activity was noted in most areas within the Eagle Valley district. Large blocks of new claims were in evidence, and most properties showed signs of recent sampling. Some trenching and drilling had been done, and a drill rig was operating near the Thor mine when we were in that area in September, 1983. No activity was seen in the Nevada portion of the district in June, 1984, but a small mining operation was underway east of the Confidence mine, in Utah. In the Horsethief Spring area, recent exploration for disseminated gold there has consisted of sampling and considerable rotary drilling.

GEOLOGIC SETTING

With the exception of the Horsethief Springs area, all of the Eagle Valley district is underlain by Tertiary volcanics. The Horsethief Spring prospects are within an outcrop area of undifferentiated Upper Cambrian carbonate rocks. The Mount Wilson and Parsnip Peak volcanic centers lie to the northwest of Eagle Valley and the large Caliente caldron complex lies several miles to the south. Volcanic rocks in the Eagle Valley area may be related to either of these centers, or may be related to volcanic complexes centered to the east in Utah.

Detailed geologic investigations carried out in the Gold Springs part of the area, in Utah, divided the igneous rocks into a series of rhyolite flows, several andesite flows, intrusive rhyolite porphyries, as well as breccias and several types of dike rocks. These rocks, as well as some rhyolite tuffs, are also represented in the Nevada portion of the district.

ORE DEPOSITS

Deposits within the Deerlodge-Fay-Stateline portion of the Eagle Valley district consist of crustified fissure fillings that contain chalcedonic and comb quartz, adularia, lammelar carbonate and some fluorite along with pyrite, copper carbonates and free-milling gold. Cerargyrite is reported from the Tempa mine (White Horse, Silver Star) north of Deerlodge Canyon. Perry (1976) and Tschanz and Pampeyan (1970) both report the presence of gold telluride minerals in the district. Andesitic and rhyolitic wall rocks are highly silicified and laced with quartz veinlets along the margins of the mineralized fissures. The wall rocks are commonly brecciated some distance away from the veins and the veins themselves sometimes contain silicified wall rock fragments. Bands of dark, fine-grained sulfides (and possibly tellurides) were noted in specimens from several mines. Strike directions of the various mineralized fissures range from N80W, N50W, N-S, to N20-35E. The largest mine in the Nevada portion of the district, the Horseshoe, has a N-S strike. Another, the Snowflake, described by Perry (1976) as the largest vein system in the district, extends on a N15-20W trend from Gold Springs Wash in Utah to the northeast side of Buck Mountain in Nevada. Here, the Snowflake system is a silicified area of quartz stockworks veining about 100 feet wide with a main quartz vein about 10-15 wide in the center. North of Deerlodge Canyon, the Tempa or White Horse, Silver Star mine is located midway along an impressive N35E silicified zone that has a strike length of at least 7000 feet. The structural trend can be seen near the mine in the southeast corner of Section 13, T1N, R70E and it extends through the Tempa mine area and on to the prospects on the southwestern flank of Gold Bug mountain. To the north of the central part of the district, the Confidence mine is located on a strong N80W structure that is traceable for at least 3500 feet along the strike. The old Bergin mine, in Utah, is on the southeastern projection of this structure.

Mineralization in the Horsethief Springs area is very different from that to the east at Deerlodge-Fay. The host rocks are carbonates assigned by Tschanz and Pampeyan (1970) to the Uper Cambrian. Old prospects within this area explored areas of silicification and jasperoid which formed along shear structures in the carbonate rocks. Pods of heavy manganese oxide and iron oxide have been explored by shallow shafts, and lenses of white, crystalline

barite are exposed in two old prospect pits in the area. Recent prospecting activity in this area is no doubt for fine-grained gold.

GEOCHEMICAL RELATIONSHIPS

Sample results from select ore samples taken in the Eagle Valley district showed almost no variability. Silver was reported present in amounts ranging from 2 to 200 ppm, several samples showed detectable gold (one reported 20 ppm). Copper, lead and zinc values were all very low, and no samples reported detectable arsenic or antimony. Several samples, on the other hand, showed anomalous molybdenum and several reported anomalous beryllium.

SELECTED REFERENCES

- Collins, T. M., 1977, Geology of the Statelilne District, Utah-Nevada: unpub. M.S. thesis, Univ. of Missouri-Rolla.
- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS Map I-1041.
- Lincoln, F. C., 1923, Mining Districts and Mineral Resources of Nevada: Nevada Newsletter Publishing Co.
- Paher, S. H., 1970, Nevada Ghost Towns and Mining Camps: Howell-North.
- Perry, L. I., 1976, Gold Springs Mining District, Iron County, Utah and Lincoln County, Nevada: Utah Geology, v. 3, no. 1, p. 23-49.
- Thompson, K. C., and Perry, L. I., 1975, Reconnaissance Study of the Stateline Mining District, Iron County, Utah: Utah Geology, v. 2, no. 1, p. 27-47.
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

ELY SPRINGS DISTRICT

LOCATION

The Ely Springs or Lone Mountain district is located on the west slope of the Ely Springs Range, about 13 miles west of Pioche. The principle mines and prospects are located north and south of Ely Springs canyon near the southern end of the range. Access to the district is not good, but it may be reached by poor dirt roads which skirt Dry Lake valley to the west of the district.

HISTORY

Little is known of the history of this district. The county report (NBMG Bull. 73) states that ore was discovered here before 1917, but gives no details. The principal mine, the Hedman (King Midas), was not discovered until 1943, and the total district production has been only \$8,400. Silver has been the major commodity produced along with zinc, lead, and minor gold.

A problem with the location of the Hedman mine became apparent as a result of our field examination. The location shown on the map accompanying NBMG Bull. 73 places the Hedman mine in what is shown as Swiss Bob canyon on the Ely Springs 7 1/2' topographic map. There are no workings of any type in this location. The description of the Hedman mine, also given in Bull. 73, describes very accurately a very small prospect on the south edge of the district, south of Ely Springs canyon. The major mine of the district, however, is located north of Ely Springs canyon, about half way between the map location and the location of the described prospect. It must be assumed that the Hedman mine is the middle property, as it has several levels, extensive dumps, and substantial surface structures. No signs of recent activity were apparent in the district, but new claim posts were in evidence in several localities.

GEOLOGIC SETTING

The Ely Springs range is composed of complexly faulted and folded Upper Cambrian and Ordovician rocks. The mines of the district are restricted mainly to limestone in the Upper Cambrian rocks along the western front of the range.

ORE DEPOSITS

The ore deposits seen in the Ely Springs district are replacement silver-zinc-lead orebodies which have formed in the carbonate rocks along crosscutting structures. At the Hedman mine, there is some indication that the ore lenses occur where fractures have formed parallel to the axes of folding in the carbonate rocks. Breccia, consisting of irregular blocks of limestone cemented by white calcite and jasperoid, follows a N30⁸ E trend which generally parallel the axis of a gently dipping anticlinal structure.

Ore minerals present at the Hedman mine are sphalerite, galena, and hemimorphite in a gangue of quartz, white and black calcite. The carbonate host rock shows silicification adjacent to the mineralized structures.

GEOCHEMICAL RELATIONSHIPS

The geochemical sampling in the district, although admittedly limited, did not show unusual results. Samples were generally high in manganese, silver, zinc, and lead. Cadmium was present in large amounts in one sample. Anomalous arsenic was present on one sample, anomalous antimony in another. Three samples contained molybdenum, one of these contained tin. Samples from the main part of the district were low in barium, while the one sample from the east of the district was high in barium. The eastern locality also reported a high cobalt value.

SELECTED REFERENCES

Tschanz, C. M., and E. H. Pampeyan, 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

FREIBERG DISTRICT

LOCATION

The Freiberg (Worthington) mining district is located on the north end of the Worthington Mountains in northwestern Lincoln County. The historic silver-base metal part of the district is in central T1N, R57E, at the foot of Freiberg Peak. The more recent tungsten prospects are located northwest of there, on the northwest tip of the range.

HISTORY

According to Thompson and West, 1881, ore was discovered here in the fall of 1865 and the Worthington district was organized at that time. No work was done in the area until 1869, when additional discoveries were made and the district was renamed Freiberg. A mineral belt three miles long by one mile wide and containing eight parallel veins with values up to \$800 per ton is described in the 1881 account. The earliest recorded production from the district, however, is 1919 when a little oxidized iron ore containing silver and lead was shipped from the Roadside property. More ore was shipped in 1921, other shipments were made up through 1948, but the total recorded production through 1968 is given as only \$18,000 (Tschanz and Pampeyan, 1970). The tungsten deposits on the northwest side of the district were discovered much later than the silver-lead deposits, but there is no record of production from them.

There was no activity in the district at the time of our examination (fall, 1983), but a heap-leach silver operation was active at the Freiberg mine between 1980-1982. Most of the properties in and around the old district are within the New Freiberg Project, controlled by the Freiberg Mining Corp. Ore for the leach operation was apparently mined from a pit at the old Freiberg mine site.

GEOLOGIC SETTING

Rocks in the Freiberg district consist of complexly faulted lower Paleozoic carbonate rocks which have been intruded by two granite stocks. Many granitic and lamprophyre dikes cut the area, and the most of the limestone around the stocks have been converted to marble. Except for the tungsten prospects in the contact aureole of the western stock, and of the mines and prospects of the district are in limestones of the Ordovician Pogonip Group near the contact of the eastern stock.

ORE DEPOSITS

Two types of ore deposits have been explored within the Freiberg district; small, irregular replacement lenses or veins in altered limestone which contain silver-bearing sulfides, and skarn deposits which contain scheelite. The silver-bearing, base-metal sulfide veins are marked on surface by jasperoid-gossan zones which cut silicified and silicated (to weak skarn) limestone.

Galena, sphalerite, and pyrite occur in calcite-cemented limestone breccia along fault zones. The oxidized portions of the breccias contain cerrussite, malachite, and iron manganese oxides. These deposits were mined mainly for their silver-lead content, although some gold was also recovered.

In the skarn deposits on the northwest tip of the district, sparse scheelite occurs in an epidote-calcite-diopside-quartz skarn. The skarn zone is very weakly developed, and there has been no tungsten production from the deposit.

GEOCHEMICAL RELATIONSHIPS

Sample taken of ores from the Freiberg district were high in lead, zinc, copper and cadmuim with low silver values. Some, but not all showed high arsenic and antimony associated with the lead-zinc-copper and tin was present in five out of the six samples taken in the east part of the district. The one sample taken on the skarn deposit reported molybdenum as well as tungsten to be present. Low arsenic and antimony accompany the tungsten and molybdenum.

SELECTED REFERENCES

Lincoln, F. C., 1923, Mining Districts and Mineral Deposits of Nevada: Nevada Newsletter Publishing Co.

Stager, H. K., in prep., Tungsten Deposits of Nevada: NBMG Bull.

Thompson, T. H., and West, A. A., 1881, History of Nevada: Howell-North [1958].

Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

GOURD SPRINGS

LOCATION

Gourd Springs district covers the east flank of the East Mormon Mountains in the southwestern part of Lincoln County. The major prospects are located in the southwestern portion of T11S, R69E, near Gourd Springs. Properties in the Mormon Mountains to the west are also placed in this district as there is no other district close by.

HISTORY

The only recorded production from this district was in 1929 when 60 tons of manganese ore were shipped from the Amos Hunt property (Tschanz and Pampeyan, 1970). This property could not be located and, in fact, it could be in another area. In 1941, W. R. Cogart located claims on the Bruson (Macbruson) tungsten property, but no production has been reported (Stager, in prep.). There was no activity in the district at the time of our examination (summer, 1983).

GEOLOGIC SETTING

The East Mormon Mountains are composed of a complex thrust sheet of Pennsylvanian limestone which has overridden Cambrian Prospect Mountain quartzite and Precambrian intrusive and metamorphic rocks. In the area of the Bruson prospect, Precambrian pegmatite dikes intrude Precambrian amphibolite.

ORE DEPOSITS

The only ore deposits of note within the district are the Amos Hunt manganese property and the Bruson tungsten property. The Hunt property could not be located, and its existence is questionable. The Bruson tungsten prospect explores a contact zone of tourmaline-bearing pegmatite dikes which cut amphibolite. The dikes and quartz veins associated with them contain scheelite, powellite, molybdenite and wolframite.

GEOCHEMICAL RELATIONSHIPS

Samples taken of ore from the Bruson property were high in tungsten. One sample reported anomalous molybdenum and very high gold, the other sample reported high tin and beryllium. Base metal values as well as barium were low in both samples.

SELECTED REFERENCES

Stager, H. K., in prep., Tungsten Deposits of Nevada: NBMG Bull.

Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

GROOM DISTRICT

LOCATION

The Groom mining district is located in the southwestern Groom Range. The district is centered around the one major mine, the Groom Mine in T7S, R55E about 5 miles north of Groom Lake. While the district is not at this time officially included within the limits of the Nellis Air Force Bombing and Gunnery Range, the Air Force has essentially taken the area and all non-military access is restricted.

HISTORY

The Groom Mine was discovered in 1864, the district was organized in 1869, and a small, unrecorded amount of low-grade silver ore was produced between that time and about 1875. In 1885, the property was acquired by the Sheahan family who still own it. Production has been recorded for the periods 1915-1918, 1918-1942, and 1942-1956. Total production for the 1915-1918 period is recorded \$935,900 in silver and lead with minor zinc, copper and trace gold.

GEOLOGIC SETTING

In the vicinity of the Groom mining area, the rocks of the Groom Range consist of a thick section of lower Paleozoic rocks that strike north and dip steeply to the east. The Paleozoic rocks are covered on the east and north by Tertiary volcanic rocks. These volcanic rocks may be related to the Bald Mountain caldron which is shown by Ekren, et. al., 1977, to be several miles north of the Groom district. According to Humphrey, 1945, the Groom district is in a 2,000-foot-wide, complexly faulted graben of Pioche Shale, Lyndon Limestone, Chisholm Shale, and Peasley Member of the Highland Peak Formation faulted into the Prospect Mountain Quartzite. The Main fault, the north-striking fault which bounds this graben on the east, has been calculated by Humphrey to have had a vertical movement of over 3000 feet.

ORE DEPOSITS

The only productive ore bodies at the Groom Mine have been replacement deposits in limestone within the graben, on the hanging wall of the Main fault. The bedded replacement deposits are in three thin limestone beds in the upper part of the Pioche Shale, the irregular replacement deposits are in the Lyndon Limestone along steep fissures related to the Main fault. The limestone along the mineralized fissures is commonly silicified. Argentiferous galena and sphalerite are the primary ore minerals, but cerussite and anglesite occur in the oxidized ores. South of the Groom Mine, the Black Metal (Lane) mine has produced a small amount of zinc ore and a few small gold deposits occur in breccia zones in quartzite some distance to the north of the Groom Mine.

COMMENTS

Since the Air Force is restricting access to the Groom range, we were not able to conduct any field examinations in this area. We contacted Air Force Security and made a request to visit the area but it was denied. We were told we could not gain admission to this sensitive area "anytime in the foreseeable future". Our descriptions of the area therefore are taken entirely from available literature, and we have no geochemical relationships to report. Fortunately, the report by Humphrey, 1945, is very good, and it contains detailed descriptions of the ore occurrences in the district.

SELECTED REFERENCES

- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS map I-1041.
- Humphrey, F. L. , 1945, Geology of the Groom District, Lincoln County, Nevada: NBMG Bull. 42.
- Lincoln, F. C., 1923, Mining Districts and Mineral Resources of Nevada: Nevada Newsletter Publishing Co.
- Thompson, T. H., and West, A. A., 1881, History of Nevada: Howell-North [1958].
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

HIGHLAND DISTRICT

LOCATION

The Highland district is located in the northern Highland range and southern Bristol range and generally includes the area from near Arizona Peak to north of Stampede Gap. The Highland district is sometimes included with the Pioche district to the east and some properties are shared with the Comet district to the south. The Pioche district lies across a valley to the east, a natural boundary, but the boundary with the Comet district is given as latitude $37^{\circ}55'$, an entirely artificial boundary. Most of the mines in the district are clustered about Arizona Peak on the east side of the Highland range and around Stampede and Manhattan Gap on the range crest near the Junction of the Highland and Bristol ranges. Several mines and prospects are scattered along the western side of the district between Manhattan Gap and the Comet district boundary.

HISTORY

Silver discoveries were made on the eastern side of the Highland range in 1868 and a camp was built near Highland spring the next year (Paher, 1970). Ore was transported from the mines by wagon to a smelter at Bristol Well. Iron ore from the Manhattan mine at Manhattan Gap and oxidized lead-silver ores from the Mandha mine were used as fluxing ores at the smelter. A mill at Floral spring, south of Highland spring, was used to concentrate other silver ores from the district and these concentrates were also sent to the Bristol smelter. Accurate production figures for the Highland district have not been kept and, after 1935, production has been generally lumped with the Pioche district. Tschanz and Pampeyan (1970) estimate a gross production value of about \$2,000,000 from the district, mainly in lead, silver, gold, copper, and manganese. The major production years were 1872 to 1932.

At the time of our examination (fall, 1983, summer, 1984) the only activity noted in the Highland district was in the vicinity of the Forlorn Hope - Mountain Lion mines on the western side of the district. Many areas here had been recently sampled, and new drill sites were seen south of the Mountain Lion mine.

GEOLOGIC SETTING

The Highland district is underlain principally by Cambrian rocks which have been locally intruded by small stocks and dikes of quartz monzonite and granite porphyry. The main part of the Highland and Bristol ranges is made up of an east-tilted block of Pioche Shale, Lyndon Limestone, Chisholm Shale, and limestone of the Highland Peak Formation which has been overridden by thrust plates of Upper Cambrian rocks. This thrust, termed the Highland thrust plate, is thought to underlie Arizona Peak and to have overridden the Pioche Hills to the east as well. The thrust sheet is highly faulted and is now eroded from large portions of the Highland range.

ORE DEPOSITS

Three general types of ore occurrences are present within the limits of the Highland district. The principal ore deposits are siliceous replacement veins in the thrust plate of Upper Cambrian rocks on Arizona Peak and bedded replacement deposits related to them. The second type of occurrence consist of skarn and quartz vein deposits related to the small intrusive center near Manhattan Gap. The third type of occurrence is limited to one property, the Forlorn Hope mine on the southeastern margin of the district. The Forlorn Hope is a manganese rich zinc-lead replacement deposit formed in the Pioche Shale. It is similar to deposits found to the south in the Comet district and to the replacement deposits in the Pioche district.

The replacement veins follow $N70^{\circ}-85^{\circ}W$ fissures and ore formed both along the fissures and in limestones adjacent to the fissures. Siliceous gossans with jasperoid and iron and manganese oxides form the surface expressions of these veins, and the ores were lead carbonate which contained values in both silver and gold. The skarn ore from the Manhattan mine at Manhattan Gap consisted of massive iron gossans in garnet skarn. Thick quartz veins cut the skarn and continue to the southwest for about two thousand feet. The manganese-zinc-lead replacement orebody at the Forlorn Hope mine appears to be similar to deposits to the south in the Comet district. The ore consisted of quartz-manganosiderite-sphalerite-galena lenses which occurred in a member of the Cambrian Pioche Shale.

It does not appear that the Pioche Shale has been extensively explored for replacement ore to the north of the Forlorn Hope where the Pioche Shale is partially covered (the lower portion) by the Highland thrust. Replacement bodies could exist in this area in favorable horizons which do not outcrop.

GEOCHEMICAL RELATIONSHIPS

All of the ore samples analyzed from the Highland district showed certain similarities; most were high in zinc, lead, copper, arsenic and manganese. Silver was reported from all samples, but the values were not exceptionally high. The vein-replacement ores contained low but consistent antimony values and reported anomalous tin and tungsten in about half of the samples. Samples taken from the Manhattan Gap area were high in molybdenum and tungsten but contained no antimony and only low lead-zinc. The one sample from the manganese replacement deposit (Forlorn Hope) reported high manganese, zinc, lead with moderate arsenic, no antimony, and low tin. This element association is seen again in samples from the Comet district to the immediate south of the Forlorn Hope.

SELECTED REFERENCES

- Gemmill, P., 1968, The Geology of the Ore Deposits of the Pioche District, Nevada: Ore Deposits of the Western States, AIME Graton-Sales Volume, v. 2.
- James, L. P., and Knight, L. H., 1979, Stratabound Lead-Zinc-Silver Ores of the Pioche District, Nevada - Unusual "Mississippi Valley" Deposits: RMAG-UGA-1979 Basin and Range Symposium.
- Merriam, C. W., 1954, Cambrian Rocks of the Pioche District, Nevada: USGS Prof. Paper 469.
- Paher, S. W., 1970, Nevada Ghost Towns and Mining Camps: Howell-North.
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.
- Westgate, L. G., and Kopf, A., 1932, Geology and Ore Deposits of the Pioche District: USGS Prof. Paper 171.

LITTLE MOUNTAIN

LOCATION

The Little Mountain district is located in the general area north and south of Empty Mountain (Little Mountain) on the southwestern edge of the Cedar range. The largest of the few prospects in the district are located near the common corner of T3-T4S and R68-69E on the south side of Empty Mountain. One additional prospect is located several miles to the north in Miller Spring Wash.

HISTORY

No information is available on the discovery or production history of this district. All of the workings are small and production must have been minor at best. Recent claims were in evidence in the district but no work was being done at the time of our examination (1983-1984).

GEOLOGIC SETTING

Empty Mountain is composed of "older" Tertiary andesitic volcanics (Tschanz and Pampeyan, 1970) which have been intruded by several small stocks of diorite. To the north of Empty Mountain, in Miller Wash, a small outcrop of pre-Tertiary carbonate rock is exposed on the diorite contact. Other very small carbonate masses must be present in other areas on the diorite contact as small pods of skarn mineralization were found at some of the prospects in the district. Tschanz and Pampeyan, 1970, describe the entire diorite mass as being weakly chloritized, but alteration is most intense along the contact with the older volcanics and along shear zones that cut the contacts. On the regional map of Lincoln County (Ekren, et al, 1977) the Little Mountain area falls along the northern rim of the Caliente caldron complex, and is generally on the eastern extension of the Tempiute lineament.

ORE DEPOSITS

All of the small mineral deposits within the Little Mountain district occur in or near the intrusive bodies. Most are confined to narrow shear zones which cut the contacts, and mineralization consists mainly of stainings of copper minerals. Epidote and other skarn minerals are present with pods of magnetite, psilimelane, specularite, malachite and chrysocolla. Wall rocks near the mineralized shear zones are commonly silicified and the rocks are stained with several shades of unidentified yellow and green oxide minerals.

GEOCHEMICAL RELATIONSHIPS

Samples taken from the prospects south of Little Mountain contain values which might be expected from copper skarn occurrences. Very high copper values were, of course, obtained from the selected ore samples. Samples were also high in lead and zinc, and contained some silver. Anomalous bismuth was present in two samples and one, from the southern-most prospect (sample site 786) was very high in molybdenum, possibly accounted for by some of the yellow oxide mineral reported present there.

SELECTED REFERENCES

Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary rocks, Lincoln County, Nevada: USGS Map I-1041.

Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

PENNSYLVANIA DISTRICT

LOCATION

The Pennsylvania district is located near the head of Pennsylvania Canyon on the southwest flank of the Clover Mountains and east of Meadow Valley Wash. The district is centered around one major deposit, the Pennsylvania Mine just east of the center of T6S, R67E. Access to the area is by the steep Ella Mountain road which leads from Elgin in Meadow Valley Wash.

HISTORY

According to Thompson and West, 1881, the Pennsylvania district was discovered by "a mormon named Klingensmith" and the first work was done in the fall of 1871. The principal mine was named the Klingensmith, and it was developed by a 75-foot incline and a 200-foot shaft. The vein was two and one half to three feet wide and produced low-grade ore valued at twenty to twenty five dollars per ton. Old mill ruins, dumps, and foundations can today be seen which date to this early period of mining, but no production records exist from this activity. It is probable that production from that early period was credited to the nearby Caliente Delamar or Viola districts. Smith (1969) mentions a 1943-vintage DMEA contract which was carried out at the Pennsylvania mine, but, again, no records of this exist. Production figures of about \$45,000 are given in NBMG Bull. 73, but they are not well documented.

The claims immediately surrounding the old Pennsylvania mine are owned by Tom Johnson and family of Eureka, Nevada. Several exploration programs have been conducted on the property and the surrounding area in the past twenty or so years, and a small-scale gold leaching project is now underway. The first of the recent exploration efforts in the Pennsylvania district was by Bear Creek Mining Co. in the late 1960's. Bear Creek was interested in the copper potential of the skarn prospects to the southeast of the Pennsylvania gold occurrences. Following Bear Creek, other major companies, including Homestake Mining Co. and Cordex Exploration investigated the area for gold. From the drill pattern seen within the Pennsylvania property, it appears that the present small operation plans to mine gold from the area of the open pit near Johnson's cabin.

GEOLOGIC SETTING

The Pennsylvania district lies along the southwestern boundary of the main portion of the large Caliente caldron complex. The mines and prospects of the district are aligned along a regional NNW structure which either parallels or forms the southwestern boundary of the caldron. To the northeast of the structure, a thick sequence of ash flow tuffs and rhyolitic flows fill the caldron. To the southwest, a structurally complex band of pre-Tertiary rocks outcrop somewhat as a window surrounded by andesitic and rhyolitic volcanics. The pre-Tertiary sedimentary rocks are intruded by small plugs of what has been described as diorite porphyry. The older limestones have been marbleized near the diorite contacts, and small skarn deposits have formed in areas along the

margins of the diorite. The structural complexity of the Pre-Tertiary rocks and the limited extent of their outcrop within a much larger area of tuffs related to the Caliente caldron complex suggests the possibility that these older rocks could be structural blocks broken from the walls of the caldron.

ORE DEPOSITS

Mining activity in the Pennsylvania district has been limited to an area about one mile long which extends N10°-30°W along a fault contact-caldron margin at the head of Pennsylvania canyon. The mineralized zone exposed in cuts and pits at the Pennsylvania mine consists of a sheeted quartz vein system which cuts altered andesitic volcanics. The veins trend NNW and generally dip to the east. In some areas along the structure, quartz-cemented breccia occurs with vugs lined with quartz crystals. Pyrite and chalcopyrite are visible in ore specimens, and rock fragments are commonly coated with iron, manganese, and copper oxide minerals. Free gold is occasionally visible. The andesitic wall rocks are propylitically altered and silicified. There has been limited prospecting of the small, weak skarn zones exposed within the blocks of Cambrian limestones which are found southeast of the Pennsylvania mine. These prospects contain magnetite, copper minerals, and sparse scheelite.

GEOCHEMICAL RELATIONSHIPS

Samples of ores from the mines of the Pennsylvania district were found to be uniformly high in manganese, copper and silver, and locally contained very high gold values. The samples were low in barium, contained low to moderate amounts of lead and zinc and, at least at the detection limits of our analytical methods, contained no antimony or arsenic. Tin and bismuth were not detected and only one sample, a skarn, contained molybdenum.

SELECTED REFERENCES

- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS map I-1041.
- Smith, L. E., 1969, The Tom Johnson Property, Pennsylvania District, Lincoln County, Nevada: NBMG File 167, item 1.
- Thompson, T. H., and West, A. A., 1881, History of Nevada: Oakland, Calif., Howell-North [1958].
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

PIOCHE DISTRICT

LOCATION

The Pioche district is centered around the Pioche Hills, or Ely Range, which forms a low, northwest-trending arc extending to the east from the more prominent Bristol-Highland range. The hills form a general dividing line between Meadow Valley to the south and Lake Valley to the north. The mines of the district are located in T1N, R67E south of the present town of Pioche. The district was first known as the Meadow Valley district as the original settlement and milling center was near Panaca to the south in Meadow Valley. Later, the district was named the Ely district after one of the early mine owners. The present district name, Pioche, is sometimes extended to include the Highland district to the west but this report will use the Pioche name to cover only those mines in the Pioche Hills.

HISTORY

Silver ore from Pioche was shown to William Hamblin, a Mormon missionary, by Indians in 1863. The Indian name for silver ore was "panacare", a name Hamblin slightly transformed to "Panacher" and applied to claims he staked on the silver croppings. With a little more adjustment, the name became "Panaca" and is still in use for the small Mormon farming town in Meadow Valley. Hamblin and others organized the Meadow Valley mining district in March, 1864 but little mining was done until 1868 when San Francisco financier F. L. A. Pioche entered the district and formed the Meadow Valley Mining Co. In 1869, W. H. Raymond and John Ely came to the area and formed the Raymond and Ely Mining Co., and the first major mining period in the district began. The first ores mined were high-grade silver chloride-cerrusite ores from narrow fissure veins on Treasure Hill slightly southeast of Pioche. These ores contained considerable gold and were treated by stamp mills at Bullionville, near Panaca in Meadow Valley and in Dry Valley. This first period of production peaked in 1873 and was over by 1879. About \$21 million, nearly all in silver, was produced during the short time period. Two later periods of production followed. Between 1912 and 1920, low-grade manganese-silver fluxing ores were produced from mines on the westside of the district and, between 1934 and 1953, large bedded replacement ores containing zinc-lead-silver were mined, also from the west side of the district. Total district production is recorded at \$133 million but this figure may contain some production from nearby districts. At the present time (1984), none of the mines in the Pioche district are active. Some ores from outside the district are reportedly being treated at the mill immediately northeast of Pioche, but the efforts are very small-scale. Exploration has been done near Caselton for the past few years and several major mining companies continue to show interest there. Exploration results and future plans for the area are, however, unknown.

GEOLOGIC SETTING

The Pioche Hills (Pioche district) are composed of complexly faulted Lower and Middle Cambrian rocks which have been intruded by a few porphyry dikes and

sills. In general, the eastern part of the district is underlain by Cambrian Prospect Mountain Quartzite which served as host to the narrow, high-grade silver fissure deposits mined early in the district's history. The western part of the district is underlain by quartzite as well as the overlying Pioche Shale, Lyndon Limestone, Chisholm Shale, and Highland Peak Formation. The south-eastern portion of the Pioche Hills, beyond the mining area, is covered by Tertiary volcanic rocks.

The Pioche Shale served as host horizon for the large bedded replacement ore bodies and the Lyndon Limestone and Highland Peak Formation were the host rocks for the low-grade manganese-silver fluxing ores mined during the later mining periods of the district.

Regionally, the Pioche Hills, and the adjacent Highland and Bristol ranges, are part of a north-south elongated outcrop of mainly Cambrian rocks which appear to embay or are covered by volcanic rocks of the large Mount Wilson and Caliente caldron complexes which are centered to the east and south. Westgate and Knopf (1932) and Tschanz and Pampeyan (1970) consider the Pioche Hills to be a window in a regional thrust plate of Upper Cambrian rocks that overrode older Cambrian rocks and Tertiary volcanic rocks. They presume the thrust underlies Cambrian rocks on the west side of the Highland range and on Arizona Peak. A megabreccia composed of blocks of Cambrian rocks and volcanic rocks is known, from drill hole data, to surround the productive portion of the district. Tschanz and Pampeyan (1970) believe the megabreccia to be the result of gravity sliding. Gemmill (1968) discounts entirely the thrust concept and attributes all of the former thrust fault relationships to more simple gravity sliding. It would be interesting to investigate the possibility that the megabreccia could be related to the large volcanic centers which almost totally encircle the district.

ORE DEPOSITS

Three important types of orebodies have been mined within the Pioche district; high-grade fissure vein occurrences of silver in quartzite on Treasure Hill, low-grade manganese-silver replacement bodies from limestones on the west side of the Pioche Hills, and zinc-lead-silver bedded replacement bodies from limestones within the Pioche Shale (largely from the "CM" limestone bed).

The fissure deposits were mainly in three nearly east-west trending fissures, the Raymond and Ely which split into the Meadow Valley and Burke veins, and the Yuba Dike. Oxidized silver ore shoots in the fissures extended for several thousand feet along strike and they were locally mined to a depth of 1200 feet. The richer fissure ore contained 75 to 150 ounces of silver to the ton, mainly as silver chloride. Lead, as cerrusite, was present in amounts ranging from 11 to 20 percent.

The low-grade silver-bearing, manganese fluxing ores came from the Prince and Virginia Louise mines on the western slope of the Pioche Hills, south of Caselton. Between 1915 and 1927, these mines produced about 1,100,000 tons of manganese fluxing ore which contained an average of 2.7 ounces silver, 3 percent lead, and 3.5 percent zinc along with 31.5 percent iron and 12.5 percent manganese. This material was sent to lead smelters in the Salt Lake Valley, Utah.

The bedded replacement deposits in the Pioche Shale, the largest orebodies both in size and total value mines at Pioche, occur principally in the Combined Metals Member and Susan Duster bed of the Pioche Shale. The bedded ore was mined from "channels", ore zones roughly aligned along an east-west trend across the district. The main channel, the Castelton, is mineralized for some 9000 feet through the district. It has produced about 3,250,000 tons of ore containing 0.044 ounces gold, 4.86 ounces silver, 4.48 percent lead and 11.96 percent zinc per ton. Minerals in the sulfide portions of this material are sphalerite, galena, pyrite, and manganoan siderite.

Gemmill, 1968, notes that there seems to be no direct relationship between mineralization in fissures in quartzite and mineralization in the C.M. bed of the Pioche Shale. The "Greenwood fissure", important as a feeder structure in the Castelton replacement ore channel, is not mineralized where it is seen in Prospect Mountain Quartzite. The Raymond and Ely fissure, where projected to intersect Pioche Shale, does not form replacement ore.

GEOCHEMICAL RELATIONSHIPS

Ore samples from the Pioche district displayed fairly consistent relationships. Silver was reported present in all, but was highest in samples from fissure-vein occurrences. Manganese, lead and zinc values were highest in ores from the replacement deposits. Arsenic was anomalous in all samples, antimony anomalous in most. Only a few samples showed detectable gold. Low tin values and scattered tungsten values were reported. No molybdenum was reported from any samples, and the barium values appear to be lower than those found in many other nearby districts.

COMMENTS

The Pioche district is the largest mining district, in production, in Lincoln County and, in all of eastern Nevada, is second only to the Robinson district to the north in White Pine County. Several detailed studies have been made of Pioche district geology and of geology of major Pioche mining properties. These studies should be referred to for more detailed information on the area. One point that has not been stressed in earlier work, however, is the coincidence between the Pioche district and the volcanic structures in this part of eastern Nevada. There is no reason to infer that the massive bedded ores at Pioche are in any way related to late vulcanism, but some features noted during our field examinations could point to the presence of late-stage, low-temperature mineralization which in fact could be related to volcanic activity. Open-space fillings of silica were noted at several properties, as was crystalline jarosite, and quartzite breccia cemented with opaline silica was reported from the Wide Awake mine southeast of Pioche. Although not visited during our examination, Knopf (Westgate and Knopf, 1932, p. 51) reported the presence of a considerable mass of opal north of the Ely Valley mine and related it to a hot spring origin resulting from Tertiary volcanic activity.

SELECTED REFERENCES

- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary rocks, Lincoln County, Nevada: USGS Map I-1041.
- Gemmill, P., 1968, The Geology of the Ore Deposits of the Pioche District, Nevada: Ore Deposits of the Western States, AIME Graton-Sales Volume, v. 2.
- James, L. P., and Knight, L. H., 1979, Stratabound Lead-Zinc-Silver Ores of the Pioche District, Nevada - Unusual "Mississippi Valley" Deposits: RMAG-UGA-1979 Basin and Range Symposium.
- Lincoln, F. C., 1923, Mining Districts and Mineral Resources of Nevada: Nevada Newsletter Publishing Co., Reno.
- Merriam, C. W., 1954, Cambrian Rocks of the Pioche District, Nevada: USGS Prof. Paper 469.
- Paher, S. W., 1970, Nevada Ghost Towns and Mining Camps: Howell-North.
- Park, C. F., et al, 1958, Geologic Map and Sections of the Pioche Hills, Lincoln County, Nevada: USGS Map MF-136.
- Thompson, T. H., and West, A. A., 1881, History of Nevada: Howell-North[1958].
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.
- Westgate, L. G., and Kopf, A., 1932, Geology and Ore Deposits of the Pioche District: USGS Prof. Paper 171.
- Wheeler, H. E., 1940, Revisions in the Cambrian Stratigraphy of the Pioche District, Nevada: NBMG Bull. 34.

QUINN CANYON AREA

LOCATION

Only the southern foothills of the Quinn Canyon Range lie within Lincoln County, and only a portion of them is within the Caliente Resource Area. For the purposes of this study, however, we have included most of the Quinn Canyon fluorite district within our area of interest. The area covered in reconnaissance fashion extends from the vicinity of Sec. 1, T2N, R54E on the Lincoln-Nye county line northeast along the Quinn Canyon Range to just northeast of Adaven. A good portion of this area is within the Humboldt National Forest.

HISTORY

This area is included within the Willow Creek mining district which is largely in Nye County. Kral, 1951, credits the first discoveries in the district to Charles Sampson and David Jenkins who located the Rustler claim east of Nyala on an arsenical gold-silver deposit. Other small deposits containing gold and silver were discovered nearby, and shipments were made from some during the periods 1917-1926, 1938-1939, and 1948. No production is recorded but Kral, 1951, estimates metallic production of not over \$100,000.

Fluorite was discovered in the northeast part of the area in 1934 and other deposits were discovered to the west near Quinn Canyon in 1941 (Papke, 1979). Fluorite deposits in the Lincoln County part of the district were not staked until 1952-1953. While only about 29,5000 tons of fluorspar have been produced from this district, it contains the largest concentration of fluorspar deposits in Nevada (Papke, 1979). There has been no activity related to fluorspar production in the Quinn Canyon area for many years. There is, however, considerable activity related to precious metal exploration taking place in the district at this time (1984). Several major mining companies, including Superior Oil, Cominco American, and Amoco Minerals have large claim blocks within the district.

GEOLOGIC SETTING

The southern part of the Quinn Canyon Range consists mainly of volcanic rocks through which several isolated blocks of Paleozoic carbonate rocks are exposed. A rhyolite plug cuts the volcanic rocks in Cottonwood Creek, southeast of Adaven. The carbonate rocks range in age from Cambrian Windfall Formation through Devonian Guilmette Formation. These rocks are complexly faulted. The volcanic rocks consist mainly of thick sections of welded ash flow tuff and both Paleozoic carbonates and the tuffs have been cut by rhyolite plugs and east-northeast trending rhyolite dikes. The occurrence of thick ash flows in the domed central part of the Quinn Canyon Range and the occurrence of numerous rhyolite plugs and flows on the southwest and south flanks all strongly suggest that the range is, in part, a resurged caldron. The rocks are intensely fractured and faulted and hydrothermal alteration is locally intense (Stainsbury and Kleinhampl, 1969).

ORE DEPOSITS

The fluorite deposits in this district are thoroughly described by Papke, 1979, and his work should be consulted for details concerning the various mines and prospects. Our reconnaissance work was designed to investigate the potential for metallic mineralization in the district and our descriptions and sampling reflects this emphasis.

Generally, two types of fluorite deposits are described by Papke (1979), deposits associated with large masses of jasperoid in carbonate rocks, and deposits associated with breccia zones in altered volcanic rocks. The jasperoid bodies as well as the breccia zones and related fluorite deposits generally are aligned along north-northeast directions parallel to rhyolite dikes which cut the older rocks in the district. An impressive feature of the district which is not emphasized in the literature is the size and extent of some of the jasperoid masses. These, and the rhyolite dikes, stand out in topographic relief and can be visually traced for great distance along strike. The structural control for the fluorite deposits, the jasperoid-filled structures and the dikes may be related to the resurged caldron. The fluorite deposits themselves may be just one manifestation of a much larger mineralized system.

GEOCHEMICAL RELATIONSHIPS

Samples taken in this study were not specifically of high-grade fluorite, rather they were taken from silicified breccias and jasperoid at or near the fluorite occurrences. Gold was found to be present, in small amounts, in 17 of the 22 samples taken in the area. Arsenic and antimony values were generally low, but high values were obtained from two known precious metal occurrences on the north side of the district. The presence of gold in association with fluorite occurring along major structures marked with jasperoid and silicification makes the Quinn Canyon area an obvious target for precious metal exploration.

SELECTED REFERENCES

- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS Map I-1041.
- Hill, J. M., 1916, Notes on Some Mining Districts in Eastern Nevada: USGS Bull. 648.
- Kleinhample, F. J., and Ziony, J. I., 1984, Mineral Resources of Northern Nye County, Nevada: NBMG Bull. 99B.
- Krall, V. E., 1951, Mineral Resources of Nye County, Nevada: NBMG Bull. 50.
- Papke, K. G., 1979, Fluorspar in Nevada: NBMG Bull. 93.
- Stainsbury, C. L., and Kleinhample, F. J., 1969, Fluorite Deposits of the Quinn Canyon Range, Nevada: USGS Bull. 1272-C.
- Stewart, J. H., and Carlson, J. E., 1976, Cenozoic Rocks of Nevada: NBMG Map 52.
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

TEMPIUTE DISTRICT

LOCATION

The Tempiute district is located on Tempiute Mountain, a north-south trending spur range on the west end of the Timpauite Range in northwestern Lincoln County. The townsite of old Tempiute and the 1868-era silver discoveries are located in the southern part of the district, mainly in T4S, R56E. The tungsten properties are located to the north on the north end of the range near the boundary of T3 & 4S, R56 & 57E.

HISTORY

Paher, 1970, dates the discovery of silver in the district as 1865, but Thompson and West, 1881, credit the discovery to December 1868, and state that the district was organized in January of 1869. Rich silver chloride ores were mined and milled at a mill at Crescent in the nearby Pahranaagat district, but mining declined when this mill was dismantled and moved to another location. The district was active during the 1870's then quiet up until 1916 when the scheelite claims were staked. No tungsten mining was done at this time, however, and the district was again inactive until 1924 to 1941 when some silver ores were mined. The tungsten deposits again became of interest in 1936 and were relocated. Tungsten production began in 1940 by Lincoln Mines, Inc. The Atolia Mining Co. acquired the tungsten properties in 1945 and they operated until 1948. Wah Chang Mining Corporation acquired the property in 1951, built a larger mill, and operated until 1957 when tungsten mining ceased due to depressed prices and demand. In 1968, Union Carbide Corp. became active in the Tempiute district, leased the tungsten properties, developed new ore reserves, built a new mill, changed the name of the mine to the Emerson Mine and began production in 1977. Operations again ceased in 1982 due to falling tungsten prices and problems with grade control within the mine. The new mine-mill plant is now (1984) on standby status.

The recorded production of the Tempiute district through 1958 is given as \$14,922,000 (Tschanz and Pampeyan, 1970). Of this total, \$198,600 is from gold, silver, copper, lead, and zinc, the balance is from tungsten. Total production of tungsten, through 1982 is estimated at 500,000 units (Stager, in prep.), but no dollar amount is available for this production.

At the time of our examination (fall, 1983), the operation at the Emerson tungsten mine was on standby, but some development work was being done. There was also activity on the silver properties on the south end of the range and one, the Johnson claim area, appeared to be nearing a production stage.

GEOLOGIC SETTING

Tempiute Mountain is underlain by steeply east-dipping Paleozoic sedimentary rocks which have been intruded on the north by two small granitic stocks. The Paleozoic sequence is more than 7000 feet thick and includes rocks of

Ordovician, Silurian, Devonian, and Carboniferous ages. The main part of the range appears to be a homocline that strikes north, with older beds on the west side, younger ones on the east. At the north end of the range the beds steepen and overturn along strike, a dip reversal possibly brought about by overthrusting prior to granite intrusion which cuts through the thrust plate (Stager, in prep.). The two stocks have been dated at about 92 my (Kruger and Schilling, 1971) and are described as quartz monzonite.

ORE DEPOSITS

Two types of mineral deposits occur in the Tempiute district; silver-bearing brecciated quartz veins which follow bedded plane faults in limestone and dolomite, and tungsten-bearing skarn zones which have formed in the contact zones of the intrusives in the north part of the district.

The massive silver-bearing quartz veins commonly have wide brecciated zones on their walls and occupy bedding plane fault zones in the steeply-dipping carbonate rocks. The carbonate rocks show silicification which decreases in intensity away from the mineralized structures. Ore minerals include pyrite, chalcopyrite, galena, tetrahedrite, sphalerite, hemimorphite, cerussite, malachite, and azurite. The breccia zones are cemented with sulfide-bearing quartz, cavities are lined with euhedral quartz, and outcrops are stained with iron, manganese, and copper oxide minerals. These vein occurrences are found mainly on the southwestern tip of the range. Many old cabin ruins in the area indicate that these were the deposits exploited in the 1870's.

Tungsten deposits occur in the northern part of the district associated with skarn zones formed in the carbonate rocks near their contact with the two intrusive bodies. The following description of these deposits is taken largely from Stager (in prep.). On the west side of the south stock, part of the limestone is altered to thick bodies of tactite in bands parallel to bedding. Around the north stock, only a few narrow lenses of tactite occur, principally on the northeast side. Tactite is present along the west half of the south stock for more than 6,000 feet. Directly at the contact is a continuous band of tactite 15 to 110 feet thick. Adjoining this band is a nearly continuous belt of platy hornfels 25 to 110 feet and in part split into two beds separated by tactite. Large masses of tactite lie west of the hornfels and extend as far as 450 feet from the granite contact. Scheelite is the only mineral found in commercial amounts in the contact deposits. Most of the scheelite occurs in garnet tactite, but some rich deposits have been found in small masses of calcite-fluorite-sphalerite rock formed in marble remnants adjoining tactite bodies. Other minerals that occur in the tactite are quartz, actinolite, pyrite, pyrrhotite, hematite, epidote, and molybdenite. The scheelite occurs in greater concentration on the limestone side of the tactite bands.

At the Lincoln or Emerson mine, ore has been mined from two separate ore shoots; the Moody zone which is east of the platy hornfels zone, and the Grubstake zone which is west of the platy hornfels horizon. The Moody zone has been the most continuous and uniform, the Grubstake, while having high-grade shoots, is not as continuous and has shorter strike length. The Moody zone commonly contains high concentrations of pyrrhotite and sphalerite gangue minerals, and some ore zones contain considerable bismuth.

GEOCHEMICAL RELATIONSHIPS

The two types of ore occurrences at Tempiute each reported very different geochemistry. Ore samples from the silver vein deposits were uniformly high in silver, copper, lead, zinc, and antimony. Arsenic and cadmium values, while not high, were uniformly consistent. Molybdenum was reported in only two samples, tin in one, and the values were low. Manganese values were only moderately high. The ore samples from the tungsten skarns, on the other hand, were uniformly high in tungsten and manganese. Copper and lead values were low, but some samples were high in zinc. Beryllium values were high in the skarns, tin was reported in six samples and molybdenum was present in six. It was interesting to note that barium was present in higher amounts in several of the skarn samples than it was in any of the silver vein samples.

SELECTED REFERENCES

- Binyon, E. O., Holmes, G. H., Jr., and Johnson, A. C., 1950, Investigation of the Tem Piute Tungsten Deposit, Lincoln County, Nevada: USBM RI 4626.
- Buseck, P. R., 1962, Contact Metasomatic Deposits at Conception Del Oro, Mexico, Tem Piute, Nevada; and Silver Bell, Arizona: Columbia Univ. PhD. Thesis, unpub.
- Enaudi, M. T., Meinert, L. T., and Newberry, R. J., 1981, Skarn Deposits: Econ. Geol. Seventy-Fifth Anniversary Volume.
- Johnson, A. C., and Benson, W. T., 1963, Tungsten Resources of Nevada: USBM unpub. report.
- Kerr, P. F., 1946, Tungsten Deposits of the United States: GSA Memoir 15.
- Kruger, H. W., and Schilling, J. H., 1971, Geochron/Nevada Bureau of Mines K/AR Age Determinations-List 1: Isochron/West, 71-1.
- Lincoln, F. C., 1923, Mining Districts and Mineral Resources of Nevada: Nevada Newsletter Publishing Co.
- Paher, S. W., 1970, Nevada Ghost Towns and Mining Camps: Howell-North Books.
- Stager, H. K., in prep., Tungsten Deposits of Nevada: NBMG Bull.
- Thompson, T. H., and West, A. A., 1881, History of Nevada: Howell-North [1958].
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

VIGO DISTRICT

LOCATION

The Vigo district covers a large and rather indefinite area beginning north of Lime Mountain on the southern edge of the Clover Mountains and extending to the southern edge of the Tule Springs Hills. Part of the area was formerly known as the Bull Valley mining district (Smith, 1931) and the southern area, the southern tip of the Tule Springs Hills, is sometimes identified as the Tule Springs district. Most of the properties in the district are north of Lime Mountain but a few gypsum properties are scattered about in the area south of the Tule Springs Hills.

HISTORY

Very little is known about the mining activity in this area, and not much mining has actually taken place. According to Smith, 1931, L. Leavitt and E. and J. Walker of Bunkerville had locations on the manganese deposit here in 1926. In 1926, the group is reported to have mined 2 or 3 carloads of ore (either manganese or iron) which they shipped to the Columbia Steel Works at Los Angeles. This property could not be definitely located in the field during our examination, but it is possible that it could be in the area of Sec. 9 (?), T8S, R70E. Evidence of recent claim staking, geophysical work, and drilling were seen in this area when we were there in the spring of 1984.

GEOLOGIC SETTING

Rocks cropping out in the Vigo district consist of Paleozoic and Triassic sedimentary formations overlapped to the north by volcanics related to the large Caliente caldron complex. At Lime Mountain and in the Tule Springs Hills, Cambrian to Mississippian limestone and dolomite are overthrust on Triassic rocks of the Kiabab, Toroweap, Moenkopi, and Chinle Formations. The Paleozoic formations are in the Tule Springs thrust plate, which is thought to represent the northern extension of the Muddy Mountains thrust plate in Clark County (Tschanz and Pampeyan, 1970). The volcanic rocks in the northern part of the district consist of intermediate lavas and tuffs of Miocene and Oligocene age (Ekren, et al, 1977).

ORE DEPOSITS

The prospects examined in the Vigo district consisted of manganese-rich gossans and jasperoid bodies associated with steep fault zones or with fault breccia related to the Paleozoic-Triassic thrust contact. One building stone quarry was noted, and gypsum deposits in the Toroweap Formation occur to the south of the Tule Springs Hills.

The manganese prospects referred to by Smith, 1931, may be the iron-manganese gossans seen in prospects in Sec. 9 (?), T8S, R70E. To the north of the manganese prospects, prospects near Cedar Wash in the southern Clover Mountains

(T7S, R70 & 71E) explore altered breccia zones in lavas and tuffs of the Caliente caldron complex.

GEOCHEMICAL RELATIONSHIPS

Samples taken from the manganese prospects north of Lime Mountain were not particularly high in manganese, although they did report high iron contents. Barium values in the district ranged from low to moderate, although one sample from the largest "manganese" prospect reported high barium. Samples from the volcanic area on the north edge of the district reported low silver values and one sample, No. 787, reported anomalous lead, molybdenum, and copper. The iron-manganese gossans samples at the manganese prospects also reported values in cobalt and nickel. The values for these elements are not high, but they are above the values normally seen in other areas.

SELECTED REFERENCES

- Ekren, E. B., Orkild, P. P., Sargent, K. A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS Map I-1041.
- Smith, A. M., 1931, Inspection Trip Memo, NBMG File 177, item 1.
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

VIOLA DISTRICT

LOCATION

The Viola district extends along the southern flank of the Clover Mountains from Meadow Valley Wash near Cottonwood Canyon on the west to the Blue Nose Peak area on the east. The mines and prospects of the district are in the east half of T8S, R68E and the west half of T8S, R69E.

HISTORY

According to Tschanz and Pampeyan, 1970, the Cherokee vein in the western part of the Viola district was discovered in the 1800's. A carload of silver ore was reportedly shipped from the Viola (Cherokee) Mine early in the history of the district, but no records of this production have survived. It is possible that early production was credited to either the Pennsylvania or Caliente districts. Claims were first staked on the fluorite deposits on the edge of the Tule Desert southeast of Blue Nose Peak in 1942 (Papke, 1979). Apparently no production was made from these deposits until 1958-1968 when they were intermittently mined by Wells Cargo Co. Some additional fluorite was mined during 1968-71 and extensive exploration was done on the property during the early 1970's (Papke, 1979). Total fluorite production through 1971 is recorded at 44,900 tons of 69% (ave. grade) CaF_2 . There has been not activity in the Viola district for several years. At the time of our examination (1984), there were new claims covering the fluorite (Carp mine) area, and there was evidence of recent sampling at several of the silver prospects in the north part of the district.

GEOLOGIC SETTING

The Viola district lies just to the south of the southern margin of the Caliente caldron complex. Rocks in the district are composed of three isolated outcrops of Paleozoic carbonates surrounded by Miocene ash flow tuffs which originated from within the caldron. The large masses of limestone and dolomite crop out along a northwest-trending band extending from the Tule Desert on the southeast to the Cottonwood Canyon area on the northwest. The southeastern outcrop, near the Carp mine, and the central block, near the Pittsburg and other mines around Blue Nose Peak, are composed of Mississippian and Pennsylvanian-Permian dolomite and limestone. The third block, to the northwest in the Cherokee mine area, is composed of Permian and Triassic limestones. The structure within the carbonate blocks is complex, and relationships do not correlate from block to block; the older Paleozoic rocks may be part of the regional thrust plate which in nearby areas, has placed older Paleozoic rocks over younger Paleozoic rocks and Triassic rocks. The area could also be reflecting sturctural complications related to the margin of the Caliente caldron.

ORE DEPOSITS

At the Carp (Wells Cargo) mine, large replacement bodies of fluorite were mined

from a wide zone of brecciation along a northwest-trending fault zone in dolomite and dolomitic limestone. Barite and chalcedonic silica are also present and some areas show iron and manganese oxide staining. Both fluorite and barite cement breccias along the wide structure. To the north of the main Carp pit, fluorite-cemented breccia occurs along a north-south trending prophyry dike which cuts silicified tuff.

The many prospects in the Blue Nose Peak area explore small replacement zones and silicified breccias which formed along steep structures cutting carbonate rocks. Clots of galena and tetrahedrite occur with quartz, fluorite, calcite, and barite along these northwest and northeast striking fault zones. A large area of alteration just west of the saddle north of Blue Nose Peak resembles an area of hot springs leaching.

At the Cherokee mine, the largest metal mine in the Viola district, galena, tetrahedrite, pyrite, and copper, iron, and manganese oxides occur in a wide quartz-calcite vein which cuts Permian Kiabab limestone. The vein fills a N45°W fault zone and has been explored for about 200 feet along strike. The structure at the Cherokee has been traced for 2 miles (Tschanz and Pampeyan, 1970) and is parallel to mineralized structures seen at Blue Nose Peak and at the Carp mine area to the southeast.

GEOCHEMICAL RELATIONSHIPS

Samples taken from the southeastern part of the district, the Pittsburg and Carp areas, were all high in barium. The Pittsburg (Blue Nose Peak) sample were generally high in lead, antimony, zinc, cadmium and contained some silver. One sample in this area was also high in arsenic. Low to moderate molybdenum values were obtained from several Blue Nose Peak samples also. To the northwest, samples from the Cherokee area were high in copper, low in barium, contained moderate lead-zinc, and did not report antimony or arsenic. Low molybdenum was reported from two samples in this area.

SELECTED REFERENCES

- Ekren, E. B., Orkild, P. P., Sargent, K., A., and Dixon, G. L., 1977, Geologic Map of Tertiary Rocks, Lincoln County, Nevada: USGS Map I-1041.
- Lincoln, F. C., 1923, Mining Districts and Mineral Resources of Nevada: Nevada Newsletter Publishing Co.
- Papke, K. G., 1979, Fluorspar in Nevada: NBMG Bull. 93.
- Papke, K. G., 1984, Barite in Nevada: NBMG Bull. 98.
- Tschanz, C. M., and Pampeyan, E. H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: NBMG Bull. 73.

APPENDIX A

Sample Description

Sample Number	Location	Description
117	Quad: Chief Mtn. 7½' Sec: 8 T: 3S R: 67E UTM: 4175100 N 0719280 E SOA Lode claim Chief District	Calcite vein/gossan/gouge. Earthy mixture of calcite & Feoxs, possibly also barite? Remnant partially oxidized clots pyrite & very fine grained, minor galena. Rock is thoroughly oxidized, brecciated & show boxworks throughout (Looks like Ag ore).
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
118	Quad: Chief Mtn. 7½' Sec: 8 T: 3S R: 67E UTM: 4174950 N 0719240 E Gold Chief Chief District	Yellow-white, silicified limestone/quartzite breccia coated with & cemented by calcite, clay?, opaline-silica & minor Feoxs. Yellow-green alteration coating possibly after arsenate mineral Minor Feoxs after pyrite? & dark Mn ox streaks & clots.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
119	Quad: Chief Mtn. 7½' Sec: 8 T: 3S R: 67E UTM: 4174920 N 0719200 E Gold Chief Chief District	Dense, red-brown earth mass of limonite, hematite, calcite "gossan" surrounds coarse, white, bladed barite crystals which are coated by Fe & Mn ox & contain clots of oxidized pyrite & specular hematite? or metallic sulfide. Sample is mixture of vein & gouge material (Brecciation evident). Possibly contains Ag in oxidized material.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
120	Quad: Chief Mtn. 7½' Sec: 8 T: 3S R: 67E UTM: 4174920 N 0719200 E Gold Chief Chief District	Marly limonitic, hematitic, Mn ox-rich gossan & intergrown vitreous grey, massive quartz. Vugs in gossan filled with white to red-brown calcite. Earthy, oxidized dense (possible barite?, probably also Ag.) Continuous chip across fissure on SW side of glory hole.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
121	Quad: Chief Mtn. 7½' Sec: 7 T: 3S R: 67E UTM: 4174990 N 0718530 E Lucky Chief Chief District	Sample consists of brecciated mass of limonitic & Mn ox-rich gossan cut thru by calcite & opaline veins & containing euhedral crystals of white barite. Part of sample consists of acicular masses of pyrolusite.

Sample Description

Sample Number	Location	Description
122	Quad: Chief Mtn. 7½' Sec: 7 T: 3S R: 67E UTM: 4174670 N 0718490 E Lucky Hobo Chief District	Banded brown earth & jaspery gossan & siliceous vein breccia. Siliceous vein material is composed of greenish chalcedonic & opaline quartz which encloses altered limestone(?) fragment. Clots MnOx & cerussite(?) common coated with opaline quartz. Rock is very dense & probably contains dispersed fine-grained sulfides (Au?, Ag?) Minor remnant chalcopryrite (?) observed.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
123	Quad: Chief Mtn. 7½' Sec: 7 T: 3S R: 67E UTM: 4174650 N 0718390 E Lucky Hobo Chief District	Very dense sulfide ore in siliceous vein material. Grey, waxy, finely crystalline sulfide (probably galena) with yellow alteration product occurs in abundance in hematite stained, quartzose gangue. Small vugs encrusted with hematite quartz. Minor chalcopyrite observed.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
124	Quad: Chief Mtn. 7½' Sec: 7 T: 3S R: 67E UTM: 4174580 N 0718410 E Lucky Hobo Chief District	Calcite (& barite?) cemented limestone breccia. Fragments altered to limonite/hematite. Vein material contains dispersed sulfides. Cerussite coats surfaces & occurs in calcite & quartz Clots oxidized pyrite common. Sample dense; may contain some barite.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
125	Quad: Chief Mtn. 7½' Sec: 18 T: 3S R: 67E UTM: 4274060 N 0718500 E Advance Mine Chief District	Recrystallized, Fe-stained quartzite & silica/Fe-cemented quartzite breccia. Fine quartz veining & quartz encrusted fractures. Grey streaks may be finely disseminated sulfides, possibly Pb or Ag mineral? Oxidized, fine-grained pyrite abundant in most samples. Yellow-green oxides common.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
126	Quad: Chief Mtn. 7½' Sec: 18 T: 3S R: 67E UTM: 4174150 N 0718720 E Sample loc 126 Chief District	Heavily Fe-stained, altered quartzite & quartzite breccia. Breccia cemented with hematite limonite & silica. Quartzite frags are coated & veined by finely crystalline quartz & hematite & contain clots chlorite(?), sericite & oxidized pyrite. Some portions gossany & display boxworks.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
127	Quad: Chief Mtn. 7½' Sec: 18 T: 3S R: 67E UTM: 4174215 N 0718900 E Contact Mine area Chief District	Fe/stained-cemented quartz, vein breccia & jaspery, hematitic red-brown gossan or vein material. Fine hairline black quartz veinlets & clacite encrusted vugs. Opaline coated surfaces.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	Material is siliceous & oxidized.
128	Quad: Chief Mtn. 7½' Sec: 18 T: 3S R: 67E UTM: 4174310 N 0718885 E Contact Mine area Chief District	Dark brown jaspery, hematitic gossan. Some fragments quartzite & clots white quartz vein. Brecciation evident, also fine siliceous veining. Yellow, red & green oxides & some boxworked vugs.
129	Quad: Mosey Mtn. 7½' Sec: 36 T: 3S R: 68E UTM: 4169110 N 0735465 E Sample loc 129 Little Mtn. District	Light green epidote, calcite, quartz skarn with irregular glassy pods of quartz & calcite. Quartz carries, oxidized clots pyrite, galena(?), chalcopryrite (?), tetrahedrite(?) or chalcocite(?). Some siderite vein & altered, pyritized, Cu-stained intrusive rock also. (No scheelite observed when lamped.)
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
576	Quad: Blue Nose Peak 7 1/2' Sec: 33 T: 8S R: 69E UTM: 4121260 N 0740750 E Carp Mine Viola District	Breccia from fracture zone in pit, dolomite wall rock, barite and fluorite cementing material, minor FeOx and MnO stain, bright yellow-green mineral coating fracture surfaces.
577	Quad: Blue Nose Peak 7 1/2' Sec: 32 T: 8S R: 69E UTM: 4122000 N 0740450 E Carp Mine Area Viola District	Silicified rhyolite porphyry along brecciated zone, N-S structure, possibly some fluorite in breccia matrix. Rhyolite may be dikes cutting Paleozoic rocks.
578	Quad: Blue Nose District 7 1/2' Sec: 19 T: 8S R: 69E UTM: 4125000 N 0738050 E Unnamed Prospect Viola District	Replacement ore from prospect dumps, white, recrystallized limestone with barite-fluorite in breccias, pods galena, tetrahedrite, oxide copper and lead minerals.
579	Quad: Chokecherry Mtn. 7 1/2' Sec: Unsurv. T: 5S R: 66E UTM: 4154200 N 0709330 E Taylor Mine Delamar District	Brecciated vein from fault zone, quartz cemented, silicified rhyolite, open spaces coated with acicular quartz traces FeOx and MnO ₂ stain.
580	Quad: Caliente NW 7 1/2' Sec: 3 T: 4S R: 65E UTM: 4166610 N 0703960 E Antique Prospect Delamar Area	Massive, white vein quartz, minor MnO ₂ points, some calcite crystals in vugs.
581	Quad: Tempiute 15' Sec: 36 T: 4S R: 55S UTM: 4157550 N 0611010 E Andies Mine Don Dale District	Kaolinized, silicified rhyolite ash flow tuff, fracture surfaces and adjacent rock flooded with hematite, microbreccia with fragments of pyrite cemented with pyrite and quartz.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
784	Quad: <u>Mosey Mtn. 7½'</u> Sec: <u>36</u> T: <u>3S</u> R: <u>68E</u> UTM: <u>4168880</u> N <u>0736010</u> E <u>Dig A Little Claims</u> <u>Little Mtn. District</u>	<u>Massive, irregular pods & fine veinlets of magnetite & vug fillings of malachite & chrysocolla occur in dark red, garnetiferous tactite. Minor calcite in tactite, mainly siliceous.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>Unidentified steeley, bladed mineral & green crystalline coatings. Rock very dense. Feoxs & boxworks common. (No scheelite observed when lampd)</u>
785	Quad: <u>Mosey Mtn. 7½'</u> Sec: <u>31</u> T: <u>3S</u> R: <u>69E</u> UTM: <u>4168660</u> N <u>0737840</u> E <u>Dig More Claims</u> <u>Little Mtn. District</u>	<u>Chloritized & epidotized mafic intrusive with abundant Cu-staining on fracture surfaces & clots unoxidized magnetite(?) or other sulfide. Oxidized pyrite & hematite in veinlets & on fractures.</u>
786	Quad: <u>Islen 7½'</u> Sec: <u>12</u> T: <u>4S</u> R: <u>68E</u> UTM: <u>4166450</u> N <u>0736580</u> E <u>Sample loc 786</u> <u>Little Mtn. District</u>	<u>Fe-stained altered diorite intrusive with veinlets & clots of magnetite, malachite, purite & specularite. Also botryoidal coatings of steely grey mineral with yellow streak & yellow oxidation product (Pb Sb ox?) Galena(?) & psilomelene also noted. Host rock is bleached & epidotized.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>_____</u> <u>_____</u> <u>_____</u>
787	Quad: <u>Docs Pass 7½'</u> Sec: <u>31</u> T: <u>5S</u> R: <u>71E</u> UTM: <u>4150020</u> N <u>0757150</u> E <u>Sample Site 787</u> <u>Vicinity of Vigo District</u>	<u>Brecciated rhyolite flow, silicified, argillically altered on surface, pinkish grey, remnant mafics, glass shards, platy partings (almost shale like in outcrop, very minor limonitic and MnO₂ stains, rocks cut by silica veinlets, breccia fragments exhibit milling.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>_____</u> <u>_____</u> <u>_____</u>
788	Quad: <u>Dodge Spring 7½'</u> Sec: <u>12?</u> T: <u>7S</u> R: <u>71E</u> UTM: <u>4138180</u> N <u>0760390</u> E <u>Vicinity of Vigo District</u>	<u>Hydrothermal breccia, mafic-rich intrusive cemented with cockscomb quartz crystals, euhedral to anhedral, abundant open spacing, intergrown calcite crystals; calcite also coats surfaces (secondary) abundant boxworks, surfaces coated with Fe-Mn oxides, some psilomelane, barite intergrown with quartz?, pinkish-maroon spots (not right color for FeOx), quartz crystals radiate from central nucleation point and from walls of breccia.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>_____</u> <u>_____</u> <u>_____</u>

Sample Description

Sample Number	Location	Description
789	Quad: Dodge Spring 7½' Sec: 24? T: 7S R: 70E UTM: 4135525 N 0755500 E Blackstone Claims Vicinity of Vigo District	"Wonder stone", bleached, porous, differentially weathered, rhyolitic ash tuffs, glass shards, quartz crystals iron stains produce swirled patterns building stone quality?
790	Quad: Jacks Mountain 7½' Sec: 9? T: 8S R: 70E UTM: 4128500 N 0751380 E Vigo District	Iron, manganese rich, hydrothermally altered rock, ("cooked"), heavy, slag-like, oxidized, silicified, late stage calcite nodules and surfaces coatings slightly magnetic.
791	Quad: Dodge Spring 7½' Sec: 32 T: 7S R: 71E UTM: 4131490 N 0758840 E Vigo District	Jasper/jasperoid/calcite veins, heavily FeOx stained, silicified, calcite crystalline, silicified pods, localized breccia cemented with bluish silica, pale green (malachite) surface coatings, breccia carries dark, very fine grained mineral (Ag?) in silica cement, chalcedonic, fine veinlets of brownish-yellow silica mineral cuts breccia.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
792	Quad: Dodge Spring 7½' Sec: 36 T: 7S R: 70E UTM: 4131600 N 0755290 E Vigo District	Rounded iron-manganese concretion nodules, fractured, weathered, oxidized, varying degrees of density.
793	Quad: Pioche 7½' Sec: 7 T: 1S R: 68E UTM: 4195690 N 0727790 E Blue Queen Claims Pioche District	Quartzite breccia, heavily hematite stained between quartz grains and in silica cement, patches and bands limonite botryoidal specularite coats fractures, fine cavities interspersed in breccia, white alteration material coats some pieces, rocks silicified.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
794	Quad: Pioche 7½' Sec: 7 T: 1S R: 68E UTM: 4195690 N 0727790 E Blue Queen Claims Pioche District	Quartzite, white to beige, fractured, exposed surfaces coated with golden to dark brown jarosite, possibly with minor intergrown sphalerite, crystal platy, pseudocubic to hexagonal, rocks fluorescence spotty yellow-orange with stringers bright green (Opaline?), quartzite spotted with very fine hematite and finely disseminated dark grey mineral rocks cut with fine silica veinlets.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
795	Quad: Pioche 7½' Sec: 7 T: 1S R: 68E UTM: 4195600 N 0727850 E Blue Queen Claims Pioche District	Quartzite Breccia, silicified, fragments fine, cut with silica veinlets, very fine malachite disseminated throughout rock, clots tetrahedrite carried by quartz veins, also disseminated, very fine fresh and oxidized pyrite grains, botryoidal hematite coats fracture minor sericite, quartzite beige to pink, recrystallized, yellow alteration on surfaces (SbOx?).
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
796	Quad: Pioche 7½' Sec: 5 T: 1S R: 68E UTM: 4195850 N 0728200 E Independence Mine Pioche District	Fe-Mn ore replacing pinkish-grey quartzite heavy, dense, dirty, pyrolusite crystals, oxidized hematite, pyrolusite fibrous/feathery, minor quartz veining.
797	Quad: Pioche 7½' Sec: 5 T: 1S R: 68E UTM: 4195950 N 0728150 E Independence Mine Pioche District	Mafic rich intrusive dike, hydrothermally altered, grains malachite, abundant calcite coats surfaces, veinlets resembles asbestos, abundant biotite, soft isometric black, mineral grains, minor FeOx stains, greenish cast to rocks (chloritized?) rocks heavy and very dense.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
798	Quad: Pioche 7½' Sec: 36 T: 1N R: 67E UTM: 4198650 N 0726520 E Pioche District	Quartzite/gouge material, minor limestone Fe-Mn oxide stained, minor oxidized pyrite, minor calcite/quartz veining rocks heavier than expected, gouge platy, with minor sericite, minor fracturing with hematite stains.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
799	Quad: Pioche 7½' Sec: 26 T: 1N R: 67E UTM: 4199360 N 0725990 E Wide Awake Mine Pioche District	Silt/mudstone, coated with crystalline pyrite crystals and finely disseminated throughout rock, abundant pyritic stains calcareous along fractures, quartzite gouge material, Fe-Mn oxide stained, loosely cemented with abundant open spaces, minor malachite coats surfaces, bleached alteration material, fractured quartz vein, sacchroidal, minor silica veinlets cut vein, arsenopyrite?, rocks locally silicified.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
800	Quad: <u>Pioche 7½'</u> Sec: <u>26</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4199450</u> N <u>072580</u> E <u>Volcano Mine</u> <u>Pioche District</u>	<u>Quartz vein cutting quartzite, veinlets,</u> <u>clots, pods fresh and oxidized sulfides</u> <u>(galena, argentiferous, tetrahedrite,</u> <u>pyrite grains), secondary minerals</u> <u>include malachite, anglesite, SbOx,</u> <u>FeOx, MnO2, vein fractured, vuggy,</u> <u>cut by silica veinlets, silicified,</u> <u>fractures in quartzite lined with</u> <u>euhedral quartz crystals, boxworks,</u> <u>gossan pods, very fine opaline silica.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____

Sample Description

Sample Number	Location	Description
1389	Quad: Highland Peak 7½' Sec: 9 T: 1N R: 66E UTM: 4204275 N 0713800 E Blue Bell Mine Highland District	Hydrothermally altered vein replacement material (gossan), heavily Fe-Mn oxide stained, siliceous, heavy, pods stringers fresh fine grained galena, greenish alteration suggests anglesite,
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	pyrite ghosts, fracture surfaces coated with opaline silica and very fine grained calcite, vugs lined with very fine grained drusy quartz, fine jarosite coats boxworks.
1390	Quad: Highland Peak 7½' Sec: 8 T: 1N R: 66E UTM: 4203550 N 0711225 E Highland District	Silicified gossan, hydrothermally altered heavily Fe-Mn oxide stained, some surface coated with malachite powdery, gossan carries stringers and pods vitreous quartz fractured,
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	chalcopryite ghosts, hematite pseudomorphs after pyrite, grey zones suggest disseminated sulfides,
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	seritice borders separate quartz from gossan, rock abundant boxworks, vugs chrysocolla, host rock probably original limestone, abundant claiche and calcite.
1391	Quad: Highland Peak 7½' Sec: 8 T: 1N R: 66E UTM: 4203650 N 0711200 E Highland District	Gossan, quartz vein breccia, mangano-siderite vein, all highly Fe-Mn oxidized, earthy, siliceous, heavy.
1392	Quad: Highland Peak 7½' Sec: 8 T: 1N R: 66E UTM: 4203675 N 0711180 E Highland District	Quartz vein/breccia cementing gossan, silicified, quartz granular, heavily Fe-Mn stained, highly fractured, exposed surfaces coated with caliche, iridescent oxides.
1393	Quad: Highland Peak 7½' Sec: 8 T: 1N R: 66E UTM: 4204560 N 0711480 E Death Trap Shaft Highland District	Quartz vein, sheared, highly fractured carrying barite laths, oxidized pyrite and chalcopryite crystals, fractures and boundery of vein lined with fresh galena, surfaces coated with malachite,
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	chrysocolla, cerrusite, Fe-Mn oxides, dendritic pyrolusite yellow-green, crusty mineral (anglesite?) (SbOx?).

Sample Description

[illegible]

Sample Description

Sample Number	Location	Description
1394	Quad: <u>Highland Peak 7½'</u> Sec: <u>8</u> T: <u>1N</u> R: <u>66E</u> UTM: <u>4203900</u> N <u>0711500</u> E <u>Manhattan Tunnel</u> <u>Highland District</u>	<u>Vitreous, white quartz vein carrying</u> <u>clots of heubnerite-ferberite, inter-</u> <u>grown pyrite-molybdenite, possibly</u> <u>with minor galena, tetragonal pink</u> <u>soft crystals line vug, patches and</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>veins of abundant iron-stained</u> <u>sericite, oxidized grains pyrite,</u> <u>vein appears pegmatitic in patches,</u> <u>quartz grains intergrown with sericite.</u>
1395	Quad: <u>Highland Peak 7½'</u> Sec: <u>8</u> T: <u>1N</u> R: <u>66E</u> UTM: <u>4203900</u> N <u>0711500</u> E <u>Manhattan Tunnel (Upper Workings)</u> <u>Highland District</u>	<u>Andradite (?) garnet-gossan, iron-rich</u> <u>heavily oxidized, quartz vein/pods</u> <u>(breccia?) oxidized pyrite grains</u> <u>disseminated in quartz, intergrown</u> <u>heubnerite-ferberite? limonite stains,</u> <u>very fine boxworks, green, glassy hard</u> <u>mineral intergrown with quartz.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____
1396	Quad: <u>Highland Peak 7½'</u> Sec: <u>9</u> T: <u>1N</u> R: <u>66E</u> UTM: <u>4203525</u> N <u>0712450</u> E <u>Highland District</u>	<u>Hydrothermally altered quartz vein/</u> <u>siliceous gossan, abundant Fe-Mn oxide</u> <u>stained, quartz granular/vein, granular</u> <u>calcite/crystalline calcite, minor</u> <u>MnO₂, secondary copper coats, a lone</u> <u>piece of quartzite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____
1397	Quad: <u>Highland Peak 7½'</u> Sec: <u>16</u> T: <u>1N</u> R: <u>66E</u> UTM: <u>4202625</u> N <u>0712050</u> E <u>X-Ray Tunnel</u> <u>Highland District</u>	<u>Crystalline, medium grey limestone</u> <u>with abundant clots, pods, stringers,</u> <u>white calcite, very fine pyrite grains,</u> <u>oxidized, minor FeOx stains. Breccia</u> <u>zones cemented with crystalline calcite</u> <u>with abundant open spacing.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____

Sample Description

Sample Number	Location	Description
1416	Quad: <u>Pioche 7½'</u> Sec: <u>26</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4199610</u> N <u>0725425</u> E <u>Daily East Mine</u> <u>Pioche District</u>	<u>Milky white quartz vein, breccia with</u> <u>quartz and pink quartzite, clots</u> <u>partially oxidized pyrite, coatings</u> <u>yellow jarosite.</u>
1417	Quad: <u>Pioche 7½'</u> Sec: <u>26</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4199720</u> N <u>0725275</u> E <u>Pioche District</u>	<u>Quartz vein/quartzite, vitreous grey,</u> <u>carrying fresh and oxidized pyrite</u> <u>grains also finely disseminated through-</u> <u>out vein fractures, jarosite and Fe-Mn</u> <u>oxide coat fractures and fresh surfaces,</u> <u>very fine boxworks, cerrussite crystals</u> <u>fresh and Fe stained coat exposed</u> <u>surfaces, weight of rock suggest finely</u> <u>disseminated galena (or other lead</u> <u>mineral).</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>Fractured/brecciated quartzite, cemented</u> <u>with silica, heavily Fe-Mn stained,</u> <u>crystalline jarosite coats fracture</u> <u>surfaces, limonitic stains, some</u> <u>fragments milled, quartz veining.</u>
1418	Quad: <u>Pioche 7½'</u> Sec: <u>26</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4195825</u> N <u>0725675</u> E <u>Pioche District</u>	<u>White to pinkish quartzite carrying</u> <u>stringers, pods, and clots of crystalline</u> <u>galena, quartzite highly fractured/</u> <u>brecciated, some fragments milled,</u> <u>surface coated with white, yellow,</u> <u>greenish alteration minerals, crystalline</u> <u>jarosite coat fracture surfaces, box-</u> <u>works coated with MnO2 surfaces, box-</u> <u>works coated with MnO2 very minor</u> <u>pyrite grains, oxidized.</u>
1419	Quad: <u>Pioche 7½'</u> Sec: <u>26</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4199900</u> N <u>0725700</u> E <u>Alps Mine</u> <u>Pioche District</u>	<u>White to beige quartzite, brecciated</u> <u>and fractured, opaline silica coats</u> <u>open spaces, abundant Fe-Mn oxides,</u> <u>specularite on fractures, banding,</u> <u>yellow oxides, Euhedral quartz crystals</u> <u>line cavities, very finely disseminated</u> <u>sulfides (none large enough to identify),</u> <u>weight of rocks suggest Pb-Zn, late</u> <u>stage silica coats fractures, rocks</u> <u>argentiferous?</u>
1420	Quad: <u>Pioche 7½'</u> Sec: <u>27</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4200200</u> N <u>0724250</u> E <u>Treasure Hill Mines</u> <u>Pioche District</u>	<u>White quartz vein, highly sheared,</u> <u>fractured, cemented with Fe-Mn oxide</u> <u>stained silica, abundant boxworks,</u> <u>euhedral to subhedral quartz crystals</u> <u>intergrown with vein, open spaces,</u> <u>specularite, brecciated zones exhibit</u> <u>milling.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1421	Quad: <u>Pioche 7½'</u> Sec: <u>27</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4200200</u> N <u>0724280</u> E <u>Treasure Hill Mines</u> <u>Pioche District</u>	

Sample Description

Sample Number	Location	Description
1422	Quad: Pioche 7½' Sec: 27 T: 1N R: 67E UTM: 4200210 N 0724375 E Yuba Mine Pioche District	Quartz porphyry intrusive carrying oxidized pyrite grains, quartz veins with fresh galena stringers, very finely disseminated euhedral pyrite, clots oxidized tetrahedrite(?), (argentiferous?), rock pale green from disseminated malachite, sericitic and argillic alteration, minor limonitic stains, yellow oxides (SbOx?), rocks heavy, dense.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	Pink to grey quartzite with pods, clots, stringers and fracture fill of crystalline galena and sphalerite. Very fine grained pyrite is disseminated in grey quartzite, surfaces coated with hematite, yellow oxides, anhedral quartz veinlets cut quartzite and carry fine grained sulfides.
1423	Quad: Pioche 7½' Sec: 27 T: 1N R: 67E UTM: 4200210 N 0724360 E Yuba Mine Pioche District	Quartzite/quartz vein shear material, grains, pods, irregular stringers, clots, galena, sphalerite, pyrite, secondary malachite and Fe-Mn oxides coat surfaces along with yellow oxides (SbOx?), galena and sphalerite are very finely disseminated in quartz vein, fine open spacing, minor chrysocolla grains.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	Dark grey, very fine limestone, grains and clots of very fine grained pyrite, fresh and oxidized, irregular pods and veinlets calcite crystals, minor FeOx stains, disseminated barite, minor chalcopyrite.
1424	Quad: Pioche 7½' Sec: 27 T: 1N R: 67E UTM: 4200210 N 0724360 E Springtime Tunnel Pioche District	Muddy grey to dark grey limestone, massive and brecciated, pieces silicified crystalline and massive calcite veining, iron stains along veins, crystalline barite intergrown with calcite vein.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1425	Quad: Pioche 7½' Sec: 27 T: 1N R: 67E UTM: 4199900 N 0723650 E California Pioche Shaft Pioche District	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1426	Quad: Pioche 7½' Sec: 27 T: 1N R: 67E UTM: 4199510 N 0723775 E Pioche District	

Sample Description

Sample Number	Location	Description
1427	Quad: Pioche 7½' Sec: 26 T: 1N R: 67E UTM: 4200160 N 0725575 E Salt Lake Pioche Mine Pioche District	Quartzite breccia cemented with manganosiderite/psilomelane(?), fresh surfaces vitreous to glassy, flowage, abundant vugs some which are filled with greenish yellow mineral, exposed surfaces covered with Fe-Mn oxides, yellow oxides green minerals (anglesite?), density of rock suggest disseminated lead (or barite), rose colored cast to glassy material.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1428	Quad: Pioche 7½' Sec: 22 T: 1N R: 67E UTM: 4200310 N 0722610 E Combined Metals Mine Pioche District	Pyritized quartzite/quartz vein, fracture carry iron-rich sphalerite intergrown with minor galena, minor Fe-Mn oxides stains, fractures lines with euhedral quartz crystals and fine open spaces.
1429	Quad: Pioche 7½' Sec: 17 T: 1N R: 67E UTM: 4202850 N 0720450 E Ely Valley Mines Pioche District	Quartz vein with pyrite in pyritized quartzite host rock, unoxidized.
1430	Quad: Pioche 7½' Sec: 17 T: 1N R: 67E UTM: 4202850 N 0720450 E Ely Valley Mines Pioche District	Dark brown, dense, manganese oxide, calcite, siderite replacement and vein material, may contain fine-grained sphalerite, chalcopryrite, or pyrite.
1431	Quad: Pioche 7½' Sec: 16 T: 1N R: 67E UTM: 4202150 N 0721640 E Gelder Mine Pioche District	Quartzite breccia cemented with vitreous fractured quartz, heavily Fe-Mn oxide stained, gossany, sericite, boxworks, yellow oxides on surface, hematite clots (after sulfides), breccia sheared, very minor surface sopper.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1432	Quad: Pioche 7½' Sec: 33 T: 1N R: 67E UTM: 4197650 N 0722190 E Prince Mine Pioche District	Pyritized mud/siltstone, slightly calcarous, pyrite extremely fine-grained replacement ore, fissures and fractures filled with euhedral to anhedral pyrite crystals intergrown with iron-rich sphalerite, very minor galena grains, abundant massive pyrolusite, surface coating of native arsenic(?) from alteration of arsenopyrite, intergrown quartz crystals in sulfides. Hematite stains from clots of sulfides, solid veins of dark sphalerite, minor gossan.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	

Sample Description

Sample Number	Location	Description
1433	Quad: <u>Pioche 7½'</u> Sec: <u>20</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4200975</u> N <u>0721075</u> E <u>Half Moon Mine</u> <u>Pioche District</u>	<u>Quartz vein cutting hematite stained silt/mudstone, vein fractured, fissure filled carrying fresh and oxidized sphalerite (iron rich), open spaces between euhedral quartz crystals coated with MnO2, massive sphalerite fill after quartz crystals formation, minor galena fills fractures, malachite and cerrusite crystals (fine) coat surfaces along with abundant Fe-Mn oxides, yellow-green oxides, iridescent alteration minerals coat surfaces, quartz vein sheared and stained with hematite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1434	Quad: <u>Pioche 7½'</u> Sec: <u>18</u> T: <u>1N</u> R: <u>67E</u> UTM: <u>4203390</u> N <u>0718710</u> E <u>Pioche Metals Mine</u> <u>Pioche District</u>	<u>Quartz/calcite/siderite vein material, carrying fresh and oxidized pods, stringers and grains galena, sphalerite, pyrite, abundant Fe-Mn oxides, malachite and other secondary copper minerals,</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>country rock hematite stained quartzite, fragments exhibit milling, caliche, very fine boxworks, late stage drusy quartz on surfaces, clots of manganosiderite.</u>
1435	Quad: <u>Highland Peak 7½'</u> Sec: <u>13</u> T: <u>1N</u> R: <u>66E</u> UTM: <u>4202925</u> N <u>0716725</u> E <u>Highland District</u>	<u>Quartz vein/brecciated dolomite, massive white to grey quartz vein, highly fractured, with abundant Fe-Mn oxide stains, rocks locally silicified. Hydrothermal, abundant open spaces,</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>quartz euhedral to subhedral in veins, fine oxidized pyrite grains intergrown with quartz crystals.</u>
1436	Quad: <u>Highland Peak 7½'</u> Sec: <u>25</u> T: <u>1N</u> R: <u>66E</u> UTM: <u>4199075</u> N <u>0717920</u> E <u>Black Prince Mine</u> <u>Highland District</u>	<u>Manganese replacement ore, replacing quartzite (possibly limestone), quartz grains scattered throughout ore, white crystalline calcite coats surfaces and cements breccia/fractured ore,</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>fibrous feathery mineral (jamesomite?), minor pyrolusite crystals late stage opaline silica, bluish-white, coats surfaces, minor limonite stains, rocks very heavy, very fine quartz/calcite veinlets.</u>

Sample Description

Sample Number	Location	Description
1437	Quad: <u>Bennett Pass 7½'</u> Sec: <u>9</u> T: <u>1S</u> R: <u>66E</u> UTM: <u>4194000</u> N <u>0710620</u> E <u>Pan American Mine</u> <u>Comet District</u>	<u>Massive to crudely banded sulfide ore</u> <u>with manganiferous-siderite gangue.</u> <u>Sulfides are medium to coarsely crystall-</u> <u>ine galena, pyrite, sphalerite, chalcop-</u> <u>pyrite & pyrrhotite. White barite occurs</u> <u>in vugs.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
1438A	Quad: <u>Highland Peak 7½'</u> Sec: <u>9?</u> T: <u>1S</u> R: <u>66E</u> UTM: <u>4195060</u> N <u>0711280</u> E <u>Schodde Mine</u> <u>Comet District</u>	<u>Recrystallized, marly brown limestone</u> <u>containing irregular clots & lensed</u> <u>finely crystalline sulfides (mostly</u> <u>galens, pyrite & sphalerite) & cut</u> <u>thru by white calcite veins & veinlets.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>Rock is replaces & coated by limonite</u> <u>& hematite. Specularite on surfaces.</u> <u>Rock is dense, may also contain barite.</u> <u>Some samples silicified.</u>
1438B	Quad: <u>Highland Peak 7½'</u> Sec: <u>9?</u> T: <u>1S</u> R: <u>66E</u> UTM: <u>4195150</u> N <u>0711300</u> E <u>Schodde Mine</u> <u>Comet District</u>	<u>Marly brown, recrystallized & bleached</u> <u>limestone replaced by Feoxs & containing</u> <u>fine crystals of galena & yellow-brown</u> <u>sphalerite. Pods & veins of white</u> <u>calcite & siderite common. Ore is</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>oxidized & partially gossany. Limonite,</u> <u>hematite & Mn oxes abundant.</u> _____ _____
1439	Quad: <u>Highland Peak 7½'</u> Sec: <u>4?</u> T: <u>1S</u> R: <u>66E</u> UTM: <u>4195630</u> N <u>0710710</u> E <u>Sample loc 1439</u> <u>Comet District</u>	<u>Marly orange-brown limestone, recrystal-</u> <u>lized & jaspery replaced by Feoxs.</u> <u>Rock is cut by Fe-silica veinlets</u> <u>network with limonitic gossan portions</u> <u>remaining between more resistant</u> <u>veinlets. Specularite coats fracture</u> <u>(shear) surfaces. Mn oxes abundant.</u> <u>Galena & barite probably present in</u> <u>irregular replacement pods or dissemin-</u> <u>ated throughout ore.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____

Sample Description

Sample Number	Location	Description
1440	Quad: Highland Peak 7½' Sec: 5? T: 1S R: 63E UTM: 4196100 N 0709950 E Comet Mine Comet District	Fe-stained, white to grey, vuggy to massive or banded quartz vein with veins, clots, lenses & fracture coatings of unoxidized pyrite, galena, tetrahedrite, sphalerite, chalcopyrite,
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	bornite & pyrolusite. Cu-Fe-Mn oxs common. Some dark green prismatic minerals may be wolframite?, which is reported from this locality.
1441	Quad: Highland Peak 7½' Sec: 4? T: 1S R: 66E UTM: 4196550 N 0710910 E Sample location 1441 Comet District	Replacement ore contains irregular pods & clots galena, specularite, yellow sphalerite, & pyrite in a gangue of magano-siderite-calcite-quartz & altered limestone. Material is dark
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	brown & displays honey-comb limonitic boxworks. Calcite, siderite & drussy quartz lines vugs, cavities & veinlets MnOx abundant. Sample is from outcrop near portal.
1442	Quad: Highland Peak 7½' Sec: 4? T: 1S R: 66E UTM: 4196370 N 0710890 E TB claims Comet District	Grey-brown altered limestone with replacement pods & grains of galena, yellow sphalerite, pyrite, & chalcopyrite. Cu & FeOx coat surfaces.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	Siderite vein contains pyrite & encloses altered limestone fragments. Sulfides partially oxidized & commonly replaced ovoid algal structures.
1443	Quad: Highland Peak 7½' Sec: 32 T: 1N R: 66E UTM: 4197410 N 0710200 E Log Cabin Mine Comet District	Massive, black, heavy maganosiderite-quartz-sulfide replacement ore (gossan) Original rock was limestone which is completely replaced by Mn, Fe, silica & gossan. Finely crystalline pyrite,
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	galena, sphalerite & psilomelane are distributed throughout. Limonitic boxworks & quartz-sulfide veining abundant. Some yellow "crust" noted.
1444	Quad: Highland Peak 7½' Sec: 29 T: 1N R: 66E UTM: 4199125 N 0711090 E Forlorn Hope Mine Highland District	Black, quartz-manganese-siderite sulfide ore with clots & crystals of partially oxidized pyrite, chalcopyrite, lesser amounts of sphalerite & galena. Also recrystallized, altered limestone & calcite vein.

Sample Description

Sample Number	Location	Description
1445	Quad: Highland Peak 7½' Sec: 20 T: 1N R: 66E UTM: 4201100 N 0710440 E Sample loc 1445 Highland District	Drill cuttings consist of micaceous shales, siltstones & dark grey, finely crystalline limestone. Fine-medium unoxidized & partially oxidized pyrite occur sparsely throughout cuttings.
1446	Quad: Highland Peak 7½' Sec: 17 T: 1N R: 66E UTM: 4201625 N 0710130 E Mt. Lion Mine Highland District	Highly siliceous, jaspery & limonitic gossan & brecciated quartz vein. Quartz vein. Quartz vein is white to pale yellow-green in color contains clots & pods oxidized pyrite & galena. Quartz vein fragments are recemented by limonite & silica. Some altered quartzite & limestone wallrock fragments are included in vein material.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1447	Quad: Toquop Gap 7½' Sec: 10 T: 10S R: 69E UTM: 4106880 N 0743225 E Buckhorn Mine Gourd Springs District	Quartz/feldspathic sandstone, angular, equigranular, cemented silica, mica, sanidine grains, fine secondary silica coats surfaces, few cavities.
1448	Quad: Tule Springs 7½' Sec: 32 T: 10S R: 70E UTM: 4100350 N 0749225 E Blue Quartz Claims Tule Springs	White gypsum crystals, soft, porous, very minor FeOx stains, relatively pure.
1449	Quad: Davidson Peak 7½' Sec: 4? T: 12S R: 69E UTM: 4090275 N 0741700 E MacBruson Claims Gourd Springs District	Skarn, anhedral to subhedral andradite garnet intergrown with pale green to brown epidote, vesuvianite, clots and stringers rose and white quartz, scheelite, powellite, W-Mo minerals fluorescence white to yellow, surface coated with minor calcite, MnO2, FeOx, secondary opaline silica, clots of green, micaceous mineral intergrown with garnet and rose quartz.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1450	Quad: Davidson Peak 7½' Sec: 4? T: 12S R: 69E UTM: 4090280 N 0741685 E MacBruson Claims Gourd Springs District	Quartz vein, massive, white, vitreous, sprays molybdenum, fine purite, clots oxidized pyrite to hematite, open spaces, surface FeOx stains, quartz subhedral to anhedral.
1451	Quad: Highland Peak 7½' Sec: 14 T: 1N R: 66E UTM: 4201720 N 0715400 E Highland Queen Mine Highland District	Light grey to muddy grey, fine grained limestone carrying very fine to coarse crystalline, fresh to oxidized pyrite, very minor MnO2 stains, crystalline calcite.

Sample Description

Sample Number	Location	Description
1452	Quad: <u>Tempiute 15'</u> Sec: <u>6</u> T: <u>4S</u> R: <u>57E</u> UTM: <u>4165350</u> N <u>0621250</u> E <u>New Tempiute Mine</u> <u>Tempiute District</u>	<u>Quartz vein/pyrrhotitic skarn,</u> <u>crystalline, pyrite, chalcopyrite,</u> <u>pyrrhotite, bismuthite, massive</u> <u>and individual crystals in white</u> <u>massive fractured quartz vein, granular</u> <u>zones, abundant Fe-Mn oxides, rocks</u> <u>heavy, dense, minor gossan zones, inter</u> <u>grown micaceous mineral, abundant</u> <u>iron-rich sphalerite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____
1453	Quad: <u>Tempiute 15'</u> Sec: <u>6</u> T: <u>4S</u> R: <u>57E</u> UTM: <u>4165525</u> N <u>0621050</u> E <u>New Tempiute Mine</u> <u>Tempiute District</u>	<u>Gossan, heavily limonitic/hematite/</u> <u>MnO2 stained, crumbly, earthy, heavy</u> <u>abundant calcite, psilomelane, calcite</u> <u>crystals line vugs and cavities, (few</u> <u>barite crystals?) No fluorescence.</u>
1454	Quad: <u>Tempiute 15'</u> Sec: <u>6</u> T: <u>4S</u> R: <u>57E</u> UTM: <u>4165525</u> N <u>0621050</u> E <u>New Tempiute Mine</u> <u>Tempiute District</u>	<u>Quartz monzonite(?) intrusive,</u> <u>argillically altered, abundant limonite-</u> <u>MnO2 stains, quartz veins, fractured,</u> <u>pyrite cubes, faint fluorescence (blue-</u> <u>green) in zone of alteration, slightly</u> <u>pegmatitic quartz-muscovite veins.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____
1455	Quad: <u>Tempiute 15'</u> Sec: <u>6</u> T: <u>4S</u> R: <u>57E</u> UTM: <u>4165775</u> N <u>0621350</u> E <u>Schofield Mine</u> <u>Tempiute District</u>	<u>Skarn, massive sulfides (pyrite,</u> <u>chalcopyrite, bornite, sphalerite,</u> <u>pyrrhotite), intergrown with anhedral</u> <u>quartz grains, fluorescence reveals</u> <u>very fine sprays scheelite with minor</u> <u>powellite, minor limestone/quartzite,</u> <u>quartz veins carry fine oxidized pyrite</u> <u>and scheelite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____
1456	Quad: <u>Tempiute 15'</u> Sec: <u>1</u> T: <u>4S</u> R: <u>56E</u> UTM: <u>4165660</u> N <u>0621000</u> E <u>Schofield Mine (lower access)</u> <u>Tempiute District</u>	<u>Andradite-epidote tactite fine to</u> <u>coarse crystalline intergrown with</u> <u>subhedral to anhedral pyrite, chalcop-</u> <u>pyrite, bornite, sphalerite, massive</u> <u>quartz, fine disseminated grains</u> <u>scheelite, intergrown with powellite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____

Sample Description

Sample Number	Location	Description
1457A	Quad: <u>Tempiute 15'</u> Sec: <u>31</u> T: <u>3S</u> R: <u>57E</u> UTM: <u>4166900</u> N <u>0621200</u> E <u>Wah Chang Pit</u> <u>Tempiute District</u>	<u>Andradite tactite, euhedral, brownish-red, fibrous tremolite, very fine pyrite, dendritic pyrolusite, quartz grains and zones interspaced in tactite lesser amount of scheelite and powellite</u> <u>than previous samples, pyrrhotite, minor clots molybdenum.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____
1457B	Quad: <u>Tempiute 15'</u> Sec: <u>31</u> T: <u>3S</u> R: <u>57E</u> UTM: <u>4166900</u> N <u>0621200</u> E <u>Wah Chang Pit</u> <u>Tempiute District</u>	<u>Quartz vein, massive to sacchroidal, white, euhedral to anhedral pyrite clots grains, fine stringers, minor one scheelite grain intergrown with pyrite, vugs limonite coated, minor late stage chalcedony on surfaces, dark zones in vein suggest disseminated sulfides.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____
1458A	Quad: <u>Tempiute 15'</u> Sec: <u>36</u> T: <u>3S</u> R: <u>56E</u> UTM: <u>4166350</u> N <u>0620750</u> E <u>Lincoln Mine (6700 Foot Level)</u> <u>Tempiute District</u>	<u>Pyrrhotite skarn with quartz clots and clots of scheelite up to 1/4" minor pyrite, rock oxidized to brown, heavy, dense, parallel slicks, garnet tactite shows very fine scheelite, pyrite, chalcopryite, minor epidote.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____
1458B	Quad: <u>Tempiute 15'</u> Sec: <u>36</u> T: <u>3S</u> R: <u>56E</u> UTM: <u>4166350</u> N <u>0620750</u> E <u>Lincoln Mine (6700 Foot level)</u> <u>Tempiute District</u>	<u>Pyrite-molybdenum skarn, very fine grained, with disseminated clots scheelite and minor powellite, massive white quartz vein with clots and intergrowth of crystalline calcite and rhodochrosite, also carrying clots molybdenum, pyrite, chalcopryite, sphalerite, fractured, stained Fe-Mn oxides, garnet-epidote skarn little or no scheelite, direct contact with quartz vein with crystalline pyrite along contact, pyrite and molybdenum disseminated in tactite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____

Sample Description

Sample Number	Location	Description
1459	Quad: <u>Tempiute 15'</u> Sec: <u>36</u> T: <u>3S</u> R: <u>56E</u> UTM: <u>4166750</u> N <u>0620890</u> E <u>Lincoln Mine (Grubstake-Moody</u> <u>Tempiute District Tactite Zone)</u>	<u>Tactite, fine intergrown garnet-epidote,</u> <u>pyrite, chalcopyrite, *purple fluorite</u> <u>(fluorescences beautifully) fractured</u> <u>hornsfelsic material, abundant MnO₂,</u> <u>minor scheelite, sphalerite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>* rhodochrosite.</u> _____ _____ _____
1460	Quad: <u>Tempiute 15'</u> Sec: <u>25/30</u> T: <u>3S</u> R: <u>56/57E</u> UTM: <u>4167850</u> N <u>0620950</u> E <u>From stockpile of developmental</u> <u>Tempiute District ore</u>	<u>Sulfide skarn, pyrite, pyrrhotite,</u> <u>sphalerite, intergrown with quartz</u> <u>grains and fine to 1/2" scheelite and</u> <u>minor powellite, heavy, dense, abundant</u> <u>slickes, iridescent oxidization,</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>chalcopyrite.</u> _____ _____ _____
1461	Quad: <u>Tempiute 15'</u> Sec: <u>9</u> T: <u>4S</u> R: <u>56E</u> UTM: <u>4163000</u> N <u>0616600</u> E <u>Tempiute District</u>	<u>White (bleached), punky, volcanic ash,</u> <u>yellowish-green surface alteration,</u> <u>rounded pebbles and stones, vitreous/</u> <u>glassy grains, pumice fragments, Argill-</u> <u>ically altered, very minor FeOx stains.</u>
1462	Quad: <u>Tempiute 15'</u> Sec: <u>1</u> T: <u>4S</u> R: <u>56E</u> UTM: <u>4164300</u> N <u>0620000</u> E <u>Kinsey Claims</u> <u>Tempiute District</u>	<u>Fissure vein white subhedral to anhedral</u> <u>quartz carrying fresh and oxidized</u> <u>sulfides (pyrite, chalcopyrite, tetra-</u> <u>hedrite (?), argentiferous galena,</u> <u>sphalerite), alteration minerals include</u> <u>malachite, azurite, bronchantite, Fe-Mn-</u> <u>Sb oxides, minerals occur as distinct</u> <u>grains, clots veinlets, and along</u> <u>surface where quartz meets in center of</u> <u>vein, also as dark grey bands of</u> <u>disseminated minerals, country rock</u> <u>dark grey, grainy, LS, locally silic-</u> <u>ified.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
1463	Quad: <u>Tempiute 15'</u> Sec: <u>1, 2</u> T: <u>4S</u> R: <u>56E</u> UTM: <u>4164125</u> N <u>0619880</u> E <u>Kinsey Claims</u> <u>Tempiute District</u>	<u>White to grey quartz vein, vuggy/box-</u> <u>work sulfides (pyrite, galena, tetra-</u> <u>hedrite, sphalerite, chalcopyrite) ore</u> <u>oxidized cerrusite and malachite</u> <u>crystals intergrown, jarosite, more</u> <u>gossany.</u>

Sample Description

Sample Number	Location	Description
1464	Quad: <u>Tempiute 15'</u> Sec: <u>8, 9</u> T: <u>4S</u> R: <u>56E</u> UTM: <u>4162750</u> N <u>0619850</u> E <u>Kinsey Claims</u> <u>Tempiute District</u>	<u>Quartz vein, white to grey, fractured,</u> <u>sulfides (pyrite, chalcopyrite, tetra-</u> <u>hedrite?) decreasing, abundant CuOx</u> <u>stains, yellow oxides, gossany zones,</u> <u>highly fractured, jarosite, MnO2.</u>
1465	Quad: <u>Tempiute 15'</u> Sec: <u>14?</u> T: <u>4S</u> R: <u>56E</u> UTM: <u>4162650</u> N <u>0619750</u> E <u>Johnson Claims</u> <u>Tempiute District</u>	<u>Grey limestone/dolomite, crystalline</u> <u>barite nodules FeOx stained, cerrusite</u> <u>coats limestone, minor copper stains,</u> <u>crystalline calcite.</u>
1466	Quad: <u>Tempiute 15'</u> Sec: <u>13</u> T: <u>4S</u> R: <u>56E</u> UTM: <u>4162000</u> N <u>0620050</u> E <u>Temper Claims</u> <u>Tempiute District</u>	<u>Crystalline, dark grey limestone,</u> <u>highly fractured/brecciated, minor</u> <u>Pods oxidized sulfides(?), limonite</u> <u>stained, barite white crystalline,</u> <u>limestone locally silicified, minor</u> <u>FeOx stains, blue-white fluorescence</u> <u>on stringers and grains (scheelite?)</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____ _____
1467	Quad: <u>Tempiute 15'</u> Sec: <u>36</u> T: <u>4S</u> R: <u>55E</u> UTM: <u>4157650</u> N <u>0610800</u> E <u>MDD 1-15 Claims</u> <u>Don Dale District</u>	<u>Argillically altered, bleached</u> <u>rhyolitic ash, remnant smokey quartz,</u> <u>muscovite crystals, fine grains and</u> <u>stringers crystalline cinnabar, surfaces</u> <u>stained with Fe-Mn and yellow oxides.</u>
1468	Quad: <u>White Blotch Springs 15'</u> Sec: <u>34</u> T: <u>4S</u> R: <u>55E</u> UTM: <u>4156475</u> N <u>0608400</u> E <u>Blue Bird Claims</u> <u>Don Dale District</u>	<u>Reddish-brown quartzite, fine sprays</u> <u>malachite, heavily limonitic stained,</u> <u>slightly gossany, irridescent oxides,</u> <u>fractured, quartz porphyry with</u> <u>disseminated copper-iron.</u>
1469	Quad: <u>White Blotch Springs 15'</u> Sec: <u>34</u> T: <u>4S</u> R: <u>55E</u> UTM: <u>4156450</u> N <u>0608250</u> E <u>Blue Bird Claims</u> <u>Don Dale District</u>	<u>White to grey quartzite, fractures</u> <u>Fe-Mn stained, carrying crystalline</u> <u>chalcopyrite/pyrite, also disseminated</u> <u>sulfides in quartz crystals, vugs lined</u> <u>euhedral quartz, very fine sceptor</u> <u>quartz crystals coat surface of fracture.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	_____ _____ _____ _____ _____
1470	Quad: <u>White Blotch Springs 15'</u> Sec: <u>34</u> T: <u>4S</u> R: <u>55E</u> UTM: <u>4157000</u> N <u>0608500</u> E _____ <u>Don Dale District</u>	<u>Gossany, shear/fractured/brecciated</u> <u>quartz vein/quartzite, heavily MnO2</u> <u>and limonitic stained.</u>

Sample Description

[illegible]

Sample Description

Sample Number	Location	Description
1494	Quad: Caliente 7½' Sec: 7 T: 4S R: 67E UTM: 4166000 N 0718950 E Caliente Prospect Caliente District	Dump sample Vein quartz, cockade structure, hematite & MnO staining, jarosite.
1495	Quad: Caliente 7½' Sec: 7 T: 4S R: 67E UTM: 4166080 N 0718930 E Caliente Prospect Caliente District	Dump sample, Vein quartz, hematite and MnO stain.
1496	Quad: Mosey Mtn. 7½' Sec: 11 T: 3S R: 68E UTM: 4175390 N 0735940 E Silver Dust Adit Little Mountain District	Dump, Vein calcite, calcite-cemented breccia, minor Feox & MnO.
1497	Quad: Mosey Mtn. 7½' Sec: 12 T: 3S R: 68E UTM: 4175190 N 0735080 E Silver Dust Cut Little Mountain District	Dump, weak garnet skarn, pale red garnet, diopside, green & yellow secondary minerals coating fractures.
1498	Quad: White Rock Peak 7½' Sec: 8 T: 3N R: 71E UTM: 4223940 N 0758080 E Reeds Cabin Summit Prospect Eagle Valley District	Dump, Vein quartz, minor limonite and hematite staining.
1499	Quad: Rice Mountain 7½' Sec: 17 T: 3N R: 71E UTM: 4222530 N 0758390 E Confidence Mine Eagle Valley District	Dump, Vein quartz, brecciated possible jarosite crystals in vugs, calcite crystals.
1500	Quad: Deer Lodge Canyon 7½' Sec: 13 T: 1N R: 70E UTM: 4203010 N 0756240 E Eagle Valley District	Dump Quartz-carbonate vein, thin wisps of black mineral in quartz.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
1563	Quad: Deer Lodge Canyon 7½' Sec: 18 T: 1N R: 71E UTM: 4203930 N 0756780 E Tempa Mine Eagle Valley District	Dump Quartz carbonate vein, streaks black sulfide.
1564	Quad: Eagle Valley Reservoir 7 ½' Sec: 21 T: 2N R: 69E UTM: 4211110 N 0741640 E Horsethief Spring Prospect Eagle Valley District	Dump Silicified limestone, jasperoid, clots MnO & Feox.
1565	Quad: Eagle Valley Reservoir 7 ½' Sec: 21 T: 2N R: 69E UTM: 4211250 N 0741530 E Horsethief Spring Prospect Eagle Valley District	Barite from vein, some white calcite, minor Feox stain.
1566	Quad: Highland Peak 7½' Sec: 5 T: 1N R: 66E UTM: 4206300 N 0711200 E Florence Mine Highland District	Dump Clots galena, Feox gossan in white quartz, some Cuox stain.
1567	Quad: Ely Springs 7½' Sec: Unsurv. T: 1N R: 65E UTM: 4198260 N 0703320 E Headman Mine Ely Springs District	Dump Replacement ore, galena, sphalerite, pyrite in silic limestone.
1568	Quad: Ely Springs 7½' Sec: 34 T: 1N R: 65E UTM: 4196900 N 0703550 E Ely Springs District	Dump Replacement ore, galena, hemimorphite in silic limestone.
1569	Quad: Pioche 7½' Sec: 22 T: 1N R: 67E UTM: 4200420 N 0723930 E Meadow Valley #3 Shaft Pioche District	Vein material from wall of caving stope, quartz with massive cerussite, some fine-grained galena.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
1701	Quad: <u>Ella Mtn. 7½'</u> Sec: <u>16?</u> T: <u>6S</u> R: <u>67E</u> UTM: <u>4144090</u> N <u>0723510</u> E <u>Pennsylvania Mine (North)</u> <u>Pennsylvania District</u>	<u>Sugary, white to clear, slightly vuggy,</u> <u>Fe-stained vein cements altered volcanic</u> <u>rock fragments. Vein contains "dark</u> <u>sulfide lenses" & clots of partially</u> <u>oxidized pyrite chalcopyrite, covellite,</u> <u>cuprite & tetrahedrite. Malachite,</u> <u>chrysocolla & azurite also abundant.</u> <u>Hematite veinlets common. Yellow-green</u> <u>oxides possibly after Sb?, Pb?, or</u> <u>other element.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>Sample taken from 3" seam of heavily</u> <u>Fe-stained, clayey material cutting</u> <u>bleached, argillically altered volcanic</u> <u>tuff exposed in roadcut above workings.</u> <u>Part of sample is fault gouge, showing</u> <u>slicks.</u>
1702	Quad: <u>Ella Mtn. 7½'</u> Sec: <u>16?</u> T: <u>6S</u> R: <u>67E</u> UTM: <u>4144120</u> N <u>0723610</u> E <u>Pennsylvania Mine (North)</u> <u>Pennsylvania District</u>	<u>White, banded, sugary to massive,</u> <u>fissure-type quartz vein encloses</u> <u>altered volcanic & some sedimentary</u> <u>rock fragments. Vein material contains</u> <u>fine crystals disseminated sulfides,</u> <u>(Ag minerals?) including pyrite. Clots</u> <u>Cuoxs probably formed from oxidized</u> <u>tetrahedrite. Some white calcite vein</u> <u>intergrown with quartz, also quartz</u> <u>after calcite pseudomorphs. Vein</u> <u>material is vuggy only moderately</u> <u>stained by Fe & Mn ox. Sample from</u> <u>outcrop in NW part of mine area.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>Quartz veined andesite breccia. Veins</u> <u>are epithermal, fissure-type. Some</u> <u>sedimentary fragments, including chert,</u> <u>also included in vein. Vitreous stock-</u> <u>works cut across larger veins & split</u> <u>rock fragments. Rock is Fe-stained &</u> <u>has gossany portions, but has a low</u> <u>percentage of visible sulfides. "Dark</u> <u>streaks" & pyrite were only observed</u> <u>minerals in vein material. Quartz is</u> <u>sugary to vitreous white & grey. Rock</u> <u>looks good for gold, altho none was</u> <u>directly observed. Sample collected</u> <u>from outcrop southern part of mine area.</u>
1703	Quad: <u>Ella Mtn. 7½'</u> Sec: <u>16?</u> T: <u>6S</u> R: <u>67E</u> UTM: <u>4143900</u> N <u>0723510</u> E <u>Pennsylvania Mine (South)</u> <u>Pennsylvania District</u>	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	
1704	Quad: <u>Ella Mtn. 7½'</u> Sec: <u>16?</u> T: <u>6S</u> R: <u>67E</u> UTM: <u>4143900</u> N <u>0723510</u> E <u>Pennsylvania Mine (South)</u> <u>Pennsylvania District</u>	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	

Sample Description

Sample Number	Location	Description
1705	Quad: <u>Ella Mtn. 7½'</u> Sec: <u>Unsurv.</u> T: <u>06S</u> R: <u>067E</u> UTM: <u>4143550</u> N <u>0723490</u> E <u>Open Pit Pennsylvania Mine</u> <u>Pennsylvania District</u>	<u>Quartz vein and quartz vein andesite breccia containing clots, discrete crystals and surface coatings of partially oxidized pyrite, chalcopyrite, malachite, azurite & brochanite.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>Sampled material is characteristically dark-grey with significant amount of dispersed sulfides. Within the finely crystalline quartz there are scattered fine-grained clots of visible gold.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>The gold bearing samples are coated by abundant Cu oxides and less abundant Fe oxides.</u>
1706	Quad: <u>Ella Mtn. 7½'</u> Sec: <u>unsurv.</u> T: <u>6S</u> R: <u>67E</u> UTM: <u>4142890</u> N <u>0723970</u> E <u>Culverwell Prospect</u> <u>Pennsylvania District</u>	<u>Grey-brown sugary quartz vein with partially oxidized clots of pyrite, chalcopyrite, unidentified steely blue-grey sulfide (galena?) & malachite Grey color or vein material indicates a large percentage of dispersed, fine-grained sulfides. Small vugs filled with Mn-coated prismatic quartz & radiating malachite. Cu-Mn Feoxs coat fracture surfaces.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1707	Quad: <u>Ella Mtn. 7½'</u> Sec: <u>unsurv.</u> T: <u>6S</u> R: <u>67E</u> UTM: <u>4142760</u> N <u>0723730</u> E <u>Culverwell Adit</u> <u>Pennsylvania District</u>	<u>Dense, dark-brown, marly replaced limestone & minor tactite. Replaced limestone shows crude banding & veining composed of alternating lenses of white calcite & crystalline magnetite. Rocks contain minor Cuoxs, oxidized pyrite & oxidation product (not identified). Sample lamped & only 2 specks scheelite observed.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1708	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>25</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4201020</u> N <u>0755630</u> E <u>Sample loc 1708</u> <u>Eagle Valley/Gold Springs</u>	<u>Light maroon, flow banded rhyolite or latite volcanic rock. Rock is highly siliceous & altered. Fine breccia zones & quartz veinlets cut rock. Rock coated by Feoxs & contains clots Mnnox & pyrite(?). Pumice(?) is altered & replaced by clay & Feoxs.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
<u>1709</u>	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>30</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4200820</u> N <u>0756780</u> E <u>Keno Claims</u> <u>Eagle Valley</u>	<u>Quartz-cemented, andesite-dacite breccia</u> <u>Quartz is sugary to prismatic. Vein</u> <u>typically have open-centers & are</u> <u>banded. Quartz contains scattered</u> <u>crystals of oxidized pyrite. Some</u> <u>calcite intergrown with quartz & quartz</u> <u>after calcite pseudomorphs are common.</u> <u>Rock is coated by Fe & Mn oxs. Sample</u> <u>collected from outcrop near N-S portal.</u>
<u> </u>	Quad: <u> </u> Sec: <u> </u> T: <u> </u> R: <u> </u> UTM: <u> </u> N <u> </u> E <u> </u>	<u> </u>
<u>1710</u>	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>25</u> T: <u>1N</u> R: <u>70E</u> UTM: <u>4201090</u> N <u>0756530</u> E <u>Sample loc 1710-1711</u> <u>Eagle Valley District</u>	<u>Fe-stained, sugary, vitreous to white</u> <u>quartz vein with small vugs filled with</u> <u>euhedral quartz. Crudely banded with</u> <u>finely crystalline quartz intergrown</u> <u>with calcite (& possible barite &</u> <u>fluorite). Minor clots very fine-</u> <u>grained sulfides (pyrite, magnetite?)</u> <u>observed, in addition to scattered</u> <u>clots of hematite & Mn oxs.</u>
<u> </u>	Quad: <u> </u> Sec: <u> </u> T: <u> </u> R: <u> </u> UTM: <u> </u> N <u> </u> E <u> </u>	<u> </u>
<u>1711</u>	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>25</u> T: <u>1N</u> R: <u>70E</u> UTM: <u>4201010</u> N <u>0756375</u> E <u>Sample loc 1710-1711</u> <u>Eagle Valley District</u>	<u>Fe-stained, vitreous to white, prismatic</u> <u>to sugary quartz vein with banded</u> <u>interlenses of quartz after calcite.</u> <u>Andesite wallrock fragments enclosed</u> <u>in vein material. Minor oxidized</u> <u>pyrite. Several episodes veining</u> <u>represented including light-green</u> <u>(fluorite?), chalcedonic quartz veins</u> <u>& veinlets which cut rock fragments.</u>
<u> </u>	Quad: <u> </u> Sec: <u> </u> T: <u> </u> R: <u> </u> UTM: <u> </u> N <u> </u> E <u> </u>	<u> </u>
<u>1712</u>	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>2?</u> T: <u>1S</u> R: <u>70E</u> UTM: <u>4196500</u> N <u>0753410</u> E <u>Sample loc 1712</u> <u>Eagle Valley District</u>	<u>Quartz-cemented volcanic breccia.</u> <u>Quartz is white, vuggy, sugary to</u> <u>finely crystalline & encloses highly</u> <u>altered pink volcanic rock fragments</u> <u>(Andesite?). Fine crystals of oxidized</u> <u>pyrite occur in fragments & in quartz.</u> <u>Clots Fe & Mn oxs common. Several stages</u> <u>of veining evident and several types</u> <u>of veins present, including light green</u> <u>opaline vein.</u>
<u> </u>	Quad: <u> </u> Sec: <u> </u> T: <u> </u> R: <u> </u> UTM: <u> </u> N <u> </u> E <u> </u>	<u> </u>
<u>1713</u>	Quad: <u>Ely Springs 7½'</u> Sec: <u>24?</u> T: <u>1N</u> R: <u>65E</u> UTM: <u>4200400</u> N <u>0707750</u> E <u>Tara claims</u> <u>Ely Springs District</u>	<u>Original rock was limestone which is</u> <u>completely replaced by massive Mn oxs,</u> <u>mangano siderite, & minor Fe oxs. Gossany</u> <u>ore contains veins & cavity fillings of</u> <u>white crystalline calcite, needles of</u> <u>cerrusite & pyrolusite & minor quartz(?).</u> <u>Rock is porous, earthy, & dirty. Some</u> <u>samples are quite heavy.</u>
<u> </u>		

Sample Description

Sample Number	Location	Description
<u>1714</u>	Quad: <u>Ely Springs 7½'</u> Sec: <u>34?</u> T: <u>1N</u> R: <u>65E</u> UTM: <u>4196900</u> N <u>0703550</u> E <u>Sample loc 1714</u> <u>Ely Springs District</u>	<u>Vuggy mass of cerussite, anglesite, remnant galena, calcite & Mn & Feoxs cements altered dolomite breccia fragments. Cerussite most abundant Pb mineral. Galena, where present, is finely crystalline & occurs as replacement pods. Some portions of breccia are well silicified. Yellow-green oxides of Pb common.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>finely crystalline & occurs as replacement pods. Some portions of breccia are well silicified. Yellow-green oxides of Pb common.</u>
<u>1715</u>	Quad: <u>Ely Springs 7½'</u> Sec: <u>34?</u> T: <u>1N</u> R: <u>65E</u> UTM: <u>4198260</u> N <u>0703370</u> E <u>Hedman Mine</u> <u>Ely Springs District</u>	<u>Grey-brown, altered limestone cut by & containing pods & veins of coarse white calcite. The rock is Fe-stained & contains clots of oxidized pyrite & Mn oxs. Rocks are dense & may contain some barite. Part of sample is brecciated & recemented by Fe-stained calcite</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>_____</u> <u>_____</u>
<u>1716</u>	Quad: <u>Ely Springs 7½'</u> Sec: <u>27?</u> T: <u>1N</u> R: <u>65E</u> UTM: <u>4198320</u> N <u>0703310</u> E <u>Hedman Mine</u> <u>Ely Springs District</u>	<u>Fe-stained, altered, brecciated brown-grey limestone. Breccia fragments cemented by white calcite, clay & Fe & Mn oxs. Some clots hematite after pyrite. Some gypsum & gossany portions.</u>
<u>1717</u>	Quad: <u>Ely Springs 7½'</u> Sec: <u>unsurv.</u> T: <u>1N</u> R: <u>65E</u> UTM: <u>4199970</u> N <u>0703500</u> E <u>Tex Claims</u> <u>Ely Springs District</u>	<u>Massive to crystalline, vuggy wad, pyrolusite & manganosiderite replacement ore. Rock very dense & vugs filled with crystalline siderite, fine-grained quartz, pyrite, pyrolusite needles & arsenopyrite? Minor Feoxs & unidentified yellow oxides.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>_____</u> <u>_____</u>
<u>1718</u>	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>32</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4198470</u> N <u>0759470</u> E <u>Jennie Mine</u> <u>Stateline/Gold Springs District</u>	<u>Quartz vein intergrown with calcite, banded, open-center fissure type, contains fair amount oxidized & partially oxidized pyrite. Vein show quartz after calcite textures & encloses andesite wallrock fragments, which also show pyrite. Minor Fe-Mn oxs.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____ _____	<u>_____</u> <u>_____</u>

Sample Description

Sample Number	Location	Description
1719	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>32</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4198450</u> N <u>0759250</u> E <u>Thor Mine</u> <u>Eagle Valley/Gold Springs District</u>	<u>Heavily Fe-stained quartz vein, sugary, vitreous (clear to white), banded, vuggy, with open-centers. Quartz after calcite interlenses occur between sub-parallel fissure veins. Some minor clots & dark streaks very fine-grained sulfides & oxidized pyrite in vein material & andesite wallrock fragments enclosed in vein. Sample from outcrop of quartz vein at portal.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>Cockscomb to sugary to opaline, banded, vuggy, fissure-type, white quartz vein. Vugs & open-centers filled with Fe-stained prismatic calcite. Vein contains fine-grained clots oxidized pyrite & Mn oxes. Silicified & argillized rock fragments show minor pyrite & multiple brecciation textures. Portion of sample from outcrop.</u>
1720	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>32</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4198700</u> N <u>0758820</u> E <u>Snowflake Mine (Quarry)</u> <u>Eagle Valley/Gold Springs District</u>	<u>Quartz veined andesite breccia & pyritized, silicified andesite wallrock. Quartz veins are white, vuggy, & display combs to sugary textures. The vein & breccia fragments contain abundant pyrite, mostly oxidized to Fe oxes, especially limonite. Dark streaks surrounding fragments & on vein selvages are probably finely crystalline sulfides.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	<u>Comb & sugary white quartz vein encloses argillically altered light pink (rhyolite) volcanic fragments. Drusy quartz fills vugs. Vein is radiating or laminar in appearance. Minor Fe-staining & fine-grained oxidized pyrite observed.</u>
1721	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>32</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4198920</u> N <u>0758570</u> E <u>Big Buck Mine</u> <u>Eagle Valley/Gold Springs District</u>	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
1722	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>32</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4199400</u> N <u>0758880</u> E <u>Charley Ross Mine</u> <u>Eagle Valley/Gold Springs District</u>	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	_____ _____ _____ _____

Sample Description

Sample Number	Location	Description
1723	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>29</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4199800</u> N <u>0758720</u> E <u>Pope Mine</u> <u>Eagle Valley/Gold Springs District</u>	<u>Light green to white, sugary to</u> <u>chalcedonic, banded vuggy quartz vein</u> <u>enclosing altered rhyolite fragments.</u> <u>Sulfides are distributed through vein</u> <u>(especially on selvages or near vugs &</u> <u>fragments) but are too fine-grained to</u> <u>be identified. Mn & Fe-stained vugs</u> <u>are filled with drusy quartz & bladed</u> <u>quartz after calcite. Purple & green</u> <u>massive to crystalline fluorite noted.</u>
1724	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>29</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4199770</u> N <u>0759340</u> E <u>Redlite claims</u> <u>Eagle Valley/Gold Springs District</u>	<u>Prismatic to finely crystalline or</u> <u>chalcedonic white, vuggy banded quartz</u> <u>vein. Vugs filled with Fe & Mn stained</u> <u>terminated quartz crystals. Some</u> <u>gossany boxworks & clots of dark grey</u> <u>sulfide; pyrite is only sulfide easily</u> <u>identified. Quartz after calcite &</u> <u>interbands of calcite & siderite</u> <u>common.</u>
1725	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>24</u> T: <u>1N</u> R: <u>70E</u> UTM: <u>4202540</u> N <u>0756120</u> E <u>Fortuna & Helen claims</u> <u>Eagle Valley</u>	<u>Intergrown quartz (grey, vitreous,</u> <u>sugary - chalcedonic) & calcite (white</u> <u>& dark grey) vein which cements altered</u> <u>andesite (?) breccia fragments.</u> <u>Breccia fragments are thoroughly</u> <u>argillized or silicified. The vein</u> <u>material & fragments are Fe-stained &</u> <u>contain clots of oxidized pyrite &</u> <u>unidentified grey-black metallic</u> <u>minerals. (Pb?, Ag?) Several stages</u> <u>quartz veining & brecciation represented.</u>
1726	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>30</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4201140</u> N <u>0757220</u> E <u>Iris Mine</u> <u>Eagle Valley District</u>	<u>Banded, opaline to cockscomb, white to</u> <u>vitreous grey quartz vein & quartz-</u> <u>cemented andesite rock fragments. Vein</u> <u>contains fine clots oxidized sulfide</u> <u>(pyrite, etc.) & is stained by Fe &</u> <u>Mnox. Clots green-yellow oxides</u> <u>associated with sulfides. Quartz after</u> <u>calcite fills vugs as does drusy quartz,</u> <u>both highly Fe-stained. (Sample looks</u> <u>good for precious metals, altho none</u> <u>observed).</u>

Sample Description

Sample Number	Location	Description
1727	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>19</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4201350</u> N <u>0757480</u> E <u>Homestake Mine</u> <u>Eagle Valley District</u>	<u>Very fine grained free gold occurs in dark sulfide "streaks" & lenses with pyrite in sugary to chalcedonic, banded, light-green to white, compact (few vugs) quartz vein. Also come finely crystal-</u> <u>line, pinkish & greenish material which may be adularia?, Alunite?, fluorite? Minor chalcopryrite also noted.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1728	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>19</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4201350</u> N <u>0757480</u> E <u>Homestake Mine</u> <u>Eagle Valley District</u>	<u>Quartz-cemented andesite breccia quartz is white to vitreous (clear), forms cockade encrustations around highly altered & veined andesite & rhyolite rock fragments & carries oxidized pyrite grains. Fe & Mn oxides relatively abundant Sample probably gold bearing, altho none observed with handlens.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1729	Quad: <u>Deer Lodge Canyon 7½'</u> Sec: <u>30</u> T: <u>1N</u> R: <u>71E</u> UTM: <u>4199880</u> N <u>0757600</u> E <u>Horseshoe Mine</u> <u>Eagle Valley District</u>	<u>Sample consists of mixture of banded, fissure-type white quartz & calcite vein, siderite vein, quartz-cemented andesite breccia. Vein material contain minor oxidized pyrite.</u>
1730	Quad: <u>Blue Nose Peak 7½'</u> Sec: <u>33</u> T: <u>8S</u> R: <u>69E</u> UTM: <u>4121600</u> N <u>0740510</u> E <u>Wells Cargo Mine</u> <u>Viola District</u>	<u>White, coarsely crystalline barite occurs as vein material & breccia cement for silicified limestone/dolomite breccia. Minor calcite & Fe oxides.</u>
1731	Quad: <u>Blue Nose Peak 7½'</u> Sec: <u>33</u> T: <u>8S</u> R: <u>69E</u> UTM: <u>4121600</u> N <u>0740510</u> E <u>Wells Cargo Mine</u> <u>Viola District</u>	<u>Hydrothermally altered breccia composed of quartz vein & altered limestone fragments cemented by calcite opaline silica, barite, & minor Fe oxides. Some fine, granular crystals of white fluorite (fluoresces violet) coating surfaces.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	

Sample Description

Sample Number	Location	Description
1732	Quad: Blue Nose Peak 7½' Sec: 19 T: 8S R: 69E UTM: 4124270 N 0738410 E Viola claims Viola District	Gossany oxidized, siliceous, brecciated vein material & altered limestone. Sample is pourous mixture of calcite, barite quartz (both vein & pourous silica in matrix), Fe & Mnoxs. Yellow & green oxides are abundant possibly after Pb, As or Sb. Remnant galena & minor Cuoxs observed. Oxidized pyrite & finely crystalline, oxidized sulfides (galena?) occur thruout sample.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1733	Quad: Blue Nose Peak 7½' Sec: 19 T: 8S R: 69E UTM: 4124100 N 0738460 E Viola claims Viola District	Very similar to sample 1732. Gossany boxworked, siliceous, pourous mixture silica, calcite, barite, Feoxs, & oxidized, finely crystalline sulfides. Yellow-green oxides after Pb?, Sb? in vugs. Remnant galena & oxidized pyrite in boxworked gossan. Minor Cuoxs Possibly fluorite(?)
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1734	Quad: Blue Nose Peak 7½' Sec: 19 T: 8S R: 69E UTM: 4123960 N 0737805 E BN claims Viola District	Fe-stained, siliceous, vuggy, brecciated, med-grey jasperoid. Vugs & cracks, lined with silica, Mnoxs & (also botryoidal psilomelane) & abundant limonite & hematite. Grey siliceous veinlets cut thru rock. Oxidized pyrite(?) noted & fine white prismatic mineral on surfaces, possibly barite or Sbox? Some pink-red oxides possibly after Hg?
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1735	Quad: Blue Nose Peak 7½' Sec: 19 T: 8S R: 69E UTM: 4123990 N 0737795 E BN claims Viola District	Vuggy, coarsely crystalline, white barite & quartz vein cuts & cements jasperoid fragments. Vein material contains abundant coarse clots tetrahedrite, pyrite, chalcopyrite, galena, & Cuoxs (including malachite, azurite & chrysocolla). Rocks are dense & most sulfides partially or completely oxidized. Yellow-green oxides possibly after Pb or Sb? Feoxs minor. Show honeycombed, gossany & vugs.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
1736	Quad: <u>Blue Nose Peak 7½'</u> Sec: <u>30</u> T: <u>8S</u> R: <u>69E</u> UTM: <u>4123360</u> N <u>0738120</u> E <u>Pittsburg? Mine</u> <u>Viola District</u>	<u>Heavily Fe-stained, pyritized & silicified limestone breccia & rhyolite (siliceous grey holocrystalline, aphanitic, flow banded). Pyrite is abundant, generally finely crystalline & distributed thruout both rock types. Fragments in breccia are cut thru by fine siliceous veinlets. Opaline silica & possibly fine-grained jarosite coats surfaces. Some strange green (FePO₄?) & pink (Fe, Hg?) oxides. Part of sample consists of Fe-stained calcite vein & recrystallized limestone.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1737	Quad: <u>Blue Nose Peak 7½'</u> Sec: <u>27</u> T: <u>8S</u> R: <u>68E</u> UTM: <u>4123175</u> N <u>0734220</u> E <u>Johnnie Mine</u> <u>Viola District</u>	<u>Finely crystalline to opaline, sugary white quartz vein with siliceous, Fe-stained, gossany vugs & enclosing altered, pink rhyolite fragments which show "ghosts" after pyrite. Vein contains minor dark streaks & clots of oxidized sulfides, probably mostly pyrite & Mn ox. Unusual red oxides may be derived from Hg or Fe minerals. Much of vein material is brecciated.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1738	Quad: <u>Garden Spring 7½'</u> Sec: <u>10?</u> T: <u>8S</u> R: <u>68E</u> UTM: <u>4126410</u> N <u>0732980</u> E <u>Lucky? Prospect</u> <u>Viola District</u>	<u>Massive to sugary, white to light green quartz vein with abundant, partially oxidized clots & bands (parallel to vein walls) of tetrahedrite, bornite, pyrite, chalcopryite, galena & possibly minor sphalerite(?). Cu ox (malachite, azurite chrysocolla) Abundant throughout vein & on weathered surfaces Fe & Mn ox less abundant but present. Small drusy lined vugs occur thruout vein material. Yellow green oxides coat surfaces.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
1739	Quad: <u>Leith 7½'</u> Sec: <u>9</u> T: <u>8S</u> R: <u>68E</u> UTM: <u>4127365</u> N <u>0731920</u> E <u>Cherokee Mine</u> <u>Viola District</u>	<u>Massive to crudely banded, white crystalline quartz vein containing coarse clots & lenses of tetrahedrite & pyrite in addition to abundant malachite chrysocolla, & azurite. Some sulfides</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>& oxide minerals deposited along fine line fractures also. Fe & Mn ox & yellow-green coatings occur on weathered surfaces. Dark sulfide lenses occur thruout vein material & may contain</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>finely disseminated Pb or Ag minerals. Sample is high graded.</u>
1740	Quad: <u>Pahroc Spring SE 7½'</u> Sec: <u>13</u> T: <u>4S</u> R: <u>64E</u> UTM: <u>4162800</u> N <u>0697800</u> E <u>Ballyoran claims</u> <u>Delamar District</u>	<u>Massive white-grey quartz vein & marly jasperoid, vein material is sheared, coated by abundant Fe & Mn ox & contains finely crystalline, disseminated pyrite. Pyrolusite & a green mineral (anglesite?, epidote?) coat surfaces. Fine fractures</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>& veinlets are filled with Fe & Mn ox & clots pyrite. Yellow-brown jarosite crystals also occur on fracture surfaces & in vugs. Strange orange oxides on</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>surfaces are unidentified. Cu ox seen on dump but not included in sample.</u>
1741	Quad: <u>Pahroc Spring SE 7½'</u> Sec: <u>14</u> T: <u>5S</u> R: <u>64E</u> UTM: <u>4154340</u> N <u>0695170</u> E <u>Sample location 1741</u> <u>Delmar District</u>	<u>Fine-grained, well sorted, white quartzite & crystalline white quartz vein containing dark lenses, layers & irregular clots of unoxidized pyrite, chalcopyrite & covellite. Malachite, azurite, Fe & Mn ox fill small gossany</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>vugs near weathered surfaces. Tetrahedrite? & galena? may also be present but most sulfides in matrix are too fine grained to be easily identified, forming dark streaks & lenses in host.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
1742	Quad: <u>Pahroc Spring SE 7½'</u> Sec: <u>14</u> T: <u>5S</u> R: <u>64E</u> UTM: <u>4154340</u> N <u>0695170</u> E <u>Szywala claims</u> <u>Delamar District</u>	<u>Red & grey limestone breccia cemented</u> <u>by white calcite or Feoxs. Most frag-</u> <u>ments in breccia are angular 2 pebble-</u> <u>size. Some finely crystalline, oxidized</u> <u>pyrite deposited along hariline fractures</u> <u>Feoxs coat surfaces. Fe-cemented</u> <u>breccia is silicified & show slicks.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	_____ _____ _____
1743	Quad: <u>Pahroc Spring SE 7½'</u> Sec: <u>14</u> T: <u>5S</u> R: <u>64E</u> UTM: <u>4153860</u> N <u>0695660</u> E <u>Our Boys in Blue claims</u> <u>Delamar District</u>	<u>Siliceous, limonitic & hematitic,</u> <u>brecciated gossan. Rock is dense,</u> <u>vuggy, generally earthy or siliceous</u> <u>covered by various Fe/yellow, red,</u> <u>orange) & Mnoxs. Less altered samples</u> <u>consist of bleached, clay, Fe & silica</u> <u>altered limestone (?) Pyrolusite</u> <u>(botryoidal) coats vugs. Fe-Mn silica</u> <u>veinlets & fracture fillings common.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	_____ _____ _____
1744	Quad: <u>Pahroc Spring SE 7½'</u> Sec: <u>14</u> T: <u>5S</u> R: <u>64E</u> UTM: <u>4153860</u> N <u>0695660</u> E <u>Our Boys in Blue claims</u> <u>Delamar District</u>	<u>Quartz-veined, fine-grained, pink</u> <u>quartzite. Veins of white prismatic</u> <u>to sugary quartz range from several</u> <u>centimeters to a few millimeters in</u> <u>width. Some wider veins open-centered</u> <u>& coated by Fe & Mnoxs. Veins net-</u> <u>working but generally subparallel along</u> <u>NW outcrop strike. Minor pyrite</u> <u>observed.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	_____ _____ _____
1745	Quad: <u>Delamar 7½'</u> Sec: <u>23</u> T: <u>5S</u> R: <u>64E</u> UTM: <u>4152280</u> N <u>0695800</u> E <u>Delamar Zinc?</u> <u>Delamar District</u>	<u>Dense (Pb?) vuggy, Mn-Fe-calcite-silica</u> <u>gossan. Gossan is brecciated & cemented</u> <u>by white calcite. Some marly Fe-replaced</u> <u>limestone also. Oxidized pyrite only</u> <u>mineral recognized, altho white crust &</u> <u>coatings could be hydrozincite or</u> <u>smithsonite? Gossan is manganiferous,</u> <u>limonitic & in part siliceous.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	_____ _____ _____
1746	Quad: <u>Delamar 7½'</u> Sec: <u>25</u> T: <u>5S</u> R: <u>64E</u> UTM: <u>4150610</u> N <u>0696930</u> E <u>Sample Loc 1746</u> <u>Delamar District</u>	<u>Heavily Mn-stained, massive to prismatic</u> <u>vuggy quartz vein. Vein width generally</u> <u>5" or less. Pyrolusite & Feoxs coat</u> <u>quartz crystals which fill open vugs.</u> <u>Rocks are dense & may contain Pb or</u> <u>Ag? minerals.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	_____ _____ _____

Sample Description

Sample Number	Location	Description
1747	Quad: Delamar 7½' Sec: 25 T: 5S R: 64E UTM: 4150300 N 0696715 E Magnolia Mine Delamar District	Sample is mixture of rock types from dump including altered porphyry intrusive?, altered quartzite & limestone?, & quartz-cemented quartzite or quartz vein breccia. However, most of sample consists of banded, vuggy, prismatic (comb) to sugary white to vitreous quartz vein. MnOx abundant, coating surfaces & occurring as massive bands & clots in vein material. Some oxidized pyrite in vugs & clots chalcopyrite & malachite noted. Siliceous igneous breccia cut by quartz vein shows abundant Fe & MnOx, in addition to finely disseminated pyrite. Malachite-coated quartz vein on dump contained visible gold, but rock not included in sample.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1748	Quad: Delamar 7½' Sec: 36 T: 5S R: 64E UTM: 4148490 N 0696850 E Sample loc 1748 Delamar District	White (bleached) rhyolite porphyry intrusive which contain abundant quartz phenocrysts & leached mafics & feldspars. Rock show advanced argillic or silicic (sericitic) alteration. Fe & MnOx coat surfaces. Some "ghosts" after pyrite observed.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1749	Quad: Delamar 7½' Sec: 1 T: 6S R: 64E UTM: 4148300 N 0697400 E Delamar Mine Delamar District	Fractured quartzite cut by quartz veins (generally 0.5 mm to 1 cm in width) & quartz-cemented quartzite breccia. Quartz vein is white, open-centered, prismatic to sugary. Fine-grained pyrite is concentrated along fractures in quartzite & on quartz vein selvages. Dark streaks & greenish (?) clots may be fine-grained sulfides. Fe & Mn oxides coat fracture surfaces. Yellow-brown jarosite (?) crystals coat prismatic quartz.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
1750	Quad: <u>Delamar 7½'</u> Sec: <u>1</u> T: <u>6S</u> R: <u>64E</u> UTM: <u>4148300</u> N <u>0697400</u> E <u>Delamar Mine</u> <u>Delamar District</u>	Rock type same as 1749 but some samples show clots pyrolusite or contain abundant fine-grained, disseminated pyrite & chalcopyrite oxidized on weathered surfaces to malachite & Feoxs
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	Some unusual yellow oxides (Sb?) & opaline coatings.
1751	Quad: <u>Delamar 7½'</u> Sec: <u>1</u> T: <u>6S</u> R: <u>64E</u> UTM: <u>4148010</u> N <u>0697580</u> E <u>April Fool Mine</u> <u>Delamar District</u>	Quartzite & vuggy comb to opaline quartz vein, some containing finely disseminated unoxidized pyrite & surface coatings of Cuoxs. Some gossany vugs, opaline coatings & yellow & white crustified surface coatings (Sb?). Fe & Mn oxs common. Some dark sulfides rich lenses along vein selvages probably rich in Ag?.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1752	Quad: <u>Delamar 7½'</u> Sec: <u>1</u> T: <u>6S</u> R: <u>64E</u> UTM: <u>4148160</u> N <u>0697620</u> E <u>April Fool Mine</u> <u>Delamar District</u>	Same as 1751 except for addition of quartz-cemented quartzite breccia containing fine crystals of chalcopyrite & coarse clots oxidized pyrite & Mn. Tetrahedrite noted with rims oxidized to malachite & azurite.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
1753	Quad: <u>Delamar 7½'</u> Sec: <u>1</u> T: <u>6S</u> R: <u>64E</u> UTM: <u>4147980</u> N <u>0697720</u> E <u>Sample loc 1753</u> <u>Delamar District</u>	Vuggy, white to vitreous comb quartz vein & dense, pyritized grey-brown, fine-grained quartzite. Clots oxidized pyrite tetrahedrite(?), & Fe-Mn Cuoxs on surfaces. Gossany portions occur in central vein cavities. Shiny platy minerals also occur (Zn?, Mn?). Rocks are sheared & show slicked surfaces.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E _____	

Sample Description

Sample Number	Location	Description
1754	Quad: <u>Delamar 7½'</u> Sec: <u>1</u> T: <u>6S</u> R: <u>64E</u> UTM: <u>4147980</u> N <u>0697925</u> E <u>Jumbo Mine</u> <u>Delamar District</u>	<u>Quartz-veined quartzite & quartz-</u> <u>cemented quartzite & green, micaceous,</u> <u>siltstone breccia. Fe & Mn-stained</u> <u>comb & cockade, vuggy quartz contains</u> <u>clots oxidized pyrite & minor surface</u> <u>coatings of Cuoxs. Rocks are dense</u> <u>probably due to barite, which is</u> <u>reported from this locality. Platy</u> <u>shiny mineral is either Zn or MnOx.</u> <u>Dark streaks indicate dispersed</u> <u>sulfides. Minor, fine-grained chalc-</u> <u>pyrite noted. Rocks are fractured,</u> <u>sheared or brecciated.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1755	Quad: <u>Delamar 7½'</u> Sec: <u>2</u> T: <u>6S</u> R: <u>64E</u> UTM: <u>4148040</u> N <u>0695820</u> E <u>Delamar Wash workings</u> <u>Delamar District</u>	<u>Quartz-veined quartzite & quartz-</u> <u>cemented quartzite breccia. Vugs in</u> <u>quartzite & mid-section of veins are</u> <u>filled by vitreous, euhedral quartz</u> <u>prisms, mostly coated by Fe & MnOx.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>Some irregular dark clots & specks may</u> <u>be MnOx of fine sulfides. Feoxs &</u> <u>gossany portions occur thruout vein</u> <u>& host rock. Some ganiferous gossan</u> <u>also included in sample.</u>
1756	Quad: <u>Slidy Mtn. 7½'</u> Sec: <u>unsurv.</u> T: <u>5S</u> R: <u>65E</u> UTM: <u>4150070</u> N <u>0699400</u> E <u>Culverwell Mine</u> <u>Delamar District</u>	<u>Massive to chalcedonic (banded) to</u> <u>prismatic (comb), white quartz vein &</u> <u>quartz-cemented & veined quartzite</u> <u>breccia. Feoxs & minor MnOx coat</u> <u>surfaces & vugs in vein material. Finely</u> <u>crystalline barite (minor amount) fills</u> <u>some vugs. Partially oxidized, finely</u> <u>crystalline pyrite & arsenopyrite (?)</u> <u>occur in altered quartzite breccia</u> <u>fragments. Banded chalcedonic quartz</u> <u>vein shows numerous vitreous cross-</u> <u>cutting veinlets.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1757	Quad: <u>Slidy Mtn. 7½'</u> Sec: <u>unsurv.</u> T: <u>5S</u> R: <u>65E</u> UTM: <u>4150000</u> N <u>0699360</u> E <u>Culverwell Mine</u> <u>Delamar District</u>	<u>Quartz-siderite vein, quartz after</u> <u>calcite vein & vuggy quartz-cemented</u> <u>quartzite breccia. Clots of oxidized</u> <u>pyrite occur in vugs & along fractures</u> <u>Quartzite breccia fragments also contain</u> <u>fine crystals of oxidized pyrite & clots</u> <u>or coatings of MnOx.</u>

Sample Description

Sample Number	Location	Description
1758	Quad: <u>Slidy Mtn. 7½'</u> Sec: <u>unsurv.</u> T: <u>5S</u> R: <u>65E</u> UTM: <u>4150020</u> N <u>0702080</u> E <u>Denton Summit Workings</u> <u>Delamar District</u>	<u>Dense, red & green banded, fine-grained,</u> <u>quartz calc-silicate rock. Some hematite</u> <u>staining. Sample lamped & found to</u> <u>contain only two minute flecks of</u> <u>scheelite.</u>
1759	Quad: <u>Slidy Mtn. 7½'</u> Sec: <u>unsurv.</u> T: <u>6S</u> R: <u>65E</u> UTM: <u>4145700</u> N <u>0700200</u> E <u>Eastern Mine (sample loc 1759)</u> <u>Delamar District</u>	<u>Banded, vuggy, epithermal comb quartz</u> <u>vein & quartz-cemented limestone</u> <u>breccia containing oxidized pyrite,</u> <u>Fe & Mn oxs, & some Cu oxs, possibly</u> <u>after tetrahedrite? Prisms of quartz</u> <u>fills vugs. Limestone fragments are</u> <u>silicified. Also some very fine-</u> <u>grained quartzite fragments in breccia.</u> <u>Dark streaks indicate presence of fine-</u> <u>grained sulfides. Greenish oxides</u> <u>(after pyrite) coat surfaces of part of</u> <u>sample. Minor fluorite & calcite also</u> <u>noted as breccia cement.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1760	Quad: <u>Slidy Mtn. 7½'</u> Sec: <u>unsurv.</u> T: <u>6S</u> R: <u>65E</u> UTM: <u>4145660</u> N <u>0699860</u> E <u>Eastern Mine (sample loc 1760)</u> <u>Delamar District</u>	<u>Massive to prismatic, vitreous (clear)</u> <u>to white quartz vein containing vugs</u> <u>filled with malachite & medium-coarse</u> <u>(a few mm. across) clots of tetrahedrite</u> <u>oxidized on rims to Cu oxs. Some</u> <u>crystals pyrite or arsenopyrite(?)</u> <u>also. Yellow & white coatings may be</u> <u>after Sb min ?</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1761	Quad: <u>Caliente 2° Sheet</u> Sec: <u>unsurv.</u> T: <u>1N</u> R: <u>57E</u> UTM: <u>4198200</u> N <u>0624200</u> E <u>Sample loc 1761 & 1762</u> <u>Freiberg District</u>	<u>Sample consists of mixture of altered</u> <u>limestone breccia, calcite-cemented</u> <u>limestone breccia & dense, siliceous,</u> <u>hematitic gossan. Rocks are dense &</u> <u>contain vug fillings of soft, bright</u> <u>green crystals possibly formed from</u> <u>alteration of Pb, Zn, or Cu minerals?</u> <u>*Cerussite occurs with calcite vein</u> <u>material. Gossany vugs Fe oxs & Cu oxs</u> <u>abundant on most rock samples. All</u> <u>rocks are brecciated & most are</u> <u>silicified. *(anglesite?, scorofite?)</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
1762	Quad: <u>Caliente 2° Sheet</u> Sec: <u>unsurv.</u> T: <u>1N</u> R: <u>57E</u> UTM: <u>4198200</u> N <u>0624200</u> E <u>Sample locs 1761 & 1762</u> <u>Freiberg District</u>	<u>Fe-stained jasperoid/silicified lime-</u> <u>stone. Original rock is bleached to</u> <u>tan color & coated by hematite, limonite</u> <u>& Mnxs. All samples are highly fract-</u> <u>ured & dense. Sample taken from out-</u> <u>crop adjacent to main shaft.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1763	Quad: <u>Caliente 2° Sheet</u> Sec: <u>unsurv.</u> T: <u>1N</u> R: <u>57E</u> UTM: <u>4199000</u> N <u>0624200</u> E <u>Sample location 1763</u> <u>Freiberg District</u>	<u>Dense, light green, banded to marly</u> <u>calc-silicate; earthy hematitic gossan;</u> <u>& altered (Fe-replaced) calcite-veined</u> <u>limestone. The calc-silicate contains</u> <u>small amount of fine-grained scheelite</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>& is coated by abundant Fe & Mnxs &</u> <u>minor Cuoxs. The gossan is mostly</u> <u>oxidized, to Feoxs & cerussite, but</u> <u>unoxidized cores of galena still remain.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>Oxidized pyrite, siliceous veinlets &</u> <u>blue opaline coatings present on most</u> <u>samples.</u>
1764	Quad: <u>Caliente 2° Sheet</u> Sec: <u>unsurv.</u> T: <u>1N</u> R: <u>57E</u> UTM: <u>4200200</u> N <u>0623200</u> E <u>Sample loc 1764</u> <u>Freiberg District</u>	<u>Green garnet-epidote-calcite tactite</u> <u>with abundant fine to coarse "plates"</u> <u>of dark brown (yellow) to black</u> <u>sphalerite. Also contains disseminated</u> <u>fine crystals of chalcopyrite & pyrite,</u> <u>mainly unoxidized.</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1765	Quad: <u>Caliente 2° Sheet</u> Sec: <u>unsurv.</u> T: <u>1N</u> R: <u>57E</u> UTM: <u>4198800</u> N <u>0622600</u> E <u>Freiberg Mine</u> <u>Freiberg District</u>	<u>Dense, pink (rhodochrosite?)-brown, marly</u> <u>recrystallized & replaced dolomite &</u> <u>dolomitic limestone. Rock is coated,</u> <u>replaced & veined by Feonxs (mostly</u> <u>hematite) contains veins & pods of</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	<u>galena & pyrite, in addition to minor</u> <u>surface coatings of cerussite & Cuoxs.</u> <u>Also minor chalcopyrite noted. Replace-</u> <u>ment ore is dense (BA?, Pb?), & oxidized,</u> <u>with a gossany appearance. Oxidized</u> <u>rings of yellow mineral possibly altera-</u> <u>tion product of galena (angelsite or</u> <u>SgCl?) Looks like typical Ag ore.</u>

Sample Description

Sample Number	Location	Description
1766	Quad: Caliente 2° Sheet Sec: unsurv. T: 1N R: 57E UTM: 4198800 N 0622600 E Freiberg Mine Freiberg District	Random grab sample taken from stockpile ore & consists of a mixture of altered, earthy to marly yellow-brown limestone cut by veinlets of calcite & boxworked, hematitic gossan. Feoxs are abundant.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	Cuoxs minor rocks are dense possibly due to disseminated Pb &/or BA. Some samples silicified & show clots oxidized pyrite. Samples are generally brecciated or fractured. Mineralization is not as evident as that seen in 1765.
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
1767	Quad: Caliente 2° Sec: unsurv. T: 1N R: 57E UTM: 4201850 N 0622400 E Sample loc 1767 Freiberg District	Light-green, epidote-calcite tactite & white marble. Tactite contains coarse crystals of scheelite & powellite;
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	marble & calc-silicate rocks are relatively barren. Minor Feoxs W-bearing samples are coarse-grained (epidote & calcite) & dense. Black specks probably Mn oxes or magnetite?
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

Sample Description

Sample Number	Location	Description
<u>1768</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>34</u> T: <u>3N</u> R: <u>55E</u> UTM: <u>4213800</u> N <u>0609000</u> E <u>Nyco Mine</u> <u>Quinn Canyon District</u>	<u>Chipped from vein 150' into upper</u> <u>adit-fluorite is small crystals &</u> <u>vuggy masses with quartz. The</u> <u>country rock is quartz latite.</u>
<u>1769</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>SW 1/4 34</u> T: <u>3N</u> R: <u>55E</u> UTM: <u>42136000</u> N <u>0607800</u> E <u>Precious Metal Prospect(?)</u> <u>Quinn Canyon District</u>	<u>From minor prospect-brecciated Fe-</u> <u>stained quartz vein in quartz</u> <u>latite.</u>
<u>1770</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/4 29</u> T: <u>2N</u> R: <u>56E</u> UTM: <u>4207800</u> N <u>0614200</u> E <u>Blue Bell Prospect</u> <u>Quinn Canyon District</u>	<u>Bench exposed E-W vein of purple-</u> <u>green fluorite which is brecciated</u> <u>and silicified in a vuggy quartz.</u>
<u>1771</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/2 29</u> T: <u>2N</u> R: <u>56E</u> UTM: <u>4207500</u> N <u>0613600</u> E <u>Shannon Queen Prospect</u> <u>Quinn Canyon District</u>	<u>Sample is from outcrop of Fe-oxide</u> <u>stained/brecciated and silicified</u> <u>greenish white fluorite.</u>
<u>1772</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/4 30</u> T: <u>2N</u> R: <u>56E</u> UTM: <u>4207300</u> N <u>0612600</u> E <u>Emerald Prospect</u> <u>Quinn Canyon District</u>	<u>Fluorite vein material in prospect</u> <u>pits, lowgrade-mixed with iron,</u> <u>manganese vuggy quartz are coarse</u> <u>green crystals of fluorspar.</u>
<u>1773</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/4 30</u> T: <u>2N</u> R: <u>56E</u> UTM: <u>4207400</u> N <u>0614400</u> E <u>Near Blue Bell Prospect</u> <u>Quinn Canyon District</u>	<u>Vein exposed in road-cut 300 ft. east</u> <u>of Blue Bell Prospect-the North</u> <u>striking vein is a highly silicified</u> <u>breccia in quartz latite.</u>
<u>1774</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>SW 1/4 18</u> T: <u>2N</u> R: <u>56E</u> UTM: <u>4207400</u> N <u>0614400</u> E <u>Sunbeam Prospect</u> <u>Quinn Canyon District</u>	<u>Prospect -pits had low-grade fluorite</u> <u>in a vuggy, brecciated and</u> <u>silicified volcanic.</u>
<u>1775</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NE 1/4 16</u> T: <u>3N</u> R: <u>56E</u> UTM: <u>4220700</u> N <u>0615700</u> E <u>Horseshoe Mine</u> <u>Quinn Canyon District</u>	<u>Chipped sample from So. open-pit</u> <u>irregular shaped replacement body of</u> <u>fluorite mixed with quartz in a</u> <u>limestone. Some calcite and vuggy</u> <u>open-spaced breccia.</u>
<u>1776</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NE 1/4 16</u> T: <u>3N</u> R: <u>56E</u> UTM: <u>4220600</u> N <u>0615800</u> E <u>Horseshoe Mine</u> <u>Quinn Canyon District</u>	<u>Northern open-pit, fluorite is</u> <u>a replacement body in limestone</u> <u>with calcite. Some ore is black</u> <u>and gray ore called "coontail"</u> <u>fluorite.</u>

Sample Description

Sample Number	Location	Description
<u>1777</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NE 1/4 16</u> T: <u>3N</u> R: <u>56E</u> UTM: <u>4220800</u> N <u>0615800</u> E <u>Northern Horseshoe Prospect</u> <u>Quinn Canyon District</u>	<u>Minor Fluorite in a vein of</u> <u>silicified breccia crosscutting</u> <u>a jasperoid which forms a ridge</u> <u>maker of NE trending jasperoids.</u>
<u>1778</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>10</u> T: <u>3N</u> R: <u>56E</u> UTM: <u>4223600</u> N <u>0616600</u> E <u>Spar Mine</u> <u>Quinn Canyon District</u>	<u>Fluorite vein (pod) is along a N25E</u> <u>structure which has been bulldozed-</u> <u>fluorite is massive banded purple and</u> <u>gray/country rock is very bleached</u> <u>dolomite.</u>
<u>1779</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>SW 1/4 10</u> T: <u>3N</u> R: <u>56E</u> UTM: <u>4221400</u> N <u>0616300</u> E <u>Big Jim Prospect</u> <u>Quinn Canyon District</u>	<u>From a small adit in side of</u> <u>jasperoid/a body of fluorite which</u> <u>has jasperoid inclusions in the</u> <u>matrix.</u>
<u>1780</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/4 2</u> T: <u>3N</u> R: <u>56E</u> UTM: <u>4223200</u> N <u>0618000</u> E <u>Mammoth Prospect</u> <u>Quinn Canyon District</u>	<u>Several pits-trenchs expose fluorite</u> <u>as a matrix with limestone and</u> <u>jasperoid as breccia fragments.</u>
<u>1781</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/4 9</u> T: <u>3N</u> R: <u>57E</u> UTM: <u>4222500</u> N <u>0625500</u> E <u>Bonanza Claims</u> <u>Quinn Canyon District</u>	<u>Chipped from outcrops and dozer-</u> <u>cuts. Silicified breccia</u> <u>and jasperoid.</u>
<u>1782</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/4 10</u> T: <u>3N</u> R: <u>57E</u> UTM: <u>4222000</u> N <u>0625500</u> E <u>Liberty Bell Claims</u> <u>Quinn Canyon District</u>	<u>Chip samples from outcrops of</u> <u>silicified breccia and jasperoids.</u>
<u>1783</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NE 1/4 9</u> T: <u>4N</u> R: <u>56E</u> UTM: <u>4230700</u> N <u>0621380</u> E <u>Pathfinder Mining & Exploration</u> <u>Quinn Canyon District</u>	<u>Gossan-like iron-stained in limestone.</u> <u>From dump sulfides of Pb/Zn Ag(?)</u>
<u>1784</u>	Quad: <u>Quinn Canyon Range 1:100,000</u> Sec: <u>NW 1/4 18</u> T: <u>4N</u> R: <u>56E</u> UTM: <u>4229400</u> N <u>0611600</u> E <u>Hangen Claims(?)</u> <u>Quinn Canyon District</u>	<u>Gossan-like veins in granodiorite</u> <u>and limestone pyrite, sphalerite,</u> <u>Ag(?)</u>
	Quad: _____ Sec: _____ T: _____ R: _____ UTM: _____ N _____ E	

APPENDIX B

Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	117	118	119	120	121	122	123	124	125
Fe % (.05)	10	7	5	7	10	G20	10	20	7
Mg % (.02)	.5	3	.5	1	1	.2	.2	.5	.1
Ca % (.05)	20	G20	20	5	20	.5	L	20	.2
Ti % (.002)	.1	.3	.05	.3	.01	.05	.1	.01	.2
Mn (10)	2000	1500	G5000	G5000	G5000	5000	200	200	200
Ag (.5)	7	2	50	10	150	30	2000	20	15
As (200)	L	N	200	1000	500	5000	1000	3000	G10,000
Au (10)	N	N	N	10	N	N	N	N	N
B (10)	20	200	150	200	L	L	N	500	500
Ba (20)	200	150	G5000	G5000	3000	150	300	200	200
Be (1)	2	1.5	1	5	L	L	L	L	2
Bi (10)	10	N	20	N	N	N	10	N	50
Cd (20)	N	N	500	20	100	30	L	N	N
Co (5)	10	10	N	10	N	N	N	N	N
Cr (10)	N	10	N	20	N	10	L	N	N
Cu (5)	100	50	500	50	30	200	300	100	100
La (20)	50	70	50	50	50	L	50	50	50
Mo (5)	L	L	L	30	L	N	N	N	50
Nb (20)	L	L	L	20	L	20	L	L	20
Ni (5)	10	15	10	50	20	10	N	N	N
Pb (10)	200	150	10,000	200	2000	20,000	G20,000	G20,000	7000
Sb (100)	100	N	200	L	200	500	2000	200	500
Sc (5)	5	10	5	10	L	L	5	N	5
Sn (10)	N	N	50	N	N	N	30	100	20
Sr (100)	100	100	500	200	500	L	300	200	2000
V (10)	50	50	50	100	100	100	10	20	30
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	50	50	30	50	10	L	N	N	L
Zn (200)	500	L	G10,000	1000	G10,000	2000	300	1000	200
Zr (10)	50	100	50	200	N	L	100	N	300
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	126	127	128	129					
Fe % (.05)	10	G20	G20	7					
Mg % (.02)	.05	.2	.1	2					
Ca % (.05)	.05	.1	.05	10					
Ti % (.002)	.3	.2	.15	.3					
Mn (10)	200	200	200	2000					
Ag (.5)	5	2	10	70					
As (200)	7000	200	1000	N					
Au (10)	N	N	N	N					
B (10)	2000	20	20	20					
Ba (20)	150	200	140	200					
Be (1)	2	1	1	1					
Bi (10)	50	N	N	50					
Cd (20)	N	20	20	N					
Co (5)	N	N	N	20					
Cr (10)	L	N	N	30					
Cu (5)	100	50	100	20,000					
La (20)	50	50	30	50					
Mo (5)	20	10	10	10					
Nb (20)	20	20	L	L					
Ni (5)	5	10	N	50					
Pb (10)	700	200	1000	200					
Sb (100)	500	L	L	N					
Sc (5)	5	5	5	20					
Sn (10)	N	N	N	N					
Sr (100)	1000	N	L	500					
V (10)	50	50	200	200					
W (50)	N	N	N	N					
Y (10)	10	10	L	L					
Zn (200)	200	1000	2000	1000					
Zr (10)	500	200	200	1000					
Th (100)	N	N	N	N					

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	576	577	578	579	580	581			
Fe % (.05)	.3	.7	.5	1	.05	5			
Mg % (.02)	1.5	.1	.07	.07	1	.02			
Ca % (.05)	20	.7	3	.2	2	.15			
Ti % (.002)	.002	.03	L	1.5	.002	.05			
Mn (10)	700	100	200	1000	100	L			
Ag (.5)	2	L	1000	70	N	N			
As (200)	N	N	3000	N	N	N			
Au (10)	N	N	N	10	N	N			
B (10)	N	20	N	L	150	20			
Ba (20)	G(5000)	100	G(5000)	500	200	500			
Be (1)	N	5	N	10	N	2			
Bi (10)	N	N	N	N	N	N			
Cd (20)	200	N	G(500)	N	N	N			
Co (5)	N	N	N	15	N	N			
Cr (10)	N	N	N	20	N	N			
Cu (5)	150	5	G(20000)	100	7	10			
La (20)	N	30	L	L	L	20			
Mo (5)	100	N	300	5	N	7			
Nb (20)	N	20	N	N	N	N			
Ni (5)	L	N	7	15	N	N			
Pb (10)	5000	50	G(20000)	100	15	70			
Sb (100)	N	N	G(10000)	L	N	N			
Sc (5)	N	N	N	L	N	L			
Sn (10)	N	N	N	N	N	N			
Sr (100)	700	N	1500	200	100	L			
V (10)	150	L	20	15	L	L			
W (50)	N	N	N	N	N	N			
Y (10)	N	30	10	10	N	15			
Zn (200)	3000	N	G(10000)	200	N	N			
Zr (10)	N	100	N	70	L	100			
Th (100)	N	N	N	N	N	N			

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element	Sample Number								
	784	785	786	787	788	789	790	791	792
Fe % (.05)	20	20	10	2	2	5	G20	10	G20
Mg % (.02)	1.5	2	1	.2	.7	.05	.3	.5	.7
Ca % (.05)	10	1	.2	.5	1	L	.7	20	.5
Ti % (.002)	.1	.2	.2	.15	.15	.5	.05	.01	.15
Mn (10)	5000	5000	500	500	500	50	2000	2000	500
Ag (.5)	50	100	200	30	5	1	N	N	N
As (200)	N	N	N	N	N	N	L	L	N
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	20	20	20	20	10	10	N	20	50
Ba (20)	100	2000	700	700	200	700	700	150	G5000
Be (1)	5	2	1.5	3	2	L	20	5	7
Bi (10)	N	500	1000	100	L	L	N	N	N
Cd (20)	N	N	200	N	N	N	N	N	N
Co (5)	20	50	50	N	L	N	100	N	50
Cr (10)	L	50	50	N	20	20	20	N	20
Cu (5)	2000	G20,000	G20,000	700	70	70	70	15	50
La (20)	50	50	50	100	50	500	L	50	50
Mo (5)	L	L	G2000	200	20	20	20	N	20
Nb (20)	L	L	L	20	20	50	L	20	20
Ni (5)	10	20	20	N	N	N	200	L	100
Pb (10)	200	150	G20,000	2000	100	100	20	50	20
Sb (100)	100	N	N	N	N	N	N	N	N
Sc (5)	5	10	10	5	5	15	5	5	20
Sn (10)	20	N	N	N	N	N	N	N	N
Sr (100)	500	500	500	L	L	200	200	200	200
V (10)	200	200	1000	20	50	50	50	50	50
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	10	20	20	30	L	70	10	30	100
Zn (200)	1000	1000	10,000	500	L	N	500	L	200
Zr (10)	50	100	100	200	100	1000	L	20	50
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element	Sample Number							
	793	794	795	796	797	798	799	800
Fe % (.05)	10	3	1	20	20	15	15	10
Mg % (.02)	.02	L	.2	.5	10	.7	.2	.1
Ca % (.05)	.05	L	L	2	7	5	.05	L
Ti % (.002)	.2	.2	.5	.01	1	.2	.3	.3
Mn (10)	200	50	50	G5000	5000	5000	2000	2000
Ag (.5)	20	1	N	3	N	N	100	500
As (200)	1500	500	L	N	N	N	2000	500
Au (10)	N	N	N	N	N	N	N	L
B (10)	50	10	50	300	20	50	100	100
Ba (20)	1000	200	500	150	500	1500	1000	150
Be (1)	3	1	2	2	2	7	2	1
Bi (10)	N	N	N	N	N	N	20	N
Cd (20)	N	N	N	20	N	N	100	30
Co (5)	N	N	N	L	70	50	5	N
Cr (10)	30	N	2000	N	300	30	10	N
Cu (5)	30	10	10	10	70	30	1000	2000
La (20)	50	50	50	100	50	50	50	50
Mo (5)	N	N	N	30	10	L	N	10
Nb (20)	20	L	20	L	50	20	30	20
Ni (5)	10	N	50	10	20	15	10	N
Pb (10)	15,000	100	30	1000	100	100	7000	G20,000
Sb (100)	L	100	N	N	L	N	2000	1000
Sc (5)	7	N	5	L	30	10	10	10
Sn (10)	N	N	N	N	N	N	20	50
Sr (100)	300	300	100	300	300	300	100	N
V (10)	200	20	50	50	100	100	50	50
W (50)	N	N	N	N	N	N	L	N
Y (10)	10	L	N	10	20	50	50	50
Zn (200)	700	N	N	1000	200	L	10,000	1500
Zr (10)	200	500	70	50	100	100	200	200
Th (100)	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1389								
Fe % (.05)	G20								
Mg % (.02)	.5								
Ca % (.05)	3								
Ti % (.002)	.01								
Mn (10)	3000								
Ag (.5)	50								
As (200)	2000								
Au (10)	N								
B (10)	50								
Ba (20)	20								
Be (1)	1								
Bi (10)	10								
Cd (20)	20								
Co (5)	N								
Cr (10)	N								
Cu (5)	1000								
La (20)	50								
Mo (5)	N								
Nb (20)	L								
Ni (5)	5								
Pb (10)	G20,000								
Sb (100)	100								
Sc (5)	6								
Sn (10)	200								
Sr (100)	N								
V (10)	30								
W (50)	N								
Y (10)	L								
Zn (200)	5000								
Zr (10)	20								
Th (100)	N								

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1390	1391	1392	1393	1394	1395	1396	1397	1398
Fe % (.05)	G20	G20	G20	1	2	G20	G20	1	20
Mg % (.02)	.1	.05	.05	.05	.2	.1	.5	2	1
Ca % (.05)	1	1.5	.5	1.5	L	1	10	G20	15
Ti % (.002)	.02	.1	.02	.05	.07	.02	.02	.02	.005
Mn (10)	1000	300	200	500	500	3000	300	150	200
Ag (.5)	1.5	1.5	2	500	5	20	5	1.5	100
As (200)	300	200	N	2000	N	N	1000	N	10,000
Au (10)	N	N	N	N	N	N	N	N	L
B (10)	20	20	20	50	20	50	50	N	50
Ba (20)	200	50	50	G5000	1000	500	150	20	50
Be (1)	7	7	5	2	5	7	L	L	10
Bi (10)	N	10	10	N	N	L	10	N	20
Cd (20)	N	N	N	100	N	L	N	N	N
Co (5)	10	N	N	N	N	10	10	N	N
Cr (10)	L	L	N	N	N	N	N	N	N
Cu (5)	G20,000	2	2	1000	7	200	500	20	200
La (20)	50	L	L	50	50	L	L	50	50
Mo (5)	100	70	50	70	100	70	100	N	50
Nb (20)	20	20	20	L	20	20	20	L	20
Ni (5)	5	N	N	N	N	L	N	L	5
Pb (10)	100	50	50	20,000	150	1000	50	50	G20,000
Sb (100)	N	N	N	5000	L	N	N	N	1000
Sc (5)	L	5	N	N	N	N	N	N	N
Sn (10)	N	50	N	N	20	70	N	N	300
Sr (100)	N	N	N	1000	N	N	N	2000	L
V (10)	100	200	50	10	30	100	50	10	500
W (50)	500	100	1000	N	N	50	100	N	100
Y (10)	100	50	N	N	N	L	N	N	N
Zn (200)	500	700	L	G10,000	500	1000	L	L	200
Zr (10)	50	200	L	50	100	L	L	N	N
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1399	1400	1401	1402	1403	1404	1405	1406	1407
Fe % (.05)			2	5	10	.5	5	5	5
Mg % (.02)			1	2	.1	.2	.15	.15	.05
Ca % (.05)			5	3	L	10	.2	.2	.05
Ti % (.002)			.05	.2	.01	.03	.01	.1	.2
Mn (10)			200	500	300	1000	100	500	500
Ag (.5)			.5	.5	1	10	50	2	1
As (200)			N	N	N	N	N	N	N
Au (10)			N	N	N	10	G500	N	N
B (10)			200	1000	50	10	50	20	10
Ba (20)			20	200	50	200	5000	5000	500
Be (1)			20	10	1	50	2	2	1
Bi (10)			N	L	N	N	1000	10	N
Cd (20)			N	N	N	N	N	N	N
Co (5)			10	20	50	N	N	N	N
Cr (10)			30	50	N	N	N	20	20
Cu (5)			100	70	20	10	100	5000	7000
La (20)			50	50	50	50	50	50	50
Mo (5)			N	N	10	N	70	15	10
Nb (20)			L	L	20	20	20	20	20
Ni (5)			30	50	20	N	L	L	L
Pb (10)			20	50	150	150	500	50	50
Sb (100)			N	N	N	L	N	N	N
Sc (5)			5	15	N	N	N	N	N
Sn (10)			N	N	N	N	N	N	N
Sr (100)			200	200	L	300	200	500	200
V (10)			100	100	50	10	100	100	70
W (50)			500	N	N	N	N	50	N
Y (10)			L	N	N	N	N	N	N
Zn (200)			N	N	L	L	L	200	L
Zr (10)			10	20	L	L	L	50	100
Th (100)			N	N	N	N	N	N	N

NOT IN THE CALIENTE DISTRICT

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1416	1417	1418	1419	1420	1421	1422	1423	1424
Fe % (.05)	5	2	7	2	1	10	2	1.5	10
Mg % (.02)	.05	.02	.02	L	L	.05	.2	.05	L
Ca % (.05)	L	.05	L	L	L	L	L	L	L
Ti % (.002)	.3	.05	.1	.02	.015	.1	.2	.1	.03
Mn (10)	20	20	20	20	L	20	50	200	150
Ag (.5)	20	10	2	300	500	30	1000	100	2000
As (200)	1000	500	1500	300	500	1000	200	500	2000
Au (10)	N	N	N	N	N	N	N	N	L
B (10)	50	10	10	10	10	20	200	50	10
Ba (20)	200	200	200	100	1000	100	200	50	100
Be (1)	1	1	1	L	L	1.5	3	2	1
Bi (10)	10	N	N	L	N	N	N	N	N
Cd (20)	N	N	N	N	N	N	L	500	N
Co (5)	N	N	N	N	N	N	N	N	10
Cr (10)	L	N	50	N	N	20	N	N	20
Cu (5)	100	50	15	200	100	70	2000	700	2000
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	N	N	N	N	N	N	N	L
Nb (20)	L	L	L	L	L	L	20	L	L
Ni (5)	N	N	N	N	N	10	L	L	50
Pb (10)	150	70	300	G20,000	G20,000	7000	7000	10,000	G20,000
Sb (100)	100	L	L	200	1500	200	L	200	5000
Sc (5)	5	N	L	N	N	N	N	N	N
Sn (10)	N	N	N	10	100	70	20	100	300
Sr (100)	N	N	N	100	L	N	L	200	L
V (10)	50	20	50	20	20	30	20	20	100
W (50)	L	N	N	N	N	N	N	N	L
Y (10)	10	L	N	N	L	L	L	L	L
Zn (200)	L	L	L	L	200	L	2000	G10,000	1000
Zr (10)	500	70	100	50	20	70	200	200	20
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element	Sample Number								
	1425	1426	1427	1428	1429	1430	1431	1432	1433
Fe % (.05)	2	2	3	10	10	10	10	15	10
Mg % (.02)	2	1.5	L	.5	.2	.05	.1	.02	.03
Ca % (.05)	G20	G20	.2	.3	.05	2	.5	.2	2
Ti % (.002)	.15	.07	.03	.03	.05	.01	.2	.03	.01
Mn (10)	1500	1000	G5000	G5000	100	G5000	5000	G5000	G5000
Ag (.5)	100	5	200	100	5	10	15	20	100
As (200)	N	N	2000	1500	500	700	G10,000	5,000	10,000
Au (10)	N	N	L	N	N	N	10	N	L
B (10)	50	L	L	20	20	20	20	50	20
Ba (20)	150	20	G5000	150	50	50	150	20	30
Be (1)	1	1	1	1	1.5	1	2	1	1
Bi (10)	N	N	10	L	50	L	50	L	N
Cd (20)	N	N	L	300	100	200	50	500	150
Co (5)	N	N	10	N	N	N	N	N	N
Cr (10)	20	L	L	N	N	N	20	L	N
Cu (5)	50	20	500	300	200	200	500	1500	1000
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	N	N	N	N	N	N	N	L
Nb (20)	L	L	L	L	L	L	L	L	L
Ni (5)	50	10	L	L	L	L	10	L	L
Pb (10)	10,000	1000	G20,000	10,000	500	20,000	20,000	7000	G20,000
Sb (100)	300	N	2000	200	N	N	200	L	200
Sc (5)	L	N	N	L	L	N	10	N	L
Sn (10)	30	N	500	50	20	50	20	100	500
Sr (100)	300	500	200	N	N	L	1000	N	1000
V (10)	30	30	200	30	30	30	50	20	200
W (50)	N	N	N	50	N	500	L	N	150
Y (10)	N	L	N	L	L	L	30	10	L
Zn (200)	L	N	1000	G10,000	5000	10,000	2000	G10,000	5000
Zr (10)	100	L	20	50	100	N	100	50	N
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1434	1435	1436	1437	1438A	1438B	1439	1440	1441
Fe % (.05)	3	15	.7	20	15	15	20	7	10
Mg % (.02)	.3	.5	.3	1	5	3	.1	.02	.2
Ca % (.05)	5	1	G20	.7	G20	20	.2	L	15
Ti % (.002)	.1	.002	.02	.01	.02	.07	.02	.015	.015
Mn (10)	5000	5000	G5000	G5000	G5000	G5000	G5000	500	G5000
Ag (.5)	200	5	100	150	100	10	5	100	100
As (200)	500	1000	L	N	N	N	L	1000	N
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	100	20	L	20	20	20	100	20	20
Ba (20)	50	200	200	30	50	100	200	5000	50
Be (1)	10	10	2	1	2	2	2	1	2
Bi (10)	L	500	L	N	N	N	N	50	N
Cd (20)	300	L	50	500	200	150	100	200	100
Co (5)	N	N	N	N	N	N	N	L	N
Cr (10)	10	N	N	N	N	N	N	N	N
Cu (5)	2000	300	100	100	100	70	200	20,000	200
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	N	N	N	N	N	L	N	N
Nb (20)	L	L	L	L	L	L	L	L	L
Ni (5)	L	L	10	10	20	20	20	10	10
Pb (10)	G20,000	1	1	G20,000	20,000	500	200	G20,000	10,000
Sb (100)	150	100	200	200	100	N	N	700	200
Sc (5)	L	N	N	N	N	L	5	N	L
Sn (10)	20	100	L	50	N	N	20	200	30
Sr (100)	100	N	500	N	300	300	500	200	200
V (10)	50	100	100	30	30	30	50	10	50
W (50)	100	50	N	N	N	N	N	N	N
Y (10)	L	L	L	L	L	50	20	L	L
Zn (200)	G10,000	2000	1000	G10,000	G10,000	G10,000	10,000	G10,000	G10,000
Zr (10)	20	N	N	30	N	N	50	L	L
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1442	1443	1444	1445	1446	1447	1448	1449	1450
Fe % (.05)	5	20	15	10	15	10	L	10	1
Mg % (.02)	2	.1	2	2	.2	.2	.1	2	.05
Ca % (.05)	10	2	2	7	.1	.05	20	20	1
Ti % (.002)	.05	.03	.03	.5	.002	.5	.01	.3	.002
Mn (10)	5000	G5000	G5000	1000	500	200	100	2000	2000
Ag (.5)	G5000	100	10	2	100	2	L	L	100
As (200)	200	500	500	N	1500	L	N	N	N
Au (10)	N	N	N	N	N	N	N	N	300
B (10)	50	30	30	50	30	30	N	100	L
Ba (20)	50	1000	200	500	50	1000	L	200	100
Be (1)	1	1.5	1.5	2	5	1	N	150	7
Bi (10)	N	N	10	N	100	L	N	50	10
Cd (20)	200	500	100	N	L	N	N	N	N
Co (5)	10	N	N	70	N	10	N	10	N
Cr (10)	N	N	L	100	N	N	10	10	N
Cu (5)	2000	200	500	200	2000	50	10	20	15
La (20)	50	50	50	70	50	50	50	50	50
Mo (5)	N	N	N	N	10	50	N	N	200
Nb (20)	L	L	L	20	L	20	L	L	50
Ni (5)	30	20	30	100	30	50	N	20	N
Pb (10)	G20,000	10,000	7,000	150	G20,000	700	200	100	70
Sb (100)	1000	L	N	N	1000	N	N	L	100
Sc (5)	L	L	L	30	L	10	N	10	N
Sn (10)	N	100	30	N	500	N	N	300	N
Sr (100)	200	300	N	300	200	1000	1000	500	100
V (10)	20	50	50	50	500	100	10	700	L
W (50)	N	N	N	N	100	N	N	1000	10,000
Y (10)	L	20	10	70	L	20	L	10	N
Zn (200)	G10,000	10,000	10,000	500	3000	200	L	L	L
Zr (10)	N	100	20	500	L	500	N	N	N
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1451	1452	1453	1454	1455	1456	1457A	1457B	1458A
Fe % (.05)	20	20	20	15	G20	20	20	1	20
Mg % (.02)	2	1.5	.05	.2	2	2	2	.02	2
Ca % (.05)	20	5	5	.5	10	15	20	.2	20
Ti % (.002)	.02	.01	.01	.2	.02	.02	.05	.03	.03
Mn (10)	1000	5000	G5000	3000	5000	5000	5000	100	5000
Ag (.5)	10	L	L	1	2	2	2	2	L
As (200)	500	N	200	N	N	N	N	N	N
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	20	20	20	100	50	20	50	10	30
Ba (20)	200	L	1000	1000	150	50	100	50	L
Be (1)	5	10	50	7	30	30	30	L	20
Bi (10)	20	L	L	10	10	10	L	N	N
Cd (20)	N	50	100	N	N	N	N	N	N
Co (5)	10	20	150	N	50	10	N	N	N
Cr (10)	N	N	N	N	N	N	N	N	N
Cu (5)	200	200	200	100	2000	1000	700	100	150
La (20)	50	N	N	N	N	N	N	N	N
Mo (5)	L	L	300	30	L	L	20	20	L
Nb (20)	L	20	L	20	20	20	20	L	20
Ni (5)	30	N	70	N	20	20	L	L	L
Pb (10)	1000	10	50	100	20	20	20	10	10
Sb (100)	200	N	N	N	N	N	N	N	N
Sc (5)	N	N	N	5	L	N	L	N	L
Sn (10)	20	N	20	N	30	300	300	N	200
Sr (100)	300	N	100	300	N	N	100	N	N
V (10)	50	150	20	20	200	100	100	10	100
W (50)	100	10,000	100	50	10,000	10,000	5000	N	7000
Y (10)	10	N	50	20	L	L	L	L	L
Zn (200)	2000	7000	G10,000	700	2000	500	500	L	500
Zr (10)	N	N	N	200	N	N	30	100	N
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1458B	1459	1460	1461	1462	1463	1464	1465	1466
Fe % (.05)	10	10	G20	10	.5	.2	.1	2	2
Mg % (.02)	1.5	2	1	1	2	.7	.3	7	7
Ca % (.05)	20	20	5	.7	3	1	.7	G20	15
Ti % (.002)	.1	.07	.007	.15	.002	.005	.02	.05	.05
Mn (10)	5000	5000	5000	1000	1000	300	300	2000	1500
Ag (.5)	L	3	L	L	500	500	500	G5000	1500
As (200)	N	N	N	N	1000	700	200	200	300
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	10	10	20	50	10	10	20	20	50
Ba (20)	100	20	N	150	N	L	20	20	20
Be (1)	10	20	30	5	N	N	L	L	N
Bi (10)	L	G1000	L	L	N	N	N	N	N
Cd (20)	N	50	N	N	150	150	200	200	200
Co (5)	N	N	L	N	N	N	N	N	L
Cr (10)	50	20	N	N	N	N	N	N	L
Cu (5)	100	70	1000	50	5000	5000	1000	1500	200
La (20)	N	N	50	50	50	50	50	50	50
Mo (5)	G2000	100	20	20	N	L	10	20	N
Nb (20)	20	20	20	50	L	L	L	L	L
Ni (5)	20	50	L	L	L	20	20	50	50
Pb (10)	20	700	10	100	20,000	20,000	10,000	15,000	7000
Sb (100)	N	N	N	N	2000	7000	5000	5000	5000
Sc (5)	5	5	N	5	N	N	N	N	N
Sn (10)	50	150	20	L	50	N	N	N	N
Sr (100)	200	100	N	100	N	N	N	N	N
V (10)	200	200	200	30	10	20	100	50	50
W (50)	1000	1000	1000	50	N	N	N	N	N
Y (10)	L	50	L	20	L	L	L	L	N
Zn (200)	500	5000	500	L	10,000	G10,000	5000	5000	5000
Zr (10)	50	20	N	100	N	N	N	N	50
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1467	1468	1469	1470	1471				
Fe % (.05)	20	10	2	2	3				
Mg % (.02)	.5	.3	.05	.05	.1				
Ca % (.05)	.05	.05	L	.05	.1				
Ti % (.002)	.2	.2	.07	.02	.2				
Mn (10)	50	200	200	2000	50				
Ag (.5)	7	7	7	5	1				
As (200)	N	L	200	L	1500				
Au (10)	N	N	N	N	N				
B (10)	50	50	20	20	20				
Ba (20)	1500	500	150	150	1500				
Be (1)	2	2	10	3	2				
Bi (10)	N	20	N	N	N				
Cd (20)	N	N	N	N	N				
Co (5)	N	N	N	L	N				
Cr (10)	N	10	N	N	N				
Cu (5)	15	2000	30	20	15				
La (20)	70	50	50	50	50				
Mo (5)	N	L	10	N	L				
Nb (20)	20	20	20	20	20				
Ni (5)	N	30	20	10	N				
Pb (10)	100	7000	200	200	50				
Sb (100)	L	500	L	N	100				
Sc (5)	10	5	N	N	5				
Sn (10)	L	20	N	N	N				
Sr (100)	100	N	N	N	2000				
V (10)	50	70	20	20	70				
W (50)	N	N	N	N	N				
Y (10)	50	10	L	L	10				
Zn (200)	L	1000	300	300	L				
Zr (10)	200	300	200	50	200				
Th (100)	N	N	N	N	N				

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1701	1702	1703	1704	1705	1706	1707	1708	1709
Fe % (.05)	1	15	1	1.5	1.5	1.5	G20	1	2
Mg % (.02)	5	2	1	.7	.5	.5	1.5	.1	.5
Ca % (.05)	.1	.7	5	.5	2	5	10	.05	.07
Ti % (.002)	.07	.3	.05	.15	.03	.03	.02	.03	.2
Mn (10)	300	200	1000	700	300	500	1000	300	300
Ag (.5)	200	1	300	30	1500	2	2	2	5
As (200)	N	N	N	N	N	N	N	N	N
Au (10)	N	N	N	N	300	N	N	N	N
B (10)	10	50	10	10	10	L	20	50	10
Ba (20)	150	300	200	200	150	150	100	50	500
Be (1)	3	10	100	5	20	2	2	7	5
Bi (10)	N	N	N	N	N	N	N	N	N
Cd (20)	300	N	20	N	20	N	N	L	N
Co (5)	N	L	N	N	N	50	300	N	N
Cr (10)	N	10	N	N	N	L	30	N	N
Cu (5)	20,000	150	1000	500	20,000	5000	20,000	150	30
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	N	N	N	N	50	N	N	L
Nb (20)	L	20	L	L	L	L	L	50	L
Ni (5)	20	20	N	10	L	20	10	N	20
Pb (10)	2000	50	500	100	2000	50	500	50	20
Sb (100)	N	N	N	N	N	N	N	N	N
Sc (5)	L	15	L	L	L	N	N	L	5
Sn (10)	N	N	N	N	N	N	20	N	N
Sr (100)	L	100	100	100	100	N	N	N	300
V (10)	70	100	50	70	50	50	50	20	50
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	N	30	L	L	L	L	N	50	L
Zn (200)	3000	L	1000	L	2000	500	2000	L	L
Zr (10)	50	200	20	50	30	20	N	100	100
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1710	1711	1712	1713	1714	1715	1716	1717	1718
Fe % (.05)	.2	.7	1	5	1.5	1	10	.05	.5
Mg % (.02)	.02	.05	.2	.3	.5	.3	.5	.2	.1
Ca % (.05)	.5	5	.7	G20	1.5	G20	G20	10	.1
Ti % (.002)	.002	.03	.05	.01	.1	.015	.05	.002	.05
Mn (10)	100	500	200	G5000	2000	3000	300	G5000	300
Ag (.5)	7	10	L	100	1500	100	5	50	2
As (200)	N	N	N	500	L	L	1000	L	N
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	L	L	10	50	100	10	50	N	L
Ba (20)	150	200	150	5000	100	100	50	50	200
Be (1)	10	10	5	1	L	L	2	N	5
Bi (10)	N	N	N	N	L	N	N	N	N
Cd (20)	N	N	N	500	500	50	N	N	N
Co (5)	N	N	N	500	N	N	30	N	N
Cr (10)	N	N	N	N	N	N	10	N	N
Cu (5)	10	15	10	200	100	50	15	30	5
La (20)	50	50	50	70	50	50	50	200	50
Mo (5)	N	N	N	N	100	N	20	200	N
Nb (20)	L	L	20	L	L	L	L	L	L
Ni (5)	L	L	L	50	L	L	50	10	N
Pb (10)	20	20	20	10,000	G20,000	5000	500	1000	30
Sb (100)	N	N	N	100	500	L	N	N	N
Sc (5)	N	L	N	L	L	L	N	N	N
Sn (10)	N	N	N	50	N	N	N	100	N
Sr (100)	N	500	100	1000	200	100	L	200	L
V (10)	20	20	20	100	20	20	50	300	30
W (50)	N	N	N	300	N	N	N	N	N
Y (10)	L	L	L	50	L	L	L	N	N
Zn (200)	L	L	L	G10,000	G10,000	2000	200	1000	L
Zr (10)	L	20	50	20	100	20	50	L	50
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1719	1720	1721	1722	1723	1724	1725	1726	1727
Fe % (.05)	1.5	1	5	1	.7	.7	2	.7	.05
Mg % (.02)	.2	.2	1	.2	.1	.05	1	.2	.2
Ca % (.05)	.1	.05	.1	.1	.1	3	20	.2	.05
Ti % (.002)	.07	.05	.2	.05	.01	.02	.2	.05	L
Mn (10)	300	500	300	100	500	500	1000	300	200
Ag (.5)	10	10	30	20	50	2	200	5	50
As (200)	N	N	N	N	N	N	N	N	N
Au (10)	N	N	N	N	L	N	N	N	20
B (10)	20	20	10	30	20	10	L	L	L
Ba (20)	300	200	700	300	100	200	200	300	200
Be (1)	20	5	5	7	200	7	5	5	50
Bi (10)	N	N	N	N	N	N	N	N	N
Cd (20)	N	N	N	N	N	N	N	N	N
Co (5)	N	N	L	N	N	N	L	N	L
Cr (10)	N	N	L	L	L	N	N	L	N
Cu (5)	10	20	20	5	30	5	20	10	5
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	N	N	500	L	20	100	N	N
Nb (20)	L	L	L	20	L	L	L	L	L
Ni (5)	10	10	10	L	N	20	10	L	L
Pb (10)	50	50	50	30	50	20	100	20	20
Sb (100)	L	N	N	N	L	N	N	N	N
Sc (5)	N	N	5	N	N	N	5	N	N
Sn (10)	N	N	N	N	N	N	N	N	N
Sr (100)	100	100	200	N	100	200	200	100	L
V (10)	30	50	70	100	20	50	50	20	10
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	N	L	L	L	N	N	L	N	N
Zn (200)	L	L	L	L	L	L	L	L	L
Zr (10)	70	50	200	70	50	L	70	50	N
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1728	1729	1730	1731	1732	1733	1734	1735	1736
Fe % (.05)	5	1	L	.5	2	1	3	.2	5
Mg % (.02)	.3	.5	1	10	3	1	.05	.2	.7
Ca % (.05)	.05	20	15	G20	15	20	.5	.2	.7
Ti % (.002)	.2	.07	.005	.01	.01	.005	.03	.02	.2
Mn (10)	200	700	50	100	1000	1000	50	50	300
Ag (.5)	5	50	1	L	50	50	10	50	5
As (200)	L	N	N	N	10	L	50	20	50
Au (10)	N	L	N	N	N	N	N	N	N
B (10)	10	10	N	N	10	L	50	20	50
Ba (20)	500	500	G5000	G5000	G5000	G5000	5000	G5000	G5000
Be (1)	7	150	7	2	L	L	1	2	1.5
Bi (10)	N	N	N	N	N	L	N	N	N
Cd (20)	N	N	N	N	300	G500	L	50	N
Co (5)	L	L	N	N	N	N	10	N	N
Cr (10)	N	N	N	N	N	N	50	L	L
Cu (5)	20	30	15	5	1000	1000	70	500	50
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	100	N	N	N	50	70	100	20	50
Nb (20)	L	L	L	L	L	L	L	L	L
Ni (5)	10	L	10	10	L	L	20	5	10
Pb (10)	50	50	150	200	G20,000	G20,000	200	2000	200
Sb (100)	N	N	N	N	5000	1000	L	2000	L
Sc (5)	5	N	N	N	N	N	N	N	N
Sn (10)	N	N	N	N	N	N	N	N	N
Sr (100)	200	500	G5000	1000	5000	2000	100	2000	100
V (10)	100	20	20	30	30	10	50	20	50
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	L	L	N	N	N	N	N	N	L
Zn (200)	L	L	L	L	G10,000	G10,000	1000	1000	L
Zr (10)	100	50	N	N	N	N	50	20	100
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1737	1738	1739	1740	1741	1742	1743	1744	1745
Fe % (.05)	.2	.2	1	2	2	15	G20	1.5	10
Mg % (.02)	.05	.1	.5	L	L	3	.3	.02	1
Ca % (.05)	.05	.5	.5	L	L	G20	.07	L	15
Ti % (.002)	.007	.002	.002	.15	.005	.05	.03	.005	.005
Mn (10)	300	200	200	100	50	2000	5000	100	G5000
Ag (.5)	10	500	100	20	100	7	N	2	100
As (200)	N	N	N	2000	N	N	L	L	L
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	L	L	10	10	10	N	100	L	N
Ba (20)	500	200	300	150	200	100	100	100	500
Be (1)	2	N	1	L	N	1	1	N	N
Bi (10)	N	L	L	N	500	10	N	N	N
Cd (20)	N	20	200	30	N	N	N	N	200
Co (5)	N	N	N	N	N	10	100	N	N
Cr (10)	N	N	N	N	N	N	L	N	N
Cu (5)	10	20,000	10,000	200	1500	50	50	15	500
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	10	20	N	700	N	N	15	50
Nb (20)	L	L	L	L	L	L	L	L	N
Ni (5)	5	L	L	L	L	50	100	N	N
Pb (10)	20	3000	5000	3000	2000	200	20	300	20,000
Sb (100)	L	L	N	100	700	N	N	N	L
Sc (5)	N	N	L	N	N	L	20	N	5
Sn (10)	N	N	N	10	200	10	N	N	N
Sr (100)	N	N	L	100	N	200	L	L	500
V (10)	70	1000	20	100	10	20	200	50	200
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	N	N	L	L	L	10	20	50	10
Zn (200)	L	2000	2000	1000	300	L	100	L	5000
Zr (10)	30	N	L	70	20	L	N	L	L
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1746	1747	1748	1749	1750	1751	1752	1753	1754
Fe % (.05)	1	3	1	5	.5	3	1	3	1.5
Mg % (.02)	.5	.2	.2	.05	.03	.03	L	.02	L
Ca % (.05)	2	.07	.5	L	L	L	L	L	L
Ti % (.002)	.03	.15	.03	.03	.02	.15	.02	.15	.03
Mn (10)	G5000	G5000	300	300	200	100	100	150	50
Ag (.5)	300	300	5	10	50	50	30	70	10
As (200)	N	200	N	L	N	200	200	200	N
Au (10)	L	10	N	500	L	N	10	N	N
B (10)	L	10	10	10	10	10	10	10	10
Ba (20)	500	1500	200	500	500	2000	500	300	1000
Be (1)	7	10	2	7	1	1	L	L	L
Bi (10)	N	L	N	N	30	50	200	20	100
Cd (20)	50	50	N	N	N	N	N	N	N
Co (5)	N	N	N	N	N	N	N	N	N
Cr (10)	N	L	N	N	N	N	N	L	N
Cu (5)	200	2000	50	70	1000	700	500	2000	150
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	100	N	L	N	50	N	N	N
Nb (20)	L	L	L	L	L	L	L	L	L
Ni (5)	L	10	L	10	N	N	L	L	L
Pb (10)	10,000	10,000	150	150	50	500	150	300	150
Sb (100)	N	L	N	L	200	100	2000	2000	L
Sc (5)	N	5	L	L	N	L	N	N	N
Sn (10)	N	10	N	10	100	20	L	200	N
Sr (100)	500	500	300	L	N	200	L	L	L
V (10)	100	150	20	30	20	20	10	20	10
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	20	L	N	L	L	20	L	L	N
Zn (200)	2000	1000	L	200	L	L	L	L	L
Zr (10)	L	100	50	200	200	300	20	200	100
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

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Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1755	1756	1757	1758	1759	1760	1761	1762	1763
Fe % (.05)	10	1	.5	20	2	.05	10	3	10
Mg % (.02)	.05	.05	.05	2	.2	.2	.1	.2	5
Ca % (.05)	.05	L	L	10	.5	1	2	1	20
Ti % (.002)	.05	.2	.05	.5	.05	.002	.05	.15	.02
Mn (10)	100	200	300	2000	200	100	500	20	2000
Ag (.5)	2	7	5	1	100	100	100	1	150
As (200)	N	L	N	N	L	N	G10,000	500	N
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	50	20	L	20	10	L	20	50	200
Ba (20)	500	150	100	200	100	2000	100	300	50
Be (1)	L	2	1	1.5	2	L	L	1	L
Bi (10)	10	N	N	N	N	N	50	N	200
Cd (20)	N	N	N	N	N	N	200	N	200
Co (5)	N	N	N	20	N	N	N	N	L
Cr (10)	N	N	N	50	N	N	L	L	N
Cu (5)	50	50	10	20	100	200	G20,000	200	7000
La (20)	50	50	50	50	50	50	50	50	50
Mo (5)	N	10	N	L	50	N	50	50	N
Nb (20)	L	L	L	L	L	L	L	L	L
Ni (5)	L	L	L	100	L	L	L	L	L
Pb (10)	50	20	20	100	50	20	G20,000	150	G20,000
Sb (100)	500	N	N	L	500	1500	1500	L	150
Sc (5)	N	N	N	20	N	N	L	N	N
Sn (10)	20	N	N	N	N	N	20	N	20
Sr (100)	L	N	N	500	N	L	100	100	100
V (10)	70	30	10	50	30	L	10	20	10
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	N	N	L	70	L	N	L	L	N
Zn (200)	L	200	L	L	L	L	G10,000	500	G10,000
Zr (10)	100	100	200	200	50	N	50	200	L
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

ement

Sample Number

	1764	1765	1766	1767	1768	1769	1770	1771	1772
Fe % (.05)	10	10	10	10	L	.5	.1	.5	1
Mg % (.02)	.7	10	1	5	L	.07	.07	.07	.2
Ca % (.05)	20	20	10	20	G(20)	1	G(20)	G(20)	G(20)
Ti % (.002)	.05	.005	.05	.5	.002	.03	.02	.015	.07
Mn (10)	G5000	2000	2000	3000	100	50	200	200	5000
Ag (.5)	20	100	30	2	2	5	5	7	N
As (200)	N	L	5000	200	N	N	N	N	N
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	10	10	20	500	N	20	N	N	15
Ba (20)	L	L	500	700	N	150	50	300	500
Be (1)	2	N	L	L	3	2	1	2	5
Bi (10)	300	10	10	70	N	N	N	N	N
Cd (20)	G500	300	200	20	N	N	N	N	N
Co (5)	100	N	N	10	N	N	N	N	L
Cr (10)	N	N	20	30	N	N	N	N	N
Cu (5)	150	1500	G20,000	150	N	5	7	7	5
La (20)	50	50	50	50	N	N	L	L	70
Mo (5)	N	N	L	150	7	20	L	7	L
Nb (20)	L	L	L	20	N	N	N	N	N
Ni (5)	L	L	L	10	N	7	N	N	N
Pb (10)	1000	G20,000	G20,000	200	10	30	15	30	50
Sb (100)	N	200	1000	100	N	N	N	N	N
Sc (5)	L	N	L	15	N	N	N	N	N
Sn (10)	20	500	100	L	N	N	N	N	N
Sr (100)	L	L	100	500	200	N	100	150	100
V (10)	10	50	20	50	N	L	L	L	10
W (50)	N	N	N	5000	N	N	N	N	N
Y (10)	L	N	N	N	200	N	100	70	50
Zn (200)	G10,000	G10,000	10,000	1000	N	N	N	N	N
Zr (10)	100	N	50	200	30	50	20	20	50
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element

Sample Number

	1773	1774	1775	1776	1777	1778	1779	1780	1781
Fe % (.05)	2	1	.07	.05	15	.2	.05	.5	.5
Mg % (.02)	1	.2	.03	L	.07	2	1.5	.2	.7
Ca % (.05)	7	G(20)	G(20)	G(20)	2	G(20)	G(20)	G(20)	5
Ti % (.002)	.07	.07	.02	.002	.1	.015	.02	.05	.02
Mn (10)	3000	100	50	N	70	100	70	30	100
Ag (.5)	.5	L	N	N	L	N	N	N	2
As (200)	N	N	N	N	200	N	N	N	N
Au (10)	N	N	N	N	N	N	N	N	N
B (10)	10	L	N	N	30	N	N	50	L
Ba (20)	500	100	N	N	70	N	N	L	100
Be (1)	1.5	5	2	1	1.5	1	2	2	1.5
Bi (10)	N	N	N	N	N	N	N	N	N
Cd (20)	N	N	N	N	N	N	N	N	N
Co (5)	7	N	N	N	L	N	N	L	N
Cr (10)	L	N	N	20	N	N	N	15	10
Cu (5)	7	5	N	N	15	N	N	7	5
La (20)	L	50	L	L	L	N	N	N	N
Mo (5)	5	30	5	N	15	20	30	N	20
Nb (20)	N	N	N	N	L	N	N	N	N
Ni (5)	5	L	N	N	7	N	N	L	10
Pb (10)	50	20	L	N	15	20	70	L	20
Sb (100)	N	N	N	N	N	N	N	N	N
Sc (5)	N	L	N	N	N	N	N	N	N
Sn (10)	N	N	N	N	N	N	N	N	N
Sr (100)	L	200	300	500	150	L	100	N	N
V (10)	20	15	10	10	150	10	15	100	30
W (50)	N	N	N	N	N	N	N	N	N
Y (10)	L	200	15	L	15	20	20	20	N
Zn (200)	N	N	N	N	N	N	N	N	N
Zr (10)	50	50	30	15	70	30	20	30	10
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

Element	Sample Number								
	1782	1783	1784	1785	1786	1787	1788	1789	1790
Fe % (.05)	5	5	G(20)	.1	1.5	3	5	5	3
Mg % (.02)	.1	.3	.2	.3	1	.2	.15	.2	.1
Ca % (.05)	1.5	10	10	.5	1.5	3	1.5	.2	.5
Ti % (.002)	.07	.07	.05	L	.15	.1	.15	.2	.3
Mn (10)	100	1500	G(5000)	500	500	100	100	200	150
Ag (.5)	N	1500	20	2000	N	N	N	N	N
As (200)	500	G(10000)	G(10000)	200	N	200	700	N	N
Au (10)	N	L	N	N	N	N	N	N	N
B (10)	30	20	20	70	500	50	70	100	10
Ba (20)	150	200	200	G(5000)	700	700	500	1000	1500
Be (1)	1	1	L	150	2	1	2	1.5	3
Bi (10)	N	N	1000	N	N	N	N	N	N
Cd (20)	N	500	200	N	N	N	N	N	N
Co (5)	N	N	10	5	10	N	N	5	N
Cr (10)	15	10	L	N	100	100	100	200	N
Cu (5)	20	1000	200	300	10	20	10	30	5
La (20)	30	100	L	L	50	50	50	50	100
Mo (5)	30	20	N	10	N	L	10	L	N
Nb (20)	N	N	N	N	L	L	L	L	20
Ni (5)	30	10	L	7	20	30	10	50	N
Pb (10)	10	G(20000)	300	G(20000)	30	L	L	L	50
Sb (100)	N	G(10000)	150	300	N	100	300	N	N
Sc (5)	5	N	N	N	N	L	10	10	5
Sn (10)	N	N	N	N	N	N	N	N	N
Sr (100)	700	500	200	G(5000)	100	300	5000	200	100
V (10)	100	70	15	10	70	200	200	100	L
W (50)	N	N	N	N	N	N	50	N	N
Y (10)	200	N	10	N	N	N	50	20	20
Zn (200)	N	G(10000)	10000	10000	N	N	N	N	N
Zr (10)	30	20	15	10	70	100	100	100	500
Th (100)	N	N	N	N	N	N	N	N	N

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Semi-Quantitative Spectrographic Analysis

ement

Sample Number

	1996	1997	1998	1999	2000				
Fe % (.05)	.7	L	.2	.1	.1				
Mg % (.02)	.2	.02	.05	.03	.03				
Ca % (.05)	20	G(20)	G(20)	G(20)	20				
Ti % (.002)	.07	.01	.03	.02	.015				
Mn (10)	150	20	70	20	30				
Ag (.5)	5	.7	N	N	N				
As (200)	N	N	N	N	N				
Au (10)	N	N	N	N	N				
B (10)	L	N	N	N	N				
Ba (20)	300	L	150	G(5000)	150				
Be (1)	3	1	1	1	7				
Bi (10)	N	N	N	N	N				
Cd (20)	N	N	N	N	N				
Co (5)	N	N	N	N	N				
Cr (10)	N	N	N	N	N				
Cu (5)	5	N	N	N	L				
La (20)	70	30	20	L	L				
Mo (5)	N	N	N	5	10				
Nb (20)	N	N	N	N	N				
Ni (5)	L	N	N	L	L				
Pb (10)	30	10	20	20	15				
Sb (100)	N	N	N	N	N				
Sc (5)	N	N	N	N	N				
Sn (10)	N	N	N	N	N				
Sr (100)	300	500	300	300	150				
V (10)	15	L	L	L	L				
W (50)	N	N	N	N	N				
Y (10)	150	10	150	150	100				
Zn (200)	N	N	N	N	N				
Zr (10)	200	10	30	15	30				
Th (100)	N	N	N	N	N				

Analysis by Branch Exploration Research, U.S. Geol. Survey, Denver, Colorado

Fe, Mg, Ti reported in %, all other elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Atomic-Adsorbtion Analysis

Element

Sample Number

24-

[illegible]

Analysis by French Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

84-

G = greater than value shown, N = not detected at limit of detection, < = detected, but below value shown

element

Sample Number

84-

[illegible]

All elements reported in ppm.

Lower limits of determination are in parentheses.

α = greater than value chosen. If α is not defined, use $\alpha = 0.05$.

element

Sample Number

84-1

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection < detected but below value shown

Element

Sample Number

84-

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements determined in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

element

84-1

[illegible]

R = negative then value change. If = not detected as a change, then =

84-1

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm

Lower limits of determination are in parentheses.

0 = greater bias value shown, N = not detected at limit of detection, < = detected, but below value shown.

84-1

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

An element reported in 1941.

Lower limits of determination are in parentheses.

C = greater than value shown; N = not detected at limit of detection, < detected, but below value shown

Atomic-Adsorbption Analysis

lement

Sample Number

84-1

[illegible]

Analysis by F. J. Koch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < = detected but below value shown

Atomic-Adsorbtion Analysis

Element

Sample Number

84-1

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

Atomic-Absorption Analysis

element

Sample Number

84-1

[illegible]

Analysis by Br. Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

Atomic-Adsorbption Analysis

lement

Sample Number

84-1

[illegible]

Analysis by F. S. Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

1

Sample Number

84-1

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm

Lower limits of determination are in parentheses.

Atomic-Adsorbption Analysis

lement

Sample Number

84-1

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < = detected but below value shown

84-1

G is greater than value obtained at $\theta = 0$ and $\theta = 180^\circ$.

Atomic-Absorption Analysis

Sample Number

Element

84-1

1719	1720	1721	1722	1723	1724	1725	1726	1727
As (5)	35	5	20	15	20	15	5	5
Au (.05)	.05	1.3	1.2	2.4	8.5	.10	.05	.25
Sb (1)	N(2)	N(2)	N(2)	4	4	N(2)	2	N(2)
Zn (5)								
Au WT	10	10	10	10	10	10	10	10

Analysis by Denver Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

(+) = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

84-

Sample Number

[illegible]

Analysis by F. C. Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

Lower limits of determination are in parentheses.

2. $\rightarrow$ greater than rather than $\rightarrow$ $M = \{x \in \mathbb{R} : x \leq 1\}$

84-1

S = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

element

Sample Number

84-1

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in open

Lower limits of determination are in parentheses.

C = greater than value shown, if = not detected at limit of detection, < detected, but below value shown.

element

Sample Number

84-

[illegible]

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

element

84-1

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Element

Sample Number

84-1

[illegible]

All elements reported in ppm.

Lower limits of determination are in parentheses.

G = greater than value shown, N = not detected at limit of detection, < detected, but below value shown.

Atomic-Absorption Analysis

Sample Number

Element

54-1

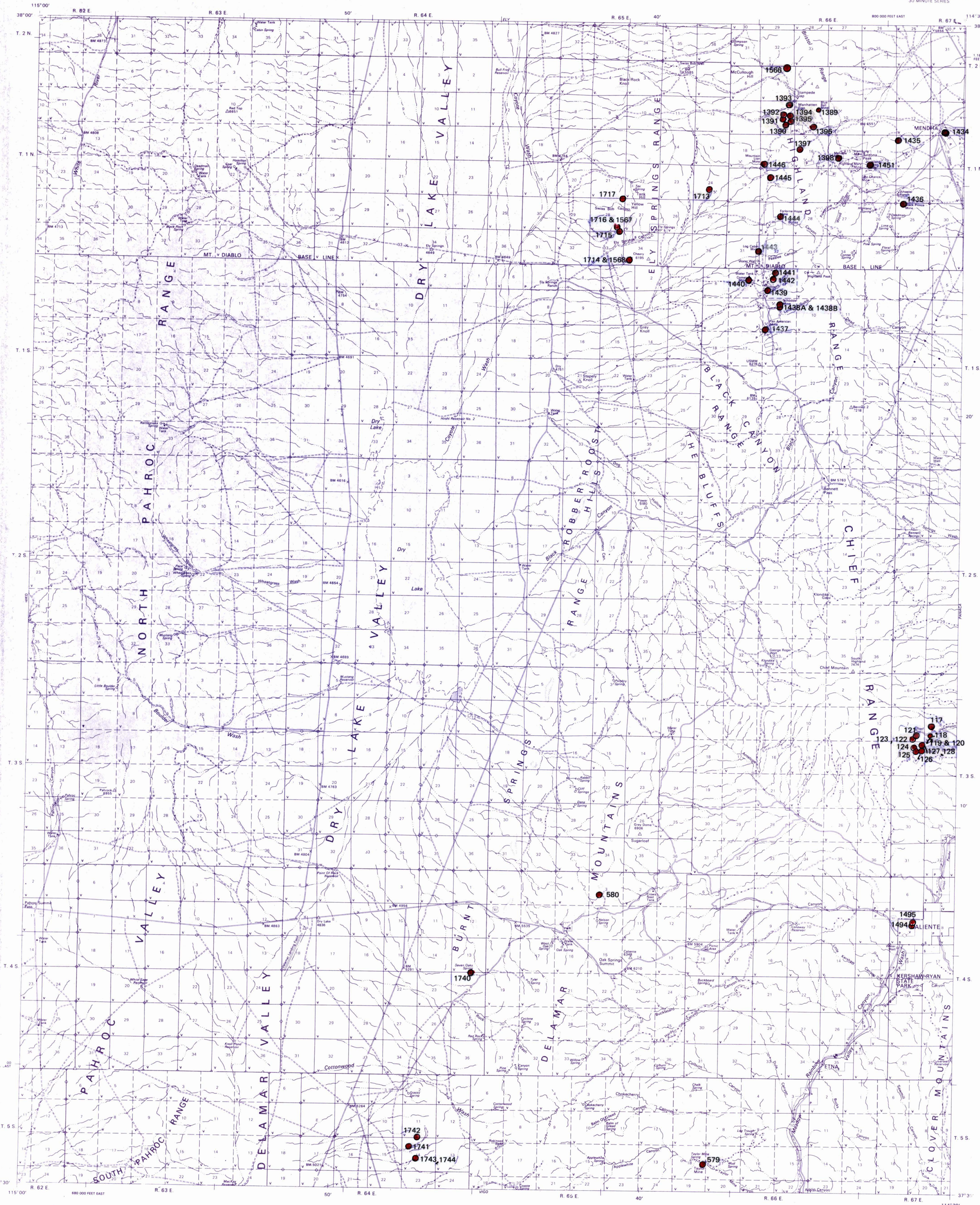
	1996	1997	1998	1999	2000
As (5)	10	1 (5)	5.0	15	10
Au (.05)	L (.05)	N (.05)	N (.05)	.05	.05
Sb (1)	2.0	N (2)	N (2)	2.0	L (2)
Zn (5)	30	5.0	10	10	10

Analysis by Branch Exploration Geochemistry, U.S. Geol. Survey, Denver, Colorado

All elements reported in ppm.

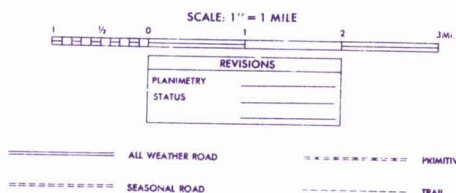
Lower limits of determination are in parentheses.

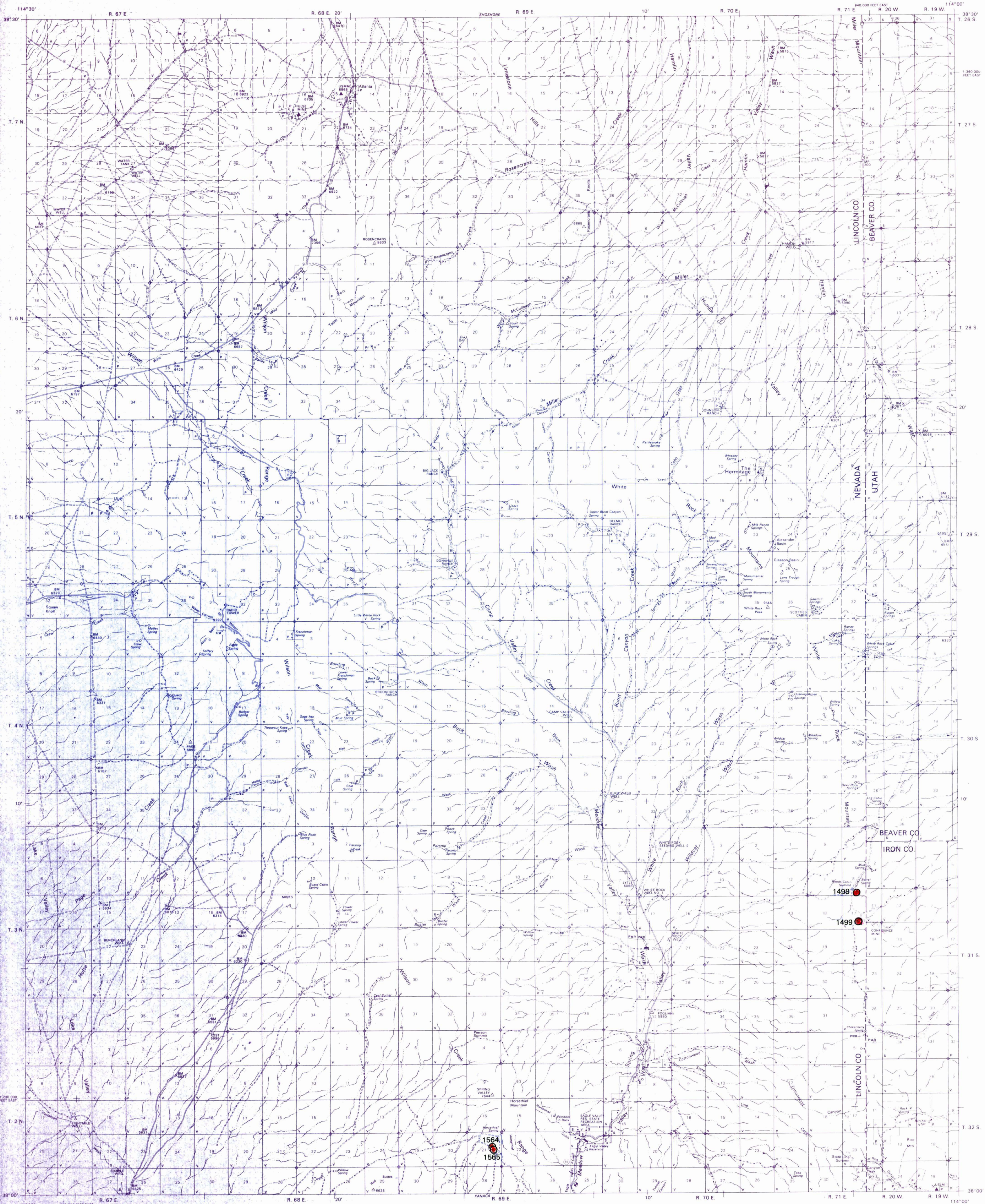
S = greater than value shown, N = not detected at limit of detection, < detected, but below value shown



SOURCE MATERIAL DATA

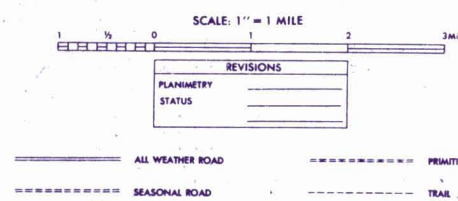
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A	A	(B) U.S.F.S. Quad Maps
A	A	(C) B.L.M. Compilation
A	A	(D) State Highway Maps





SOURCE MATERIAL DATA

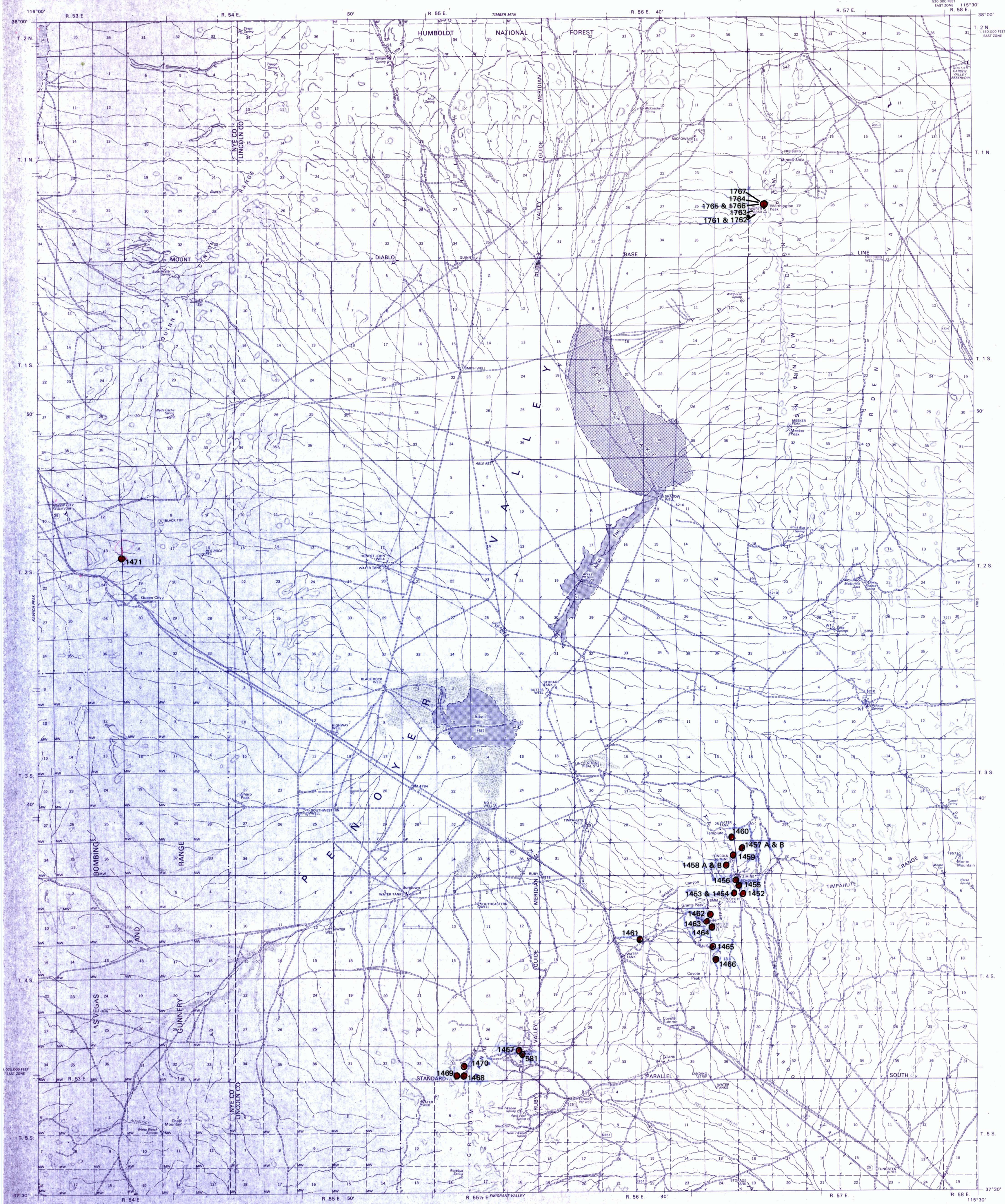
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|---|---|------------------------|
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| A | A | (B) U.S.F.S. Quad Maps |
| A | A | (C) B.L.M. Compilation |
| A | A | (D) State Highway Maps |





PANACA, NEVADA
3730-114-1
1976

NBMG 84-1b



SOURCE MATERIAL DATA

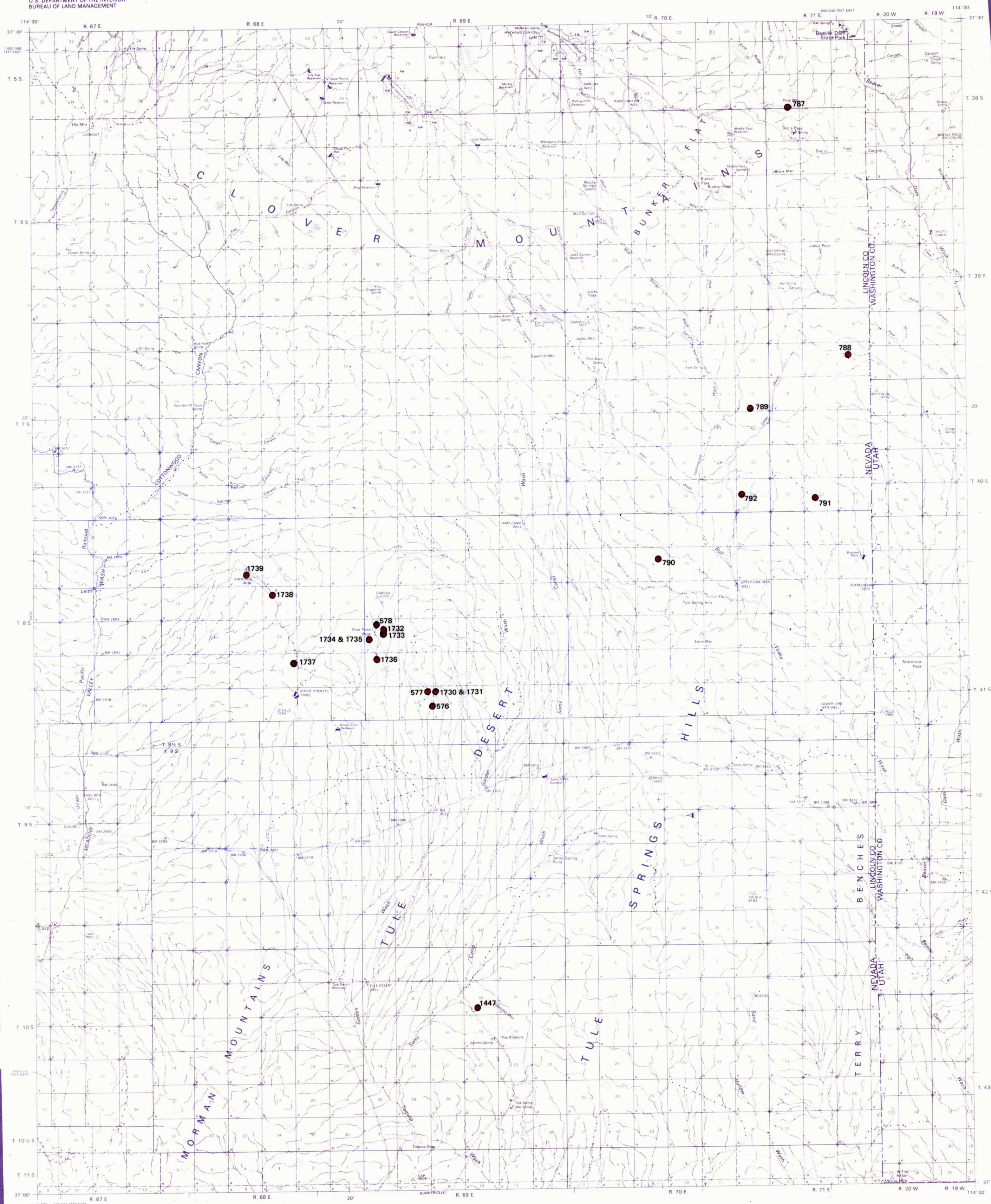
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B	(B) U.S.G.S. Quad Maps
C	(C) B.L.M. Compilation
A	(D) State Highway Maps
	(E) Source Material Updated With Photography 1967

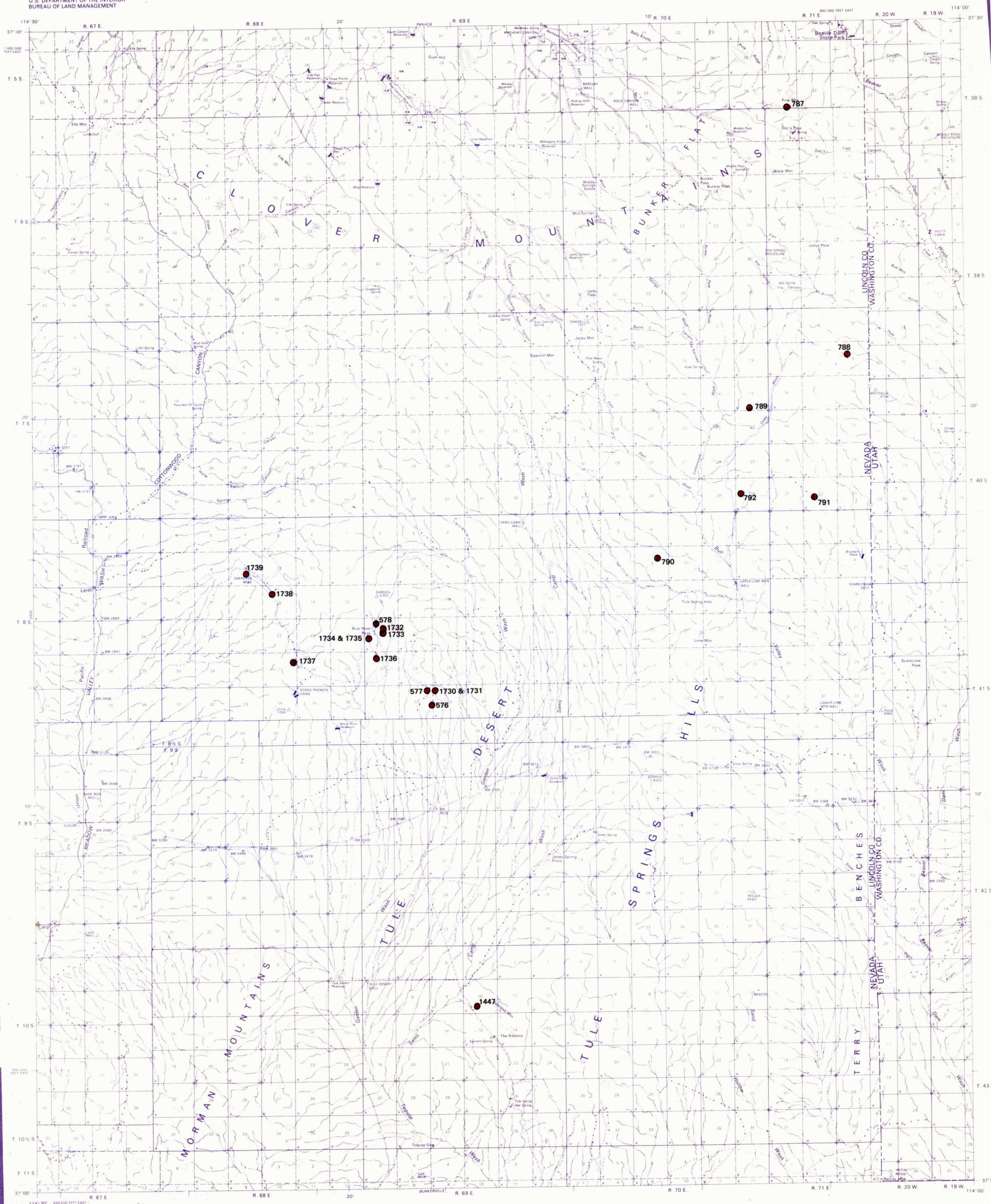
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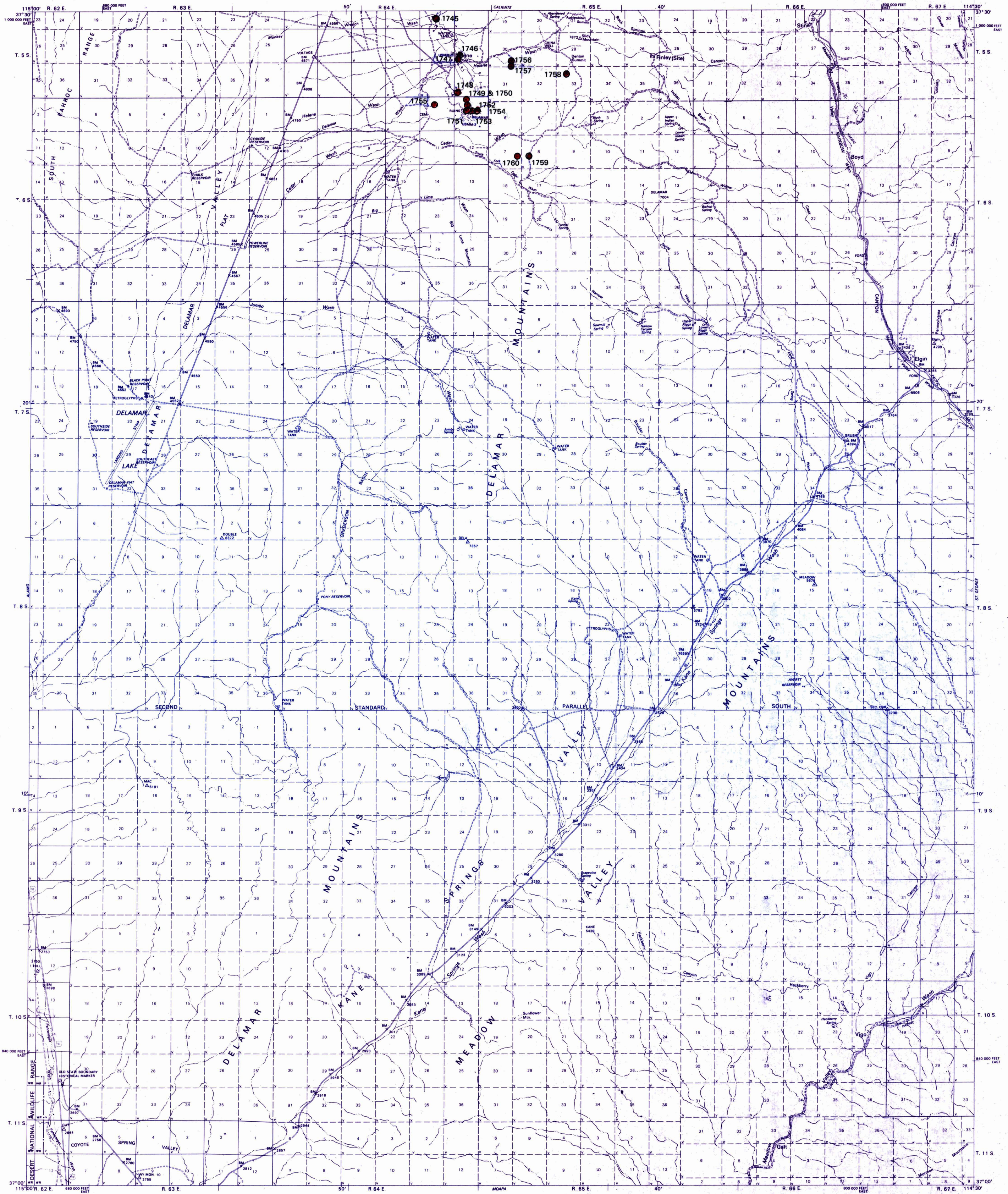
REVISIONS
PLANNING
STATUS
7 - 1978

LEGEND

ALL WEATHER ROAD	PRIMITIVE ROAD
SEASONAL ROAD	TRAIL







SOURCE MATERIAL DATA

A	A	(A) U.S.G.S. Quad Maps
A	A	(B) U.S.G.S. Quad Maps
A	A	(C) B.L.M. Compilation
A	A	(D) State Highway Maps

SCALE: 1" = 1 MILE

REVISIONS
PLANIMETRY
STATUS

ALL WEATHER ROAD
SEASONAL ROAD
PRIMITIVE ROAD
TRAIL