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Geochemistry, Geochronology, Mineralogy, and Geology Suggest Sources of and Controls on Mineral Systems in the Southern Toquima Range, Nye County, Nevada

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With geochemistry maps of **Gold, silver, mercury, arsenic, antimony, zinc, copper, lead, molybdenum, bismuth, iron, titanium, vanadium, cobalt, beryllium, boron, fluorine, and sulfur**

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And with a section on **Lead associations, mineralogy and paragenesis, and isotopes**

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ABSTRACT

Geochemistry maps showing the distribution and abundance of 18 elements in about 1,400 rock samples, both mineralized and unmineralized, from the southern Toquima Range, Nev., indicate major structural and lithologic controls on mineralization, and suggest sources of the elements. Radiometric age data, lead mineralogy and paragenesis data, and lead-isotope data supplement the geochemical and geologic data, providing further insight into timing, sources, and controls on mineralization.

Major zones of mineralization are centered on structural margins of calderas and principal northwest-striking fault zones, as at Round Mountain, Manhattan, and Jefferson mining districts, and on intersections of low-angle and steep structures, as at Belmont mining district. Paleozoic sedimentary rocks, mostly limestones (at Manhattan, Jefferson, and Belmont districts), and porous Oligocene ash-flow tuffs (at Round Mountain district) host the major deposits, although all rock types have been mineralized as evidenced by numerous prospects throughout the area.

Principal mineral systems are gold-silver at Round Mountain where about 7 million ounces of gold and more than 4 million ounces of silver has been produced; gold at Gold Hill in the west part of the Manhattan district where about a half million ounces of gold has been produced; gold-mercury-arsenic-antimony in the east (White Caps) part of the Manhattan district where a few hundred thousand ounces of gold has been produced; and silver-lead-antimony at Belmont where more than 150,000 ounces of silver has been produced. Lesser amounts of gold and silver have been produced from the Jefferson district and from scattered mines elsewhere in the southern Toquima Range. A small amount of tungsten was produced from mines in the granite of the Round Mountain pluton exposed east of Round Mountain, and small amounts of arsenic, antimony, and mercury have been produced elsewhere in the southern Toquima Range.

All elements show unique distribution patterns that suggest specific sources and lithologic influences on deposition, as well as multiple episodes of mineralization. Principal episodes of mineralization are Late Cretaceous (molybdenum and tungsten in and near granite; silver at Belmont and Silver Point mines), early Oligocene [tourmaline and base- and precious-metals around the granodiorite of Dry Canyon stock as well as at Manhattan(?)], late Oligocene (gold at Round Mountain and Jefferson), and Miocene (gold at Manhattan). Most likely principal sources of molybdenum, tungsten, silver, and bismuth are Cretaceous granites; of antimony, arsenic, and mercury are intermediate-composition early Oligocene intrusives; and of gold are early and late Oligocene and early Miocene magmas of the volcanic cycle. Lead may have been derived principally from Cretaceous granitic magma and Paleozoic sedimentary rocks.

Several areas prospective for undiscovered mineral deposits are suggested by spatial patterns of element distributions related to geologic features. The Manhattan district in the vicinity of the White Caps mine may be underlain by a copper-molybdenum porphyry system related to a buried stock; peripheral high-grade gold veins and skarn deposits may be present below deposits previously mined. The Jefferson district also may be underlain by a copper-molybdenum porphyry system related to a buried stock, it too with peripheral high-grade gold deposits. The Bald Mountain Canyon belt of small gold veins has potential for deeper deposits in buried porous ash-flow tuff similar to the huge Round Mountain low-grade gold-silver deposit. Several other areas have potential for a variety of mineral deposits.

Altogether the geochemical, geochronologic, mineralogic, and geologic evidence suggests recurring mineralizing episodes of varied character, from Late Cretaceous to late Tertiary time, related to a long-lived hot spot deep in the crust or in the upper mantle. Granite plutons of Late Cretaceous age were mineralized millions of years following emplacement. Lead-isotope data suggest that mineralizing fluids were derived from a deep, evolving magma pool that earlier had irrupted a portion of magma into the upper crust to form the plutons. Both older (granite related) and younger (stock or volcanic related) events may have introduced or mobilized particular elements into the upper crust in only a few episodes, but each successive episode modified earlier ones in complex ways dependent on evolving structural events. Alternatively, younger magmatic-hydrothermal events, probably of diverse origins but generated in the same crustal-mantle zone, through a long interval of time formed mineral deposits that varied in composition as a result of differing solutions that moved into structurally evolving and lithologically complex host rocks.

INTRODUCTION

This report describes and interprets 18 single-element geochemistry maps presented on a generalized geologic base of major lithologic units and structures in the southern Toquima Range, Nev. The map area encompasses the Round Mountain, Manhattan, Jefferson, Belmont West, Belmont East, and Corcoran Canyon 7.5-minute quadrangles. The map units are Paleozoic marine sedimentary rocks, Cretaceous granite plutons, Tertiary stocks and volcanic rocks, and Quaternary surficial deposits. This text describes element distributions and associations, from which are inferred sources of and controls on mineral systems. A section on lead element associations, lead mineralogy and paragenesis, and lead-isotope geochemistry provides insight into ages and sources of the various mineral systems.

Hoffman prepared the geochemistry maps (Sheets 1–4) using a PLUTO geochemical database for the United States prepared by Baedecker (1998).

The locations and sample numbers of approximately 1,400 geochemistry samples collected in this study are shown on topographic base maps on Sheet 5. Brief descriptions of the samples are provided in the "Appendix" of this report.

Information regarding the geologic aspects of the southern Toquima Range is introduced in appropriate places to elucidate distribution patterns of the various elements. A series of 1:48,000-scale maps (geologic, Shawe, 2002; structure, Shawe, 2001; and geophysics, Shawe, Kucks, and Hildenbrand, in press) can be used to substantiate and extend the conclusions of this report.

Interpretations of these maps and the data presented in this report suggest areas favorable for the occurrence of undiscovered mineral deposits.

Methodology employed in geochemical studies is described in some detail inasmuch as geochemistry is the dominant theme of this report. Users of the geochemistry maps are referred to published geologic maps of the area for additional context of the data in this report. References to geologic and geochemical data are made in a report on geophysical studies of the southern Toquima Range (Shawe and others, in press) to provide further insight into possible undiscovered mineral deposits.

Mineralogic studies made by Eugene Foord (Shawe and others, 1986; Foord and others, 1988) provide data useful in judging the sequence of deposition of specific minerals and thus the sequence of introduction of certain elements into the mineral deposits. Assessments of various types of mineralized rocks in the southern Toquima Range [quartz veins, other types of veins, Paleozoic sedimentary rocks, calc-silicate-mineralized limestone (tactite), granite and aplite, rhyolite dikes, and volcanic rocks] were used by Shawe (1988) to help characterize the various types of geochemical assemblages in the area. Brief summaries of the mineralogic data are presented below to provide background for later discussions.

Age data (Shawe and others, 1986, 1987, 2000; Shawe, 1999; Shawe and Byers, 1999; Silberman and others, 1975; Boden, 1986; John and Robinson, 1989; Henry, 1997; Henry and others, 1996) provide a means of correlating mineralizing and igneous events. Lead-isotope data presented here provide insight into sources of lead and associated elements. Again, brief summaries of geochronological data are presented below to provide background for later discussions.

The summaries of mineralogic and geochronologic data are followed by descriptions of individual element distributions and element associations. Presentation of lead-isotope data together with pertinent lead mineralogy follows these descriptions. Final sections summarize the data and draw conclusions.

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GEOCHEMICAL STUDIES

The analyzed rock samples were collected from 1967 to 1993 throughout the study area, mostly by Shawe while doing geologic mapping. R.F. Hardyman, then of the USGS, collected some samples in the northeast part of the map area, mostly in the Corcoran Canyon quadrangle. Both mineralized and unmineralized rocks were collected, using a generally consistent method of taking grab samples at the sample locality. At each locality, an attempt was made to collect rocks that exhibit the most evidence of mineralization, such as jasperoid, rocks with strong iron stain (resulting from weathering oxidation of pyrite), or rocks containing sulfide or oxide minerals in veins or replacement deposits and on waste dumps at mines and prospects. In addition, numerous samples of unaltered rocks were collected for analysis to determine their general chemical character and to provide an estimate of background concentrations relative to mineralized samples. During early mapping (Round Mountain and Manhattan quadrangles) many samples, mostly weakly iron stained rocks, were collected which proved on analysis to lack anomalous amounts of elements that could serve as guides to mineralized zones. Based on these results, sampling in the Jefferson, Belmont West, Belmont East, and Corcoran Canyon quadrangles avoided such materials. These areas on the geochemistry maps generally show a much sparser coverage of samples. However, areas between these sparser samples are thought to be practically devoid of anomalous values of the elements considered, inasmuch as they lacked materials that appeared mineralized and which therefore were not considered of value for geochemical data.

Analytical methods used during the period of chemical analysis (1974–1995) varied as methods evolved. Although accuracy, precision, and sensitivity (lower limits of determination) for many elements changed during the period, concentration ranges selected for illustration on the maps are considered to be sufficiently broad to minimize discrepancies in data due to minor analytical variation.

Semiquantitative emission spectrographic analyses (Grimes and Marranzino, 1968) were used to determine silver, arsenic, antimony, zinc, copper, lead, molybdenum, bismuth, iron, titanium, vanadium, cobalt, beryllium, zirconium, yttrium, boron, barium, strontium, tin, tungsten, lanthanum, niobium, and gallium. Gold was analyzed by a combination of fire-assay and atomic-absorption methods (Wilson and others, 1987); mercury was determined by wet oxidation plus atomic absorption (Kennedy and Crock, 1987); potassium, sodium, calcium, chlorine, and sulfur were determined by X-ray fluorescence spectrography (Taggart and others, 1987); fluorine was determined by the specific ion electrode method (Bodkin, 1977). Determination of some of these elements at times included partial chemical analysis and a few miscellaneous methods of analysis.

Because of the many factors of sample variation introduced by the arbitrary character of sampling itself, and by variations in analytical methods, we have chosen not to provide detailed descriptions of, or references to, minor analytical methods used. We recognize that although values provided for individual samples can be questioned, in which case knowledge of analytical methods may be critical, the broad element-distribution patterns shown by groups of samples are plain and cannot be denied. Geochemists interested in details of analytical methods may find appropriate information in USGS reports describing such methods in use during the period (1974–1995) in which our analyses were made.

An example of our handling of discrepant results from analytical variation during the period of analyses is that of gold. Early analyses of gold indicated a lower limit of determination at 0.05 ppm; later analyses indicated a lower limit of determination at 0.002 ppm. Concentration ranges for purposes of illustration on the geochemistry map for gold were arbitrarily set at 0.05 ppm and less, 0.06–0.10 ppm, 0.11–1.00 ppm, and 1.02–73 ppm. The ranges of concentration were established to emphasize the common phenomenon of highest values occurring near centers of mineralization, and lower values occurring outward from such centers (a "bulls eye" effect).

Elements for which maps were prepared are: Sheet 1, gold (Map A), silver (Map B), mercury (Map C), arsenic (Map D), antimony (Map E); Sheet 2, zinc (Map F), copper (Map G), lead (Map H), molybdenum (Map I), bismuth (Map J); Sheet 3, iron (Map K), titanium (Map L), vanadium (Map M), cobalt (Map N); and Sheet 4, beryllium (Map O), boron (Map P), fluorine (Map Q), and sulfur (Map R). Grouping of the elements was based largely on their natural associations: gold, silver, mercury, arsenic, and antimony constitute a group of precious metals and commonly associated metals; zinc, copper, lead, molybdenum, and bismuth constitute a group of base metals; iron, titanium, vanadium, and cobalt constitute a group of ferrous metals; and beryllium, boron, fluorine, and sulfur constitute a group of miscellaneous elements.

Distributions and concentrations of potassium, sodium, calcium, barium, strontium, tin, tungsten, zirconium, yttrium, lanthanum, niobium, gallium, and chlorine were evaluated. Ambiguities in the data for these elements, however, including incomplete data, data skewed by significant changes in analytical methods, and difficulty in establishing relation of distributions and concentrations to either rock type or mineralized system, precluded rational interpretation of the data for these elements. Maps showing distributions and concentrations of these elements thus are not presented.

In following sections reference is made in places to relative abundance of different elements in mineralized areas. Such reference is to what we consider to be "dominant" values in a particular area; stated another way, the relative abundance might be "mostly" in a certain range of values. The terms major, high, or abundant, minor or moderate, sparse, and virtually absent therefore are based on the arbitrary concentration intervals for individual samples shown on the separate maps, but are estimated for the aggregate of values within an area. Again using gold as an example, the established concentration ranges are not detected or less than lower limit of detection to 0.05 ppm, 0.06–0.10 ppm, 0.11–1.00 ppm, and 1.02–73 ppm. Thus if dominant values of samples are less than 0.06 ppm in a particular area, gold is considered to be virtually absent in that area. If values are mostly 0.06–0.10 ppm, the concentration is considered to be sparse; if mostly 0.11–1.00 ppm, the concentration is considered to be minor or moderate, and if mostly 1.02–73 ppm, the concentration is considered to be major, high, or abundant. The lowest range is arbitrarily considered background for the particular element, and higher ranges are considered to be anomalous. Arbitrary concentration intervals were established separately for each element, based on clusters of values within a range, because distribution of values in the entire range of values is not log-normal. In general, rocks that are clearly unaltered show values of element concentrations in the lowest range, commonly less than a particular value; however iron, for example, almost ubiquitous in rocks, has a lowest range of 2.5 percent and less as we defined it. Iron content of different rock types varies widely; some rock types that indicate higher content of iron are in fact not anomalous but instead contain normal amounts for the particular rock type (for example, serpentinite). In some instances background in unaltered or only slightly altered rocks amounted to lack of detection of the element. Generally, three such ranges of values were established for each element. In discussions of each element in later sections of the report values are given for the concentration ranges and these values are shown on the individual geochemistry maps.

No attempt has been made to treat the analytical data statistically. We think that the vagaries of sample collection, lack of normal distributions of values, as well as discrepancies in analytical results obtained by changing analytical methods through a period of more than 20 years, make statistical analysis invalid.

MINERALOGY OF ELEMENT OCCURRENCES

Mineralogy of elements treated in this study is described briefly here as a framework for following discussions. Identification of minerals was chiefly by Eugene E. Foord, much of which has been described elsewhere (Shawe and others, 1984; Foord and others, 1988; Foord and Shawe, 1989).

Gold occurs alloyed with silver in electrum, notably at the great Round Mountain gold-silver mine where gold fineness is about 650, and to some extent in auriferous pyrite. Throughout the southern Toquima Range silver occurs principally in sulfosalt minerals and in galena, as well as alloyed with gold in electrum. Minerals formed through oxidation (weathering), such as the silver mineral cerargerite, are not discussed here. Mercury is present chiefly in mercury minerals such as cinnabar and metacinnabar, but it occurs also in minor amounts locally in some sulfosalts and in galena. Mercury telluride (coloradoite) was identified in material from the Outlaw prospect. Arsenic is present mostly in realgar, orpiment, and tetrahedrite-tennantite as in several locations, and in arsenopyrite as at the White Caps mine. Although orpiment may be formed in a weathering (oxidizing) environment in places, some may be primary. Antimony is present in several localities in the mineral stibnite, and is common in numerous mineralized zones in tetrahedrite-tennantite, as well as locally in other sulfosalts.

Zinc in almost all occurrences is in sphalerite, although zinc may occur in trace amounts in carbonate minerals in the sedimentary rocks. Principal copper minerals are chalcopyrite and tetrahedrite-tennantite; in addition, copper occurs locally in the sulfosalt aikinite. Copper also may occur in trace amounts in carbonate minerals in sedimentary rocks. Lead occurs principally in galena and in a number of lead-dominant sulfosalts, and in minor amounts in potassium feldspars, as detailed in the section on lead mineralogy and isotopes later in this report. Molybdenum is present mostly in molybdenite. Bismuth occurs, in a few local concentrations, as a minor component in lead minerals (galena and several sulfosalts; see Foord and others, 1988, for details), and in bismuthinite.

Iron occurs mostly as oxides in igneous rocks, notably in iron-rich igneous rocks (for example, magnetite and ilmenite in oceanic igneous rocks and in some volcanic rocks). It also occurs as oxides and in sulfides in metamorphic rocks (for example, in magnetite and pyrite near granite-pluton contacts), and it is enriched in hydrothermally mineralized zones (in sulfides, mostly pyrite and in part arsenopyrite and chalcopyrite, and in magnetite). In igneous rocks titanium occurs chiefly in ilmenite and rutile; in mineralized zones it may reside chiefly in titanium oxides. Vanadium in igneous rocks may be present mostly in magnetite and ilmenite. Mineral residence of vanadium in most mineralized zones is uncertain. E.E. Foord (written commun., 1992) identified vanadiferous chlorite (roscoelite) in calc-silicate mineralized rock collected near the mouth of East Manhattan Wash. The mineralogy of cobalt in the study area has not been determined; it likely is similar to that of iron and titanium.

The mineral residence of beryllium is not well known. A single locality of the mineral beryl was found near the east margin of the Round Mountain pluton [locality labeled Be on the beryllium map (Map O, Sheet 4)]. The beryl occurrence is discussed in more detail in a later section. Boron is present probably chiefly in the mineral tourmaline and in minor amount in dumortierite, those being the only boron minerals identified in our studies. In mineralized zones, fluorine occurs mostly in the mineral fluorite. Some areas in granite that appear to have anomalously high fluorine may reflect high fluorine content of contained biotite. Sulfur occurs mostly in sulfides and sulfosalts.

GEOCHRONOLOGY OF IGNEOUS ROCKS AND MINERAL DEPOSITS

Radiometric ages of igneous and mineralized rocks discussed in later sections are presented below.

Plutonic activity was initiated in the southern Toquima Range when the Round Mountain pluton was emplaced at about 90 Ma (monazite $^{206}Pb/^{238}U$ age 94 Ma, $^{208}Pb/^{232}Th$ age 88 Ma, T.W. Stern, written commun., 1971; Rb-Sr whole-rock and mineral age 89.6±3.3 Ma, John and Robinson, 1989). Micas that manifest foliation in the granite, inferred to have formed during metamorphism of the pluton, give ages of about 80 Ma (muscovite K-Ar age 80.2±2.7 Ma, biotite K-Ar age 80.9±2.9 Ma, Shawe and others, 1986). Ages of quartz veins in the Round Mountain pluton also are about 80 Ma (muscovite and biotite K-Ar ages 77.9±1.5 Ma to 83.2±2.3 Ma, Shawe and others, 1986). Concordance of the metamorphism and vein emplacement ages suggests that they indicate a single metamorphic and mineralizing event.

Several closely spaced quartz veins in granite of the Round Mountain pluton 2 km southeast of Round Mountain are similar to other 80-Ma quartz veins in the granite. According to Foord and others (1988) the veins contain pyrite, sphalerite, stibnite, and aikinite (Pb,Bi,Cu sulfosalt). Sericitized wall rock contains small disseminated grains of pyrite and molybdenite. Fission-track ages on two accessory zircons and an apatite from the granite are 44.4±2.3 Ma, 43.7±2.8 Ma, and 19.7±2.0 Ma, respectively. The fission-track ages are interpreted here to indicate resetting (caused by a nearby thermal event) and (or) cooling ages following original crystallization of the minerals, and they may indicate a younger remineralization of the quartz veins.

Emplacement age of the Belmont pluton, based on Rb-Sr whole-rock data (John and Robinson,

1989) is 84.5±3.4 Ma. As described by Shawe and others (1986, 1987) and by John and Robinson (1989), seven biotite and muscovite K-Ar ages of about 80–82 Ma (see John and Robinson, 1989, for references) reflect an episode of metamorphism and mineralization of the pluton.

The Pipe Spring pluton was emplaced at about 80 Ma (whole-rock isochron Rb-Sr age 80.2±2.4 Ma, John and Robinson, 1989; whole-rock-biotite isochron Rb-Sr age 80.1±1.0 Ma, Shawe and others, 1986). A pegmatite at the contact of the pluton has a muscovite K-Ar age of 78.9±1.8 Ma. Aplite intruded into the Pipe Spring pluton has an age of 76.1±2.7 Ma (K-Ar on biotite, Shawe and others, 1987). A granodiorite dike satellitic to the Pipe Spring pluton is dated at 76.1±2.7 Ma (K-Ar on biotite) and 76.5±2.8 Ma (K-Ar on potassium feldspar) (Shawe and others, 1987). Tourmaline occurs in the granodiorite dike and in nearby wall rocks. Metamorphism of the pluton is inferred from a biotite K-Ar age of 75.0±2.6 Ma (Shawe and others, 1986). Mineralized rocks in Paleozoic marine sedimentary rocks north of the Pipe Spring pluton formed at about 75 Ma (feldspar-quartz veins in tactite, adularia K-Ar age of 74.5±1.7 Ma, muscovite K-Ar age of 76.9±1.8 Ma; quartz ladder vein in limestone layer in Cambrian Gold Hill Formation, adularia K-Ar age of 73.6±1.7 Ma).

Radiometric ages of minerals in the granite of Pipe Spring define a bimodal curve on a temperature-age plot (Shawe and others, 1986). A plateau or reversal of the cooling curve at about 55–40 Ma suggests a thermal event possibly related to intrusion of a stock at depth accompanied by a mineralizing event. This possibility is considered in later discussions of mineralization in the Manhattan mining district.

The next igneous event in the area took place at about 35 Ma with emplacement of a swarm of rhyolite dikes, a granodiorite stock, and andesite dikes in granite of the Round Mountain pluton east of Round Mountain. Rhyolite dikes and sills were intruded into Paleozoic rock near the pluton during the same episode. A rhyolite sill and rhyolite dikes were dated at 34.3±0.9 Ma, 34.4±1.2 Ma, and 34.7±1.2 Ma (K-Ar on sanidine, Shawe and others, 1986), and 36.0±1.2 Ma (K-Ar on biotite, Shawe and others, 1986). Mineralization accompanied the emplacement of the stock as manifested by tourmaline deposition in surrounding granite and rhyolite dikes; base and precious metals also were deposited in the halo around the stock, most likely during the same episode of mineralization.

Granodiorite of Dry Canyon stock emplaced in the rhyolite dike swarm is dated at 36.1±1.6 Ma and 37.4±2.3 Ma (fission track on zircon) and 36.2±2.0 Ma (fission track on sphene; Shawe and others, 1986). Ages of muscovite from tourmalinized granite near the stock are 61.6±1.2 Ma and 40.1±0.8 Ma (K-Ar on muscovite, Shawe and others, 1986). The ages are interpreted to reflect resetting of the original 80-Ma age of the muscovite as a result of emplacement of the stock.

Latite, part of the andesite dike system that intrudes the rhyolite dike swarm (and elsewhere the granodiorite stock), is dated at 36.5±1.2 Ma (K-Ar on biotite; Shawe and others, 1986).

An ash-flow tuff inferred to fill a caldera largely beneath alluvium of Big Smoky Valley north of Round Mountain has been dated at 32.18±0.13 Ma ($^{40}Ar/^{39}Ar$ on sanidine, Henry and others, 1996).

Tuff of Corcoran Canyon was emplaced as intracaldera fill in a caldera of unknown extent and configuration in the vicinity of Corcoran Canyon at 27.17±0.05 Ma ($^{40}Ar/^{39}Ar$ on sanidine, Shawe and others, 2000).

The tuff of Mount Jefferson was emplaced as intracaldera fill in the Jefferson caldera; the Jefferson Canyon fault partly controlled emplacement of the tuff, and the fault was the principal structural control on the Jefferson mining district. Age of the tuff of Mount Jefferson is 26.63±0.06 Ma to 26.82±0.06 Ma ($^{40}Ar/^{39}Ar$ on sanidine, Shawe and others, 2000), and 26.66±0.05 Ma to 26.93+/-0.06 Ma ($^{40}Ar/^{39}Ar$ on sanidine, Henry and others, 1996).

The tuff of Round Mountain, in which the huge Round Mountain gold-silver deposit was formed, is dated at 26.50±0.06 Ma to 26.53±0.07 Ma ($^{40}Ar/^{39}Ar$ on sanidine, Henry and others, 1996).

A date of 25.9±1.1 Ma (fission track on zircon), earlier interpreted as indicating age of a rhyolite intrusion at the margin of the Mount Jefferson caldera (Shawe and others, 1986), now is believed to indicate age of mineralization in part of the Jefferson mining district along the Jefferson Canyon fault. The rock is hydrothermally altered tuff of Mount Jefferson that contains thin veinlets of adularia and adularia crystals coating fracture surfaces.

Coarse-grained adularia from a gold-bearing quartz vein in the tuff of Round Mountain in the Round Mountain district was dated at 25.2±0.8 Ma (K-Ar; Silberman and others, 1975). Henry and others (1996) reported six $^{40}Ar/^{39}Ar$ dates on adularia from Round Mountain as ranging from 25.94±0.04 Ma to 26.05±0.05 Ma.

The Round Rock Formation was erupted into the Manhattan caldera at about 24.4 Ma. Henry reported $^{40}Ar/^{39}Ar$ dates (sanidine) of 24.44±0.11 Ma and 24.34±0.07 Ma on ash-flow tuff of the formation.

Gold-bearing quartzite from the Gold Hill mined area in the west part of the Manhattan district yielded fine-grained adularia dated at 16.0±0.5 Ma (Silberman and others, 1975). Coarse-grained muscovite from the same quartzite nearby has an age of 74.6±2.7 Ma (K-Ar date; Shawe and others, 1986). A gold-bearing quartz-adularia veinlet in calc-silicate-mineralized limestone (tactite) of the Gold Hill Formation collected in the area of the White Caps mine in the Manhattan mining district has an age of 16.9±0.6 Ma (K-Ar on adularia, Shawe and others, 1987). Coarsely crystalline potassium feldspar in the tactite has an age of 45.3±1.0 Ma (K-Ar date; Shawe and others, 1987). The 45-Ma date is interpreted to have been reset from a 75-Ma date of original deposition. Adularia from a gold-mineralized quartz vein that contains fluorite and pyrite, collected in the west part of the Manhattan district, has an age of 16.4±0.4 Ma (K-Ar date; Shawe and others, 1986). Coarsely crystalline feldspar from a mineralized limestone layer of the Gold Hill Formation in the same locality has a K-Ar age of 63.1±1.5 Ma (Shawe and others, 1986). The 63-Ma date also is interpreted as reset from an original date of 75 Ma.

A few young age dates have been obtained on alunite from the Round Mountain gold-silver mine. Whether these dates represent hydrothermal events or instead indicate supergene activity at the deposit is unknown. Most of the alunite dates are between 9.1±0.4 Ma and 10.2±0.2 Ma; one date is 12.4±0.7 Ma and two others are 15.9±0.7 Ma and 16.1±0.5 Ma (Sander, 1988). Some of these dates have not been recalculated to modern standards, which however would not change them substantially. One date (10.2 Ma; Tingley and Berger, 1985) is of alunite from a vein characterized by colloform carbonate minerals, fine-grained quartz, and black manganese oxide, and which is silver rich and contains significant gold and mercury (Shawe, 1988).

ELEMENT DISTRIBUTIONS

The following discussions of individual element distributions should be read in conjunction with simultaneous examination of the pertinent geochemistry maps. The maps are identified by letter on Sheets 1–4, for example, Gold (Map A). Elements are grouped as four associations: (1) precious and associated metals (Sheet 1)—gold, silver, mercury, arsenic, and antimony; (2) base metals (Sheet 2)—zinc, copper, lead, molybdenum, and bismuth; (3) ferrous metals (Sheet 3)—iron, titanium, vanadium, cobalt, and (4) miscellaneous elements (Sheet 4)—beryllium, boron, fluorine, and sulfur.

GOLD

Gold concentrations range from not detected to 73 ppm. Intermediate ranges selected for illustration on the gold geochemistry map (Map A) are: N (not detected) or L (less than lower limit of detection) to 0.05 parts per million (ppm); 0.06–0.10 ppm; 0.11–1.00 ppm; and 1.02–73 ppm. For the purpose of illustrating variance in sample values, the N,L–0.05 ppm range is considered background and the higher ranges are considered to be anomalous. Areas containing samples that range in concentration from 1.02 to 73 ppm gold are outlined on the map by dashed red lines; areas containing samples that range in concentration from 0.11 to 1.00 ppm gold are outlined on the map by dashed green lines. This system is thought to be valid inasmuch as the outlined concentration ranges tend to show a "bulls eye" effect centered on a focus of mineralization.

Gold occurs in mineralized zones closely associated with Tertiary volcanic rocks mostly at the margins of calderas where they are intersected by northwest-striking faults. Gold is concentrated in three principal and several lesser zones of mineralization, in either Paleozoic sedimentary rocks, Cretaceous granite, or Tertiary volcanic rocks. The patterns of gold distribution and concentration (as well as those of other elements) are based on samples commonly spaced too widely to relate the patterns closely to details of geology (lithology and structure) that controlled specific localization of gold.

Major gold production (more than 7 million ounces, Koschmann and Bergendahl, 1968; Tingley, 2000) has come from the Round Mountain deposit (in Tertiary volcanics), significant production has come from the Manhattan district (about 1 million ounces, Koschmann and Bergendahl, 1968; Kleinhampl and Ziony, 1984) mostly from placers and Paleozoic rocks, and smaller production (between about 20,000 and 50,000 ounces, Kral, 1951) has come from the Jefferson district (both Paleozoic rocks and Tertiary volcanics).

Gold occurs in the Manhattan district in two chemically distinct zones, not characterized by significant difference in structural setting, although by different host rocks and in part by different ages. In the west part of the district gold and minor silver were mined from Cambrian (Gold Hill Formation) schist in the Gold Hill area. In the east part of the district, in the vicinity of the White Caps mine, gold and associated arsenic, antimony, and mercury were mined from Cambrian (Gold Hill Formation) carbonate rocks. Gold has been prospected or produced in minor amounts in scattered spots in the vicinity of the granodiorite of Dry Canyon stock lying about 5 km east of Round Mountain (Cretaceous tungsten- and molybdenum-bearing quartz veins in granite in this area were remineralized with gold, silver, copper, lead, zinc, arsenic, antimony, and mercury, probably at the time of emplacement of the stock; Shawe, 1988); at The Shale Pit, a Carlin-type deposit inasmuch as it contains "invisible" gold disseminated in carbonaceous argillite; in the belt of northwest-striking veins south of Bald Mountain Canyon where volcanic rocks as well as quartz veins are locally gold rich (Shawe, 1988); at the Jumbo mine and Keystone (Wall or Summit) mine south of Manhattan; in the old Spanish silver belt 11 km northwest of Belmont (notably in a limestone layer in the Gold Hill Formation similar to that at the White Caps mine); and in the vicinity of Silver Reef prospect in the northeast part of the map area. All of these zones are defined by the geochemical data for gold.

SILVER

Silver concentrations range from not detected to 1,000 ppm. Intermediate ranges selected for illustration on the silver geochemistry map (Map B) are: N,L–0.47 ppm; 0.50–10 ppm; 15–100 ppm; and 105–1,000 ppm. The N,L–0.47 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 105–1,000 ppm silver are outlined on the map by dashed red lines; areas containing samples in the range 15–100 ppm silver are outlined by dashed green lines; areas containing samples in the range 0.50–10 ppm are outlined by dashed purple lines.

Major silver production has come from the Round Mountain gold-silver mine in volcanic rocks (more than 4 million ounces, Tingley, 2000) and from the Belmont mines in Ordovician rocks [more than 150,000 ounces (assuming an average price of 20 cents an ounce) Kleinhampl and Ziony, 1984]. Minor production has come from the Jefferson district, Barcelona mine, Silver Point mine, and a few other small producers.

Silver, though commonly associated with gold in and near volcanic rocks, has a much more widespread and diffuse distribution; it also is localized in Paleozoic rocks near the margins of Cretaceous granite plutons where gold is sparse or absent. Silver in anomalous values occurs in three broad zones associated primarily with Paleozoic rocks and the Cretaceous granite plutons. Much of the area of the Round Mountain pluton shows anomalous silver concentrations, and local high concentrations occur in Paleozoic rocks in the Jefferson district north of the pluton, the old Spanish silver belt southeast of the pluton, and in the vicinity of the Silver Point mine west of the pluton. An elongate zone of high silver values almost 14 km long north to south borders the east margin of the Belmont pluton; the Belmont silver district is centered within this zone. The deposits at the Silver Point mine and at Belmont are virtually devoid of gold. High values of silver are associated with the Pipe Spring pluton at the south margin of the map area, as at the Jumbo and Keystone mines. Lesser values of silver occur with gold in the ores of the Manhattan district farther north and in the vicinity of the Silver Reef prospect in the northeast part of the map area.

MERCURY

Mercury concentrations range from not detected to 16,000 ppm. Intermediate ranges selected for depiction on the mercury geochemistry map (Map C) are: N,L–0.10 ppm, 0.11–1.0 ppm, 1.1–10.0 ppm, and 10.2–16,000 ppm. The N,L–0.10 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas that include samples in the range 10.2–16,000 ppm mercury are outlined on the map by dashed red lines; areas that include samples in the range 1.1–10.0 ppm mercury are outlined by dashed green lines.

Mercury, a common associate of gold in epithermal deposits (Guilbert and Park, 1986), is especially abundant in samples from the northwest-trending Jefferson district, the east part of the Manhattan district in the vicinity of the White Caps mine and at the Jumbo mine where it forms a northeasterly trend of anomalous values, and the northwest-trending Bald Mountain Canyon belt of gold prospects within the Manhattan caldera. It also is associated with gold in the vicinity of the granodiorite stock east of Round Mountain, the Silver Reef prospect in the northeast part of the map area, and parts of the old Spanish silver belt (mercury is abundant in the vicinity of the Flower mercury mine at the east end of the belt and near the Barcelona mine at the west end of the belt). Mercury is only slightly enriched in the Round Mountain gold mine and in The Shale Pit gold prospect, a Carlin-type deposit in Ordovician carbonate and argillite rocks northeast of the Silver Point mine and 4 km south of Round Mountain. However, mercury is enriched in the Belmont silver district and at Silver Point mine which carry virtually no gold, and it is abundant at or near the Red Bird Toquima and Van Ness mercury mines and the Mariposa Red Dog mercury prospect near the south margin of the Round Mountain granite pluton where gold is sparse or undetected. (No geochemistry sample was taken at the Mariposa Red Dog deposit, but presence of cinnabar at the deposit established presence of anomalous mercury.) Mercury is present but only in low amounts in the main gold-producing area in the west part of the Manhattan district (Gold Hill mined area), although farther west and south of the Manhattan fault it is more abundant.

Only small amounts of mercury have been produced in the southern Toquima Range. Somewhat more than 900 flasks of mercury came from the old Spanish silver belt (Kleinhampl and Ziony, 1984), of which more than 700 flasks were produced from the Van Ness mine, about 100 flasks came from the Red Bird Toquima mine (old Senator mine), and the Flower mercury mine produced about 50 flasks (Bailey and Phoenix, 1944). An additional unknown amount of mercury was produced from the Red Bird Toquima mine in recent decades prior to 1990. A minor amount of mercury was produced from the White Caps mine in the east part of the Manhattan district and from a few other mines in the southern Toquima Range.

ARSENIC

Arsenic concentrations range from not detected to 30,000 ppm. Intermediate ranges selected for depiction on the arsenic geochemistry map (Map D) are: N,L–100 ppm, 101–1,000 ppm, and 1,500–30,000 ppm. The N,L–100 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas that contain samples in the range 1,500–30,000 ppm arsenic are outlined on the map by dashed red lines; areas that contain samples in the range 101–1,000 ppm arsenic are outlined by dashed green lines.

Arsenic, also commonly associated with epithermal gold (Guilbert and Park, 1986), is highly concentrated in the east half of the Manhattan district (vicinity of the White Caps mine) and eastward to Ralston Valley, and to a lesser degree at the west end of the district. It also is anomalously high in and near the Round Mountain gold mine, The Shale Pit Carlin-type prospect, the Jefferson district, the granodiorite stock east of Round Mountain, a northwest-trending zone centered on the Flower mercury mine at the east end of the old Spanish silver belt, southwestward from the mercury mine along the silver belt to the vicinity of the Barcelona mine, the Silver Reef prospect, and part of the Belmont silver district and southward for about 4 km. Arsenic is low or undetected in the vicinity of Gold Hill mines where substantial gold has been produced, and at the Jumbo and Keystone mines, which were mined for gold.

Almost 700,000 pounds of arsenic was produced from the east part of the Manhattan district (Kral, 1951; Kleinhampl and Ziony, 1984); probably very little has been produced from other mines in the southern Toquima Range.

ANTIMONY

Antimony concentrations range from not detected to 15,000 ppm. Intermediate ranges selected for depiction on the antimony geochemistry map (Map E) are: N,L–100 ppm; 108–1,000 ppm, and 1,500–15,000 ppm. The N,L–100 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 1,500–15,000 ppm antimony are outlined on the map with dashed red lines; areas containing samples in the range 108–1,000 ppm antimony are outlined with dashed green lines.

Antimony, like mercury and arsenic, commonly is associated with epithermal gold (Guilbert and Park, 1986). In the southern Toquima Range, antimony-rich zones generally coincide with distribution of high values of silver in the Jefferson district and along the east margin of the Belmont pluton, including the Belmont silver district. However, high values in the Manhattan district are principally in a northeast-trending zone centered on the White Caps mine where silver is low and mercury and arsenic are high. Lesser concentrations of antimony occur in the west part of the Manhattan district, near the Silver Point mine, at both ends of the old Spanish silver belt near the Barcelona silver mine and near the Flower mercury mine, and in a few small scattered areas elsewhere.

According to Lawrence (1963) more than 90,000 pounds of antimony was produced from the White Caps mine in the east part of the Manhattan district between 1925 and 1958. Very little production has come from other mines in the southern Toquima Range; ores from other mines are known to contain antimony, but records suggest that little antimony has been recovered from them.

ZINC

Zinc concentrations range from not detected to 70,000 ppm. Intermediate ranges selected for depiction on the zinc geochemistry map (Map F) are: N,L–200 ppm; 230–500 ppm; 700–1,000 ppm; and 1,500–70,000 ppm. The N,L–200 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 1,500–70,000 ppm zinc are outlined on the map with dashed red lines.

Zinc is especially abundant and widespread in Paleozoic sedimentary rocks, but it is otherwise sparse, except for small local concentrations, in other rock types such as in volcanic rocks at Round Mountain and north of Manhattan, as well as in granite in the vicinity of the granodiorite stock east of Round Mountain. No zinc occurrences have been developed into mines for the production of zinc and associated metals.

COPPER

Copper concentrations range from not detected to 30,000 ppm. Intermediate ranges selected for illustration on the copper geochemistry map (Map G) are: N,L–10 ppm; 12–100 ppm; 150–1,000 ppm; and 1,500–30,000 ppm. The N,L–10 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the ranges 1,500–30,000 ppm copper and 150–1,000 ppm copper are outlined on the map by dashed red lines.

Distribution of high values of copper is similar to that of high values of zinc, being predominantly in Paleozoic rocks. No records indicate any production of copper, including byproduct recovery from silver ores.

LEAD

Lead concentrations range from not detected to 100,000 ppm. Intermediate ranges selected for depiction on the lead geochemistry map (Map H) are: N,L–30 ppm; 31–55 ppm; 56–300 ppm; and 301–100,000 ppm. The N,L–30 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 301–100,000 ppm lead are outlined on the map by dashed red lines; areas containing samples in the range 56–300 ppm lead are outlined by dashed green lines.

The most important areas of lead concentration are a broad zone that includes the Belmont silver district and extends for about 11 km peripheral to the east margin of the Belmont granite pluton, the Jefferson mining district for about 4 km along the trend of the Jefferson Canyon fault, a cluster of quartz veins southeast of the granodiorite of Dry Canyon stock, veins and replacements in Paleozoic rocks 3–5 km south of Round Mountain (including the deposit at Silver Point and a galena-bearing knot of quartz in black argillite at The Shale Pit—not sampled for the geochemistry study, and hence not evidenced on the map of lead distribution, but analyzed for lead-isotope composition), a zone about 4 km long bordering the northwest margin of the Pipe Spring pluton and including the Jumbo and Keystone mines, concentrations at and near the Barcelona silver mine and the Flower mercury mine, and a small zone in the vicinity of the White Caps mine in the Manhattan district. Less significant zones of lead mineralization are near the northeast margin of the Manhattan caldera, several scattered quartz veins in granite of the Round Mountain and Belmont granite plutons, and in Paleozoic rocks on the southwest side of the Meadow Canyon fault. As with copper, no records indicate production of lead, including as a byproduct from processing silver ores.

MOLYBDENUM

Molybdenum concentrations range from not detected to 5,000 ppm. Intermediate ranges selected for depiction on the molybdenum geochemistry map (Map I) are: N,L–2 ppm; 3–10 ppm; 11–100 ppm; and 130–5,000 ppm. The N,L–2 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 130–5,000 ppm molybdenum are outlined on the map by dashed red lines; areas containing samples in the range 11–100 ppm molybdenum are outlined on the map by dashed green lines.

Anomalously high amounts of molybdenum are widespread in the study area, both geographically and in age of mineralization. Molybdenum is concentrated in and near the Round Mountain granite pluton, particularly in the vicinity of the Jefferson district, Round Mountain gold mine, Silver Point mine, and westward from the Barcelona silver mine to include the Van Ness and Red Bird Toquima mines and the Outlaw prospect. It also is concentrated at the east margin of the Belmont granite pluton in and near the Belmont silver district. A zone of high molybdenum values extends northeastward from the White Caps mine in the Manhattan district in Paleozoic sedimentary and Tertiary volcanic rocks, and an east-trending zone occurs in volcanics near the Silver Reef prospect in the northeast part of the map area.

BISMUTH

Bismuth concentrations range from not detected to 3,000 ppm. Intermediate ranges established for depiction on the bismuth geochemistry map (Map J) are: N,L–5 ppm, 7–30 ppm, 50–100 ppm, and 150–3,000 ppm. The N,L–5 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas that contain samples in the range 7–30 ppm bismith and higher are outlined on the map by dashed red lines.

High values of bismuth in the southern Toquima Range are more restricted in distribution than most other elements evaluated. In a general way bismuth occurs either within or close to the margins of the Cretaceous granite plutons. Perhaps most significant is a zone of bismuth concentration near the granodiorite stock east of Round Mountain and extending southeastward in granite and northeastward into the Jefferson district. Other concentrations of note occur about 1 km north of the Belmont mines, across the lower reach of East Manhattan Wash, and in a group of small quartz-chalcedony veins in the south-central part of the Belmont granite pluton.

IRON

Iron concentrations range from not detected to 23.0 percent. Intermediate ranges selected for depiction on the iron geochemistry map (Map K) are: N,L–2.5 percent; 2.6–5.0 percent; 5.1–8.8 percent; and 10.0–23.0 percent. The N,L–2.5 percent range is considered to be background; the 2.6–5.0 percent range may be background or anomalous (background will depend on the rock type inasmuch as some rocks normally contain significantly higher iron contents than other rocks); higher ranges are considered to be anomalous. Areas containing samples in the range 10.0–23.0 percent iron are outlined on the map by dashed red lines; areas containing samples in the range 2.6–8.8 percent iron are outlined by dashed purple lines.

Assessment of the significance of iron distribution in regard to mineralized zones is complicated by the fact that some rock types normally are quite high in iron, such as (1) serpentinite and other oceanic rocks in the southeast part of the map area (for locations see Shawe and Byers, 1999), (2) Crone Gulch Andesite in the Manhattan caldera (see Shawe, 1999), and (3) volcanic rocks of the tuff of Corcoran Canyon in the northeast part of the map area (see Shawe and others, 2000). These qualifications considered, it is possible to judge where mineralizing processes that introduced base and precious metals also concentrated iron. Such areas include the Round Mountain gold mine, the vicinity of the granodiorite stock east of Round Mountain, the vicinity of the Silver Reef prospect, and near the Barcelona silver mine, Flower mercury mine, and Belmont silver mines. Paleozoic sedimentary rocks in the vicinity of the Manhattan district, between the Manhattan caldera and the Pipe Spring pluton, contain high concentrations of iron.

TITANIUM

Titanium concentrations range from not detected to 3.00 percent. Intermediate ranges established for depiction on the titanium geochemistry map (Map L) are: N,L–0.15 percent, 0.16–0.30 percent, 0.31–0.92 percent, and 1.00–3.00 percent. The N,L–0.15 percent range is considered to be background; the 0.16–0.30 percent range may be background or anomalous (as with iron, some rocks in this range may contain background titanium and others may appear to be anomalous because of the significant difference in normal amounts of titanium in different rocks); higher ranges are considered to be anomalous. Areas that contain samples in the range 1.00–3.00 percent titanium are outlined on the map by dashed red lines; areas that contain samples in the range 0.31–0.92 percent titanium are outlined by dashed green lines; areas that contain samples in the range 0.16–0.30 percent titanium are outlined by dashed purple lines.

Titanium tends to parallel iron in distribution and concentration. Part of this similarity in distribution results from the fact that high-iron rocks such as the tuff of Corcoran Canyon (Shawe and others, 2000), oceanic igneous rocks south of Belmont (Shawe and Byers, 1999), Crone Gulch Andesite within the Manhattan caldera (Shawe, 1999), and gabbro intruded into Middle Ordovician Toquima Formation about 2 km north of the mouth of East Manhattan Wash (Shawe, 1998), also contain high values of titanium. However, high amounts of titanium occur in mineralized zones as well, as in the Jefferson district, possibly mostly in titanium-oxide minerals. Titanium is not concentrated in the Spanish silver belt, however, where iron is notably enriched. Unlike iron, and for unknown reasons, titanium tends to be high in the deposits of the Manhattan district.

VANADIUM

Vanadium concentrations range from not detected to 2,000 ppm. Intermediate ranges selected for depiction on the vanadium geochemistry map (Map M) are: N,L–70 ppm; 78–130 ppm; 150–200 ppm; and 210–2,000 ppm. The N,L–70 ppm range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 210–2,000 ppm vanadium are outlined on the map with dashed red lines; areas containing samples in the range 150–200 ppm vanadium are outlined with dashed green lines.

Vanadium is enriched in some of the rock units in the map area, such as the Crone Gulch Andesite within the Manhattan caldera (Shawe, 1999), oceanic rocks about 6 km south of Belmont (Shawe and Byers, 1999), and gabbro intruded into Toquima Formation 2 km north of the mouth of East Manhattan Wash (Shawe, 1998). Vanadium also occurs in high amounts in parts of some mineralized zones where addition of vanadium took place during the mineralizing process. These zones include the Jefferson district, vicinity of the Barcelona silver mine, near the mouth of East Manhattan Wash, and scattered areas near the Manhattan district. Notably, the Belmont silver district and adjacent areas in Paleozoic rocks to the north and south, and Paleozoic rocks 2–5 km south of Round Mountain including the Silver Point mine and the Carlin-type deposit at The Shale Pit, are strongly enriched in vanadium. Possibly vanadium was concentrated as a result of hydrothermal mineralization and reconstitution that leached detrital minerals in the Paleozoic rocks such as vanadiferous magnetite or ilmenite, or by mobilization of vanadium concentrated in carbonaceous marine argillite of Ordovician age.

COBALT

Cobalt concentrations range from not detected to 700 ppm. Intermediate ranges selected for depiction on the cobalt geochemistry map (Map N) are: N,L–2.0 ppm; 2.1–10 ppm; 11–30 ppm; and 36–700 ppm. The N,L–2.0 ppm cobalt range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 36–700 ppm cobalt are outlined on the map with dashed red lines; areas containing samples in the range 11–30 ppm cobalt are outlined with dashed green lines.

Cobalt, like iron, titanium, and vanadium, is notably enriched in certain rock types such as oceanic rocks south of Belmont, gabbro intruded into Toquima Formation north of East Manhattan Wash, and Crone Gulch Andesite in the Manhattan caldera. It is also concentrated locally where it likely was deposited by hydrothermal solutions such as at Round Mountain, the vicinity of the granodiorite stock east of Round Mountain, an area bordering the Pipe Spring pluton south of Manhattan, an area near the Manhattan caldera west of Manhattan, and scattered small areas elsewhere. Although it is clear that in gabbro, andesite, and serpentinite cobalt likely resides chiefly in rock-forming minerals, and in hydrothermal deposits it is mostly in sulfide minerals, our studies did not address this question.

BERYLLIUM

Beryllium concentrations range from not detected to 50 ppm. Intermediate ranges selected for depiction on the beryllium geochemistry map (Map O) are: N,L–1.0 ppm; 1.5–5.0 ppm; 5.1–10 ppm; and 11–50 ppm. The N,L–1.0 ppm beryllium range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 11–50 ppm beryllium are outlined on the map with dashed red lines; areas containing samples in the range 5.1–10 ppm beryllium are outlined with dashed green lines.

Beryllium is concentrated in only a few zones that are distinguished by enrichment of other metals. These zones include the Round Mountain gold mine, the vicinity of the granodiorite stock east of Round Mountain, the Barcelona silver mine, the southeast end of the Jefferson precious-metal district, and deposits near the east end of the Manhattan gold district. Otherwise, concentrations are localized mostly near or within the granite plutons, as near the margin of the Pipe Spring pluton, and in scattered small areas within the plutons. A few local concentrations of beryllium occur in volcanics within the Manhattan caldera, but generally not associated with other metal enrichments.

Beryllium shows lowest levels of concentration in Paleozoic sedimentary rocks, as expected, based on normally lower levels of beryllium in sedimentary rocks compared to igneous rocks, particularly silicic igneous rocks (for beryllium content of sedimentary and igneous rocks, see Clarke, 1924; also, for that of igneous rocks, see Beus, 1962).

BORON

Boron concentrations range from not detected to 7,000 ppm. Intermediate ranges selected for depiction on the boron geochemistry map (Map P) are: N,L–20 ppm; 21–50 ppm; 70–150 ppm; and 200–7,000 ppm. The N,L–20 ppm boron range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 200–7,000 ppm boron are outlined on the map by dashed red lines; areas containing samples in the range 70–150 ppm are outlined by dashed green lines.

Boron is concentrated in three principal areas in the southern Toquima Range: as a halo surrounding the granodiorite stock intruded into granite east of Round Mountain; in a zone that includes the Flower mercury mine and is centered about 2 km southwest of the Meadow Canyon fault; and in a zone centered on Manhattan Gulch west of Manhattan. Lesser concentrations occur in Paleozoic rocks 4–6 km south of Round Mountain, spanning the margin of the Round Mountain pluton southeast of Jefferson, scattered areas at and near Belmont, and south of the mouth of East Manhattan Wash. Also shown on the map of boron distribution and concentration are areas where the borosilicate tourmaline has been observed in outcrop. The most significant areas are a zone immediately surrounding the granodiorite stock east of Round Mountain, and several zones in Paleozoic rocks lying between Pipe Spring pluton and Manhattan caldera. Taken together, the geochemical and mineralogic data are used to infer zones of boron addition through hydrothermal mineralization.

FLUORINE

Fluorine concentrations range from not detected to 9.10 percent. Intermediate ranges selected for depiction on the fluorine geochemistry map (Map Q) are: N,L–0.10 percent; 0.11–0.20 percent; 0.21–1.00 percent; and 1.02–9.10 percent. The N,L–0.10 percent fluorine range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 1.02–9.10 percent fluorine are outlined on the map with dashed red lines; areas containing samples in the range 0.21–1.00 percent fluorine are outlined with dashed green lines; areas containing samples in the range 0.11–0.20 percent fluorine are outlined with dashed purple lines.

Zones of major fluorine concentration are the vicinity of the granodiorite stock east of Round Mountain including a broad area in and near the west half of the Round Mountain pluton (possibly in part reflecting fluorine-enriched biotite in the granite), an area including the Manhattan district, small areas around the Jumbo and Keystone mines south of Manhattan and around the Barcelona mine at the west end of the Spanish silver belt, and an irregular area that includes the Belmont silver district. In mineralized zones, fluorine occurs mostly in the mineral fluorite.

SULFUR

Sulfur concentrations range from not detected to 13 percent. Intermediate ranges selected for depiction on the sulfur geochemistry map (Map R) are: N,L–0.060 percent; 0.061–0.100 percent; 0.101–0.300 percent; and 0.307–13 percent. The N,L–0.060 percent sulfur range is considered to be background; higher ranges are considered to be anomalous. Areas containing samples in the range 0.307–13 percent sulfur are outlined on the map by dashed red lines; areas containing samples in the range 0.101–0.300 percent sulfur are outlined by dashed green lines; areas containing samples in the range 0.061–0.100 percent sulfur are outlined by dashed purple lines.

Virtually all of the mineralized zones in the southern Toquima Range contain (relatively) moderate to high concentrations of sulfur, including those centered on the Jefferson, Manhattan, and Belmont districts, and the Silver Reef prospect in the northeast part of the map area. Other zones of generally lesser concentration are Round Mountain, an area spanning the western end of the Round Mountain pluton south of Round Mountain, a broad irregular area extending from the south part of the Round Mountain pluton eastward to Meadow Canyon, and areas north and south of the mouth of East Manhattan Wash. Small local concentrations are found associated with serpentinite about 6 km south of Belmont, and at small quartz-chalcedony veins in the south-central part of the Belmont granite pluton. Sulfur is virtually absent from the belt of gold-quartz veins near Bald Mountain Canyon, although 1–2 km to the northeast an area of moderate sulfur enrichment (in pyrite?) is not associated with a zone of ore metal enrichment.

FACTORS RELATED TO TIMING AND NATURE OF MINERALIZING EVENTS

The following discussions of individual elements elucidate the formation of the mineralized systems. Elements discussed include gold, silver, mercury, arsenic, zinc, copper, iron, beryllium, boron, fluorine, and sulfur. Lead is dealt with in detail in a later section.

GOLD

According to Romberger (1988) gold is likely carried in hydrothermal solutions as a bisulfide or chloride complex. The geochemical evidence of sulfur in association with gold in deposits in the southern Toquima Range suggests that bisulfide complexes were effective in gold transport into the deposits discussed here. Unsatisfactory data on chlorine distribution and concentration prevents use of a geochemistry map to assess the possibility of chlorine as an important carrier of gold in solution. Moreover, it is possible that evidence of chlorine mineral phases might not remain following trace element deposition.

Sander and Einaudi (1990), based on a study of alteration mineral assemblages at the Round Mountain gold mine, concluded that gold was deposited during transition from propylitic to potassic alteration from bisulfide solution.

Nash (1972) measured homogenization temperatures of fluid inclusions in samples from gold-bearing quartz-adularia deposits in the Round Mountain, Jefferson, and Manhattan districts (samples in the Manhattan district were collected in both the west and east parts of the district). Nash determined that Round Mountain quartz (two samples) had filling temperatures of 250°C and 260°C, and salinities equal to 0.2–1.0 and 0.2–1.4 weight percent NaCl. Sander and Einaudi (1990) determined that an initial hydrothermal fluid at Round Mountain had a salinity of 0.0–0.2 equivalent weight percent NaCl. According to Nash (1972) Jefferson quartz (one sample) had a filling temperature of 255°C and salinity equal to 0.8 weight percent NaCl. Manhattan quartz (1 sample) had a filling temperature of 235°C and salinity of 0.8 weight percent NaCl, calcite (three samples) had filling temperatures of 205°–233°C and salinities of 0.3–1.9 percent NaCl, and fluorite (four samples) had filling temperatures of 200°–220°C and salinities of 0.5–0.8 percent NaCl. Based on these data, gold-bearing quartz-adularia veins in the three districts were deposited at temperatures of about 200°–260°C and from fluids of very low salinities. These parameters are similar to those of gold-depositing hot springs, although the deposits in the southern Toquima Range are not near-surface deposits but were formed at greater depths. These data also suggest that chlorine was not a significant agent in the transport of gold in hydrothermal fluids in the three districts studied.

Conclusions regarding the character of gold-mineralizing fluids may be pertinent to hydrothermal fluids that deposited other elements in the area. However, data are insufficient to speculate further on fluid chemistry involved in deposition of the other elements; the nature of mineralizing fluids probably varied throughout the long period of hydrothermal activity in the area.

Silver-rich deposits at Belmont and at the Silver Point mine (discussed below) are characterized by paucity of gold. If the two deposits formed as a result of hydrothermal activity related to granite plutons, lack of gold in the deposits suggests three possibilities: (1) the pluton mineralizing systems were devoid of gold or were incapable of carrying gold, (2) gold if present in the Paleozoic marine sedimentary rocks was not mobilized into the mineral deposits by hydrothermal activity, or (3) gold was negligible in the marine rocks and essentially unavailable for mobilization into deposits.

SILVER

Broad distribution of anomalous values of silver (>0.5 ppm) suggests a widespread effect of silver mineralizing systems associated principally with Cretaceous granite, and extending from Cretaceous time into the Tertiary. Probably major silver mineralization in the area occurred initially in Cretaceous time and was related to emplacement of granite magmas.

Studies of the mineralogy of silver-bearing galenas from two sites near Round Mountain, the Lead-Silver King prospect and the Fairview mine (Foord and others, 1988), indicate that two generations of galena were deposited at each site. At the Lead-Silver King prospect, two phases of galena occur in an intensely sheared zone between volcanic rocks of the Mount Jefferson caldera (tuff of Mount Jefferson) and Ordovician sedimentary rocks. No evidence is available to closely date the times of deposition of the two phases except that they occurred following tuff emplacement at about 26.8–26.6 Ma. An apparent initial (probably relatively high temperature) bismuth-rich galena phase (ourayite) at the Fairview mine is found along with pyrite and molybdenite in a quartz vein in granite that underlies volcanics at the surface; the vein material is typical of nearby quartz veins in granite dated at about 80 Ma. Secondary phases of galena that contain lead, silver, and bismuth in amounts lower than the initial phase are interpreted to have formed during a Tertiary mineralizing event, and because of proximity to the nearby Round Mountain gold deposit possibly formed during that mineralizing event (at about 26.0 Ma).

The data for silver indicate that an initial silver mineralization (mostly as silver-bearing galena?) took place in the Cretaceous, about 80 Ma, at Belmont, at Silver Point, and elsewhere locally in granite, a few million years after the granite plutons were emplaced. (Three-quarters of a century ago Ferguson, 1924, suggested that the Belmont and Silver Point ores are similar, are related to the granite plutons, and are of Cretaceous age.) Proximity of major mineralization to the plutons, and abundance of silver in granite and in nearby Paleozoic rocks, suggest the granite or the Paleozoic rocks, or both, as sources of silver in the mineral deposits. Silver probably was reworked from these deposits during a Tertiary mineralizing event, though it also may have been introduced from Tertiary magmas.

A probably significant localizing structure on silver mineralization is a thrust fault in the Belmont district and extending north-northwestward about 5 km (for location, see Shawe and Byers, 1999; Shawe, 1998), as well as at the Silver Point mine south of Round Mountain (see Shawe, 1995), that places Upper and Middle Ordovician Toquima Formation upon Middle Ordovician Zanzibar Formation. The deposits (mostly quartz veins) at Belmont and Silver Point are in marine sedimentary rocks close to Cretaceous granite contacts, centered on intersections of north-striking high-angle faults and the thrusts.

MERCURY

A quartz vein at the Mariposa Red Dog prospect in Cretaceous granite of the Round Mountain pluton (90 Ma) is dated at 83 Ma (K-Ar date on muscovite lining the vein), but it has been remineralized in Tertiary time with chalcedony, barite, and cinnabar (Shawe and others, 1986). At the Outlaw prospect, about 3 km east of the Mariposa Red Dog in a screen of Paleozoic rocks that separates the Round Mountain and Belmont plutons, a dated (81 Ma) quartz vein of complex sulfide mineralogy (Foord and others, 1988) contains late-generation mercury-bearing lead-bismuth-silver-copper sulfosalts as well as coloradoite (mercury telluride). The mercury minerals were interpreted to be a Tertiary modification of the earlier mineral assemblage (Foord and others, 1988). Pyrite in the quartz vein is porous locally, as though partially leached by hot solutions following deposition. The vein contains minor amounts of tourmaline, generally associated with minerals inferred to have been deposited in the Tertiary. Altogether, the mineralogic evidence at the Mariposa Red Dog and Outlaw deposits indicates an initial Cretaceous mineralizing event that was modified by later (probably Tertiary) hydrothermal activity characterized by mercury.

ARSENIC

Notably high amounts of arsenic in the vicinity of Manhattan are confined to the Paleozoic rocks, suggesting the Paleozoic rocks as a possible source of the arsenic. Inasmuch as arsenic in some other places is enriched in volcanic rocks and granites adjacent to arsenic highs in the Paleozoic rocks, it is puzzling why such is not true near Manhattan. The enigma could be explained if arsenic mineralization at Manhattan was not related to granite emplacement, and if arsenic enrichment near Manhattan took place before emplacement of the volcanics in the Manhattan caldera. An inferred gold-mercury-arsenic-antimony mineralization at about 50–45 Ma could have accounted for the relations. High amounts of arsenic are present in the Jefferson district where Paleozoic rocks, Cretaceous granite, and Tertiary volcanics alike are mineralized. Arsenic is enriched in the vicinity of the Round Mountain mine in volcanics, near the Flower mercury mine in Paleozoic rocks, and in the Spanish silver belt and south of the Belmont mines exclusively in Paleozoic rocks as at Manhattan.

ZINC

The significant concentration of zinc metal in the sedimentary rocks relative to other rocks, even in only slightly mineralized or apparently unmineralized sedimentary rocks, suggests the Paleozoic rocks as a possible source. This relation appears true whether zinc is concentrated in quartz-carbonate veins or whether it is in replacement deposits. Concentration of zinc in the Paleozoic section may also be related to host lithologies (particularly carbonate rocks) favorable for mineral deposition.

COPPER

Distribution of copper principally in Paleozoic rocks, as with zinc, may indicate that the Paleozoic rocks are a main source of copper in the mineralized areas. However, dominance of copper in Paleozoic rocks also may be in part related to favorableness of host lithologies for mineral deposition, again regardless of residence in quartz-carbonate veins or in replacement deposits.

IRON

High concentrations of iron occur in sedimentary rocks in the vicinity of Manhattan, between the Manhattan caldera and the Pipe Spring pluton. These rocks are mostly quartzites, argillites, schists, and carbonate rocks that are not known normally to contain high iron; probably the high concentrations are the result of hydrothermal and (or) contact-metamorphic mineralization. However, the area around the principal mines of the Manhattan district shows lower iron values than much of the remainder of the area of Paleozoic rocks, suggesting that the gold mineralizing episodes there did not concentrate high amounts of iron.

The Spanish silver belt is distinctive in that it contains minor to high amounts of iron but virtually no titanium.

BERYLLIUM

Local concentrations of beryllium in mineralized zones defined by anomalous amounts of other metals suggest introductions of beryllium during mineralizing events. Universally higher concentrations of beryllium in igneous rocks, both Cretaceous and Tertiary, indicate magmas as the principal source of beryllium, and beryllium probably was deposited from mineralizing systems both in the Cretaceous and in the Tertiary.

A beryl locality (labeled Be on Sheet 4, Map O) is close to an amazonite occurrence (see Shawe, 1999, for accurate location); both beryl and amazonite occurrences are interpreted to be post-magmatic deposits formed a few million years following emplacement of the Round Mountain pluton (Shawe, unpub. data, 1990). The beryl is of aquamarine quality and occurs as strongly zoned crystals (clear blue alternating with clear colorless zones) in a biotite-rich zone in granite. The occurrence is not associated with any other metal enrichment; it indicates derivation of beryllium from the Cretaceous granite.

BORON

Distribution of boron is of interest because the boron mineral tourmaline is an associate of gold in some quartz-vein systems elsewhere (Boyle, 1959). Coincidence of boron with some mineralized zones in the southern Toquima Range suggests that boron may be a guide to a particular mineral system, for example a specific metal type such as gold (in several localities) or mercury (near the Flower mine).

FLUORINE

Fluorine may have been an important complexing agent in the transport of metallic elements to sites of deposition. Because fluorine concentrations coincide with some of the mineralized zones, fluorine likely was involved in mineralizing processes in these zones.

SULFUR

Because of its nearly ubiquitous presence, and known propensity to form complexes with metals, sulfur likely was a complexing agent in transport of base metals and precious metals deposited in most of the mineralized zones.

LEAD ASSOCIATIONS, MINERALOGY AND PARAGENESIS, AND ISOTOPES

By Daniel R. Shawe, Bruce R. Doe, Eugene E. Foord, Holly J. Stein, and Robert A. Ayuso

Lead plays an important role in understanding the sources and genesis of the mineral deposits in the southern Toquima Range. Sources of lead, and history of lead mineralization, are interpreted from three lines of evidence: physical distribution of lead and element associations, lead mineralogy and paragenesis, and lead-isotope data. Distribution of lead relative to different rock types and structures, and associations with other elements, are shown on the generalized geologic maps (element Maps A–R); lead mineralogy and paragenesis have been described by Foord and others (1988) and Shawe and others (1984). Lead-isotope data are presented herein (fig. 1; tables 1, 2). Aerial distribution of lead has been described previously in this report; element associations, lead mineralogy and paragenesis, and lead-isotope data are given in subsequent paragraphs. This section will attempt to integrate these various interrelated lead factors for the purpose of clarifying the overall mineralization history of the area. All of the areas discussed below do not have lead-isotope data to integrate with information on lead mineralogy and lead-mineral paragenesis. Nevertheless consideration of the information available for each area provides additional understanding of the overall history of lead mineralization.

ELEMENT ASSOCIATIONS

The most significant association of lead with another element is its association with silver. Lead and silver are notably associated in the zone peripheral to the east margin of the Belmont pluton, in the Jefferson district, southeast of the granodiorite of Dry Canyon stock, in Paleozoic rocks south of Round Mountain (near the Silver Point mine), at the northwest margin of the Pipe Spring pluton, and in the vicinity of the Barcelona mine. This close association strongly suggests that significant lead and silver mineralization resulted from the same event (or events). A commonality of mineralogy, as discussed later, supports this conclusion.

Other less significant associations of lead are with antimony in the Jefferson district, peripheral to the east margin of the Belmont pluton and especially in the Belmont district, near the Barcelona and Flower mines, and near the White Caps mine in the Manhattan district; with arsenic in the Jefferson district, peripheral to the east margin of the Belmont pluton, in the vicinity of the Barcelona and Flower mines, and near the White Caps mine; with bismuth, as in several scattered quartz veins in granite, in the Jefferson district, and southeast of the granodiorite of Dry Canyon stock; with mercury in the Jefferson district and southeast of the granodiorite of Dry Canyon stock, near the Barcelona and Flower mines, in the vicinity of the White Caps mine, and in Paleozoic rocks peripheral to the east side of the Belmont pluton and including the Belmont district; with copper in the Jefferson district, in the Belmont district and along the east margin of the Belmont pluton, in Paleozoic rocks south of Round Mountain, in the Manhattan district, and near the Barcelona mine; with zinc in the Jefferson district, southeast of the granodiorite of Dry Canyon stock, the Belmont district, in the Manhattan district, and in Paleozoic rocks south of Round Mountain; with molybdenum in the Belmont district, near the Barcelona mine, in the southeast part of the Jefferson district, and near the White Caps mine; with gold in the Jefferson district, southeast of the granodiorite of Dry Canyon stock, and at and near the White Caps mine; and with sulfur in the Jefferson district, southeast of the granodiorite of Dry Canyon stock, in the Belmont district, and at and near the White Caps mine.

A commonality of mineralogy helps explain some of the element associations just described, including the associations of lead, silver, antimony, bismuth, copper, mercury, and sulfur (for details of this mineralogy see Foord and others, 1988). Of course transport by a common mineralizing fluid also could explain these associations, although some associations resulted from more than one mineralizing event. Deposition from a common fluid probably accounts for association of lead with elements such as arsenic, zinc, molybdenum, and gold, which in the Toquima minerals studied do not share common mineralogy with lead.

LEAD MINERALOGY AND PARAGENESIS

Complex mineralogy of many of the previously discussed occurrences, as here described, helps explain the element associations. Studies of lead and associated minerals from the southern Toquima Range by Foord and others (1988) have provided insight into the history of lead mineralization in the area. An investigation of galena and Pb-Bi-Ag-Cu-(Hg) sulfosalts of varied composition corroborates the occurrence of several distinct mineralized systems characterized by different mineral compositions and assemblages. The different episodes of mineralization are related to different Cretaceous and Tertiary magmatic-hydrothermal events, as elaborated elsewhere in this report, although the assignment of specific mineral compositions and associations with dated mineralized systems is imperfect.

Sites from which lead minerals were obtained for mineralogic studies are the Fairview mine, Lead-

Silver King prospect, Outlaw prospect, prospect 2 km southeast of Round Mountain, prospect 5 km southeast of Round Mountain, prospect at the southwest margin of the Round Mountain granite pluton, prospect north-northeast of the White Caps mine, The Shale Pit, and the prospect at the Greenfield claim. Localities where the lead minerals were sampled are shown on Map H, Sheet 2; many of these localities were not sampled for geochemical analyses and therefore are not shown on the other geochemistry maps. The samples that were not analyzed geochemically are not listed in the appendix.

Fairview mine

At the Fairview mine, on the fringe of the major zone of mineralized ground at Round Mountain, two intergrown phases of galena are associated with Pb-Bi-Ag sulfosalts and simple sulfides (Foord and others, 1988). The two galena phases are distinguished on the basis of distinctly different silver and bismuth contents. These minerals occur in quartz vein material typical of nearby quartz veins in granite that have been dated at about 80 Ma (Shawe and others, 1986). We infer that the earlier galena (a bismuth-rich galena properly identified as ourayite) was deposited in Late Cretaceous time at relatively high temperature when quartz vein material and associated muscovite were deposited. Later mineralization resulted in crystallization of a different lead phase having lower silver and bismuth contents, possibly at the time of mineralization of the adjacent Round Mountain gold deposit at about 26 Ma. Foord and Shawe (1989) indicated that higher temperatures favor greater incorporation of silver and bismuth into galena structure, a relation commensurate with a deeper seated Cretaceous mineralization compared to a shallower Tertiary mineralization.

Lead-Silver King prospect

The Lead-Silver King prospect near the Jefferson Canyon fault northwest of the Jefferson district exposes irregular thin quartz veins in an intensely sheared zone between Tertiary (upper Oligocene) ash-flow tuff and Ordovician limestone. Galena occurs as irregular masses and fillings to several centimeters in length in sheared milky quartz or as crudely tabular masses in quartz-lined vugs (Foord and others, 1988). Two distinct phases of galena were identified that contain significantly different concentrations of silver, bismuth, and antimony (Foord and others, 1988). Galena from one sample (DRS-74-142A) contains about 6,000 ppm silver and 12,000 ppm bismuth; galena from two other samples (DRS-74-142B and DRS-79-18) each contain about 1,500 ppm silver, and 170 and 700 ppm bismuth, respectively.

We interpret the distinctive compositions of the two galenas from the Lead-Silver King deposit to indicate two separate late Oligocene or younger Tertiary mineralizing events. An initial(?) event resulted in deposition of higher temperature galena of sample DRS-74-142A (greater silver and bismuth contents) followed by a lower temperature event that deposited, or reconstituted, the galena of samples DRS-74-142B and DRS-79-18.

Outlaw prospect

At the Outlaw prospect, galena, other simple sulfides, and several rare and complex Pb-Bi-Ag-Cu sulfosalts occur as euhedral crystals and irregular masses in sheared vein quartz, and as fillings in vugs in quartz (Foord and others, 1988). (Although mineralogic studies showed the presence of lead minerals, a geochemical sample from the site fortuitously did not show anomalous lead.) The simple sulfides including galena commonly are fractured and the fractures filled with Pb-Bi-Ag-Cu sulfosalts. A late generation of mercury-bearing (50 ppm) Pb-Ag-Cu sulfosalt (aikinite) and coloradoite (mercury telluride) is also present (Foord and others, 1988). Muscovite from the quartz vein was dated (K-Ar) as 81 Ma (Shawe and others, 1986), and therefore initial lead and silver mineralization is interpreted to be Late Cretaceous. The Outlaw prospect lies in an east-west belt of mercury mineral deposits of Tertiary age, and the late-stage sulfosalt mineralization of the Outlaw deposit is inferred to be of Tertiary age. Also, presence of tourmaline in and adjacent to the quartz vein suggests Tertiary mineralization, possibly the 36-Ma episode of tourmaline mineralization indicated elsewhere in the district (Shawe, 1988). Pyrite in the Outlaw quartz vein is leached and porous locally, unlike much of the pyrite in the vein. The porous pyrite may have been leached by a post-depositional episode of hot water introduction.

Prospect 2 km southeast of Round Mountain

A prospect in granite about 2 km southeast of the Round Mountain gold-silver mine exposes several northeast-striking quartz veins, 1–20 cm wide, typical of the 80-Ma group of veins (milky-white quartz; sericitized granite wall rocks contain disseminated grains of pyrite and molybdenite), near a swarm of 36-Ma northeast-trending rhyolite dikes (Shawe, 1995). Quartz-vein material contains pyrite, sphalerite, stibnite, and aikinite. Fission-track ages on zircon and apatite from pyrite-bearing granite near the veins are about 44–43 Ma and 20 Ma, respectively (Shawe and others, 1986). We interpret the dates to reflect partial annealing of zircon at the time of emplacement of the 36-Ma dikes, and annealing of the apatite probably during both the 36-Ma event and during 26-Ma mineralization at the nearby Round Mountain gold deposit, followed by slow cooling to about 20 Ma at which time the apatite had passed through the annealing threshold. The thermal events indicated by the fission-track data may have modified the original mineralogy of the quartz veins, such that simple sulfides were in part converted to more complex sulfosalts.

Prospect 5 km southeast of Round Mountain

A prospect about 5 km southeast of Round Mountain exposes a muscovite- and huebnerite-bearing quartz vein of the Late Cretaceous mineralizing episode. Huebnerite occurs as isolated crystals in quartz and is partly altered to scheelite (Shawe and others, 1984). Pyrite, galena, covellite, and tetrahedrite form vug fillings and irregular pockets in sheared quartz (Foord and others, 1988). Deposition of sulfides and sulfosalt in their present configuration appears to have been a late event; however, sulfides may have been deposited during the initial 80-Ma mineralizing episode. Alteration of huebnerite to scheelite also was a late event. Redistribution and (or) recrystallization of sulfides, sulfosalt deposition, and scheelite formation, may have occurred in the Tertiary.

Prospect at southwest margin of Round Mountain pluton

Two parallel and closely spaced quartz veins in granite near the southwest margin of the Round Mountain pluton are mostly massive white quartz; they are similar to nearby quartz veins that have been dated at 83, 79, and 78 Ma (K-Ar on vein muscovite; Shawe and others, 1986). Locally the quartz is sheared, fractured, and lined with late vuggy quartz and chalcedony. The veins contain sparse huebnerite embedded in massive quartz. Sphalerite, pyrite, galena, tetrahedrite-tennantite, and pyrrhotite(?) are concentrated in vugs in quartz, or are strung out in quartz close to or in prominent shears within the veins (Foord and others, 1988). Tetrahedrite-tennantite is paragenetically younger than associated sulfides. At least two episodes of mineralization are suggested. Tetrahedrite-tennantite may represent a Tertiary mineralizing event. Presence of chalcedony suggests a low-temperature Tertiary event may have effected a late mineralization.

Prospects 0.7 km north-northeast of White Caps mine

Prospects 0.7 km north-northeast of the White Caps mine expose a set of quartz veins in Ordovician limestone. The veins, of white bull quartz, are a few centimeters to about 1 m wide, and they occur where limestone is jasperized, calc-silicate mineralized (to tactite), and iron mineralized. Sparse, small tabular masses of Pb-Bi-Ag sulfosalts occur along with minor chalcopyrite, galenobismutite ($PbSBi_2S_3$), and bismuthinite (Bi_2S_3) in sheared quartz (Foord and others, 1988). Typical of the 75-Ma quartz veins in the Pipe Spring granite pluton, these veins appear to have been remineralized with complex sulfosalts following initial deposition.

The Shale Pit

At The Shale Pit, a small Carlin-type gold deposit in Ordovician carbonaceous argillite and limestone about 2.5 km south of the Round Mountain gold-silver mine, a pod of milky-white quartz about 2 m long contains abundant masses of galena several centimeters long, interconnected by numerous thin anastomosing veinlets of galena. The quartz mass is strongly sheared and fractured, and locally it contains vugs lined with drusy quartz. The milky-white quartz appears typical of that in the 80-Ma quartz veins nearby in granite; the drusy quartz is typical of the Tertiary gold-bearing deposits in the southern Toquima Range (Foord and others, 1988). The galena displays somewhat curved cleavage surfaces, suggestive of significant silver content (analyses indicate 5,000–10,000 ppm silver and 2,000–15,000 ppm bismuth; Foord and others, 1988). We have no direct evidence of the age of galena mineralization; it could be Cretaceous or Tertiary, although the high silver and bismuth contents suggest an initial Cretaceous age.

Greenfield claim

At the Greenfield claim about 2 km west-southwest of Manhattan, prospect pits expose thin irregular quartz veins in Ordovician quartzite. Silver- and bismuth-rich galena occurs in quartz as well as in 1-cm masses along poorly defined irregular fractures in quartzite (Foord and others, 1988). The claim lies about 1 km south of gold deposits in the east-southeast-trending mineralized zone in the Manhattan district, and about 2 km west of the principal gold-producing area on Gold Hill. Muscovite in quartz-mineralized rock at Gold Hill has been dated as 75 Ma, and adularia associated with gold at the same locality has an age of 16 Ma (Shawe and others, 1986).

LEAD ISOTOPES

Lead-isotope data substantiate the mineral data and further elucidate the history of lead mineralization. The lead-isotope data and mineralogical studies mostly are of samples collected peripheral to the major mineralized zones, although many were collected within zones of lead mineralization that enclose major deposits. No primary lead minerals were recognized in material from the major mineralized deposits. Lead-isotope analyses were made of lead minerals collected from mineralized bodies as well as of feldspars from igneous rocks in order to determine possible relations between the igneous rocks and mineralizing processes. The data also suggest sources of the lead.

The 90-Ma Round Mountain granite pluton is characterized by lead-isotope composition of contained microcline. Lead in lead minerals in 80-Ma quartz veins in the pluton is similar in isotope composition to that in the feldspars except that it is slightly enriched in radiogenic lead relative to the feldspars. The difference suggests that source magma of the vein lead, inferred to be the same as source magma of the granite plutons, had evolved through a period of about 10 m.y. following emplacement of the pluton.

Pegmatite feldspar in the 80-Ma Pipe Spring granite pluton contains less radiogenic lead than does feldspar in the Round Mountain pluton, indicating that the Pipe Spring had a magma source different from that of the Round Mountain pluton.

Lead minerals in veins in Paleozoic rocks into which the plutons were emplaced have lead-isotope compositions indicative of derivation of some lead from the sedimentary rocks. Cretaceous (granitic) and Tertiary (volcanic) magmas both could have supplied some lead to the veins in Paleozoic rocks.

Galena from a quartz pod at The Shale Pit gold deposit has lead-isotope composition characteristic of Tertiary Carlin-type gold deposits.

Lead in sanidine in a 35-Ma rhyolite sill is indicative of Tertiary lead-isotope composition that may have evolved over a long period from magma emplaced at depth in Cretaceous time.

Details of the various occurrences of analyzed minerals are given in the following pages. Discussion of lead-isotope composition of feldspars is followed by discussion of lead-isotope composition of lead minerals.

Potassium feldspar lead-isotope data

Lead-isotope compositions of eight potassium feldspars determined for this study (fig. 1; table 1; sample localities shown on lead map, Map H) provide information useful in interpreting the lead-isotope data for lead minerals; the data support the interpretation of ages and sources of the lead minerals. The analyzed feldspars are from rocks and veins of different age and type. Four feldspars were derived from igneous rocks: Sample DRS-67-99 (sample 1, table 1) is sanidine from a rhyolite sill dated by K-Ar as about 34 Ma. Samples DRS-68-102A and DRS-68-102D (samples 2 and 3, table 1) are microcline from granite of the Round Mountain pluton. The pluton is dated by $^{206}Pb/^{238}U$ and $^{208}Pb/^{232}Th$ in monazite as about 94 and 88 Ma (T.W. Stern, written commun., 1971) and by Rb/Sr isochron as about 90 Ma (John and Robinson, 1989). Sample DRS-78-20A (sample 4, table 1) is potassium feldspar from a pegmatite dike in granite of the Pipe Spring pluton. Muscovite from the dike has a K-Ar date of about 79 Ma and orthoclase from the dike has a K-Ar date of about 55 Ma. Shawe and others (1986) concluded—on the basis of ages and closing temperatures for muscovite, orthoclase, zircon, and apatite from the dike analyzed by appropriate radiometric methods—that the dike was emplaced at about 79 Ma and experienced a thermal event at about 55–40 Ma.

Table 1. Lead-isotope compositions of potassium feldspar minerals from veins and igneous rocks in the southern Toquima Range

[Analyses by surface emission (silica gel) ionization method of solid source mass spectrometry (Doe and Delevaux, 1980). Ratios are within 0.1 percent of absolute]

Sample	Mineral	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$
1. DRS 67-99	Sanidine	19.234	15.659	38.915
2. DRS-68-102A	Microcline	19.141	15.682	38.913
3. DRS-68-102D	Microcline	19.155	15.707	38.920
4. DRS-78-20A	K-feldspar	19.070	15.617	38.663
5. DRS-78-86C	K-feldspar	19.651	15.786	39.084
6. DRS-78-158B	K-feldspar	19.238	15.712	39.011
7. DRS-80-58A	K-feldspar	19.162	15.773	39.133
8. DRS-80-58B	Adularia	18.988	15.686	38.407

SAMPLE DESCRIPTIONS

1. Rhyolite sill (sanidine K-Ar age 34.3 Ma, Shawe and others, 1986) in Ordovician strata 3 km south of Round Mountain gold-silver mine.
2. Biotite-rich granite of the Round Mountain pluton (monazite $^{206}Pb/^{238}U$ age 94 Ma; $^{208}Pb/^{232}Th$ age 88 Ma, T.W. Stern, written commun., 1971; Rb-Sr whole rock and mineral age 89.6±3.3 Ma, John and Robinson, 1989) 4 km southeast of Round Mountain.
3. Same occurrence as sample 2.
4. Pegmatite dike (muscovite K-Ar age 78.9 Ma, orthoclase K-Ar age 55.3 Ma, Shawe and others, 1986) in Cretaceous granite of Pipe Spring at contact with Cambrian schist 3 km south of Manhattan.
5. Quartz ladder vein (potassium feldspar age of 68.7±1.6 Ma, Shawe and others, 1986) in limestone layer in Cambrian Gold Hill Formation about 0.5 km north of Pipe Spring and 4 km southeast of Manhattan.
6. Coarse potassium feldspar (K-Ar age of 63.1 Ma, Shawe and others, 1986) containing quartz and small crystals of pyrite, molybdenite, and chalcopyrite; replacement(?) in limestone of the Cambrian Gold Hill Formation at the April Fool mine on April Fool Hill, east part of Manhattan district.
7. Coarse potassium feldspar (K-Ar age 45.3 Ma, Shawe and others, 1987) in sulfide- and calc-silicate-mineralized limestone from the Union Amalgamated mine dump, east part of Manhattan district.
8. Adularia (K-Ar age 16.9 Ma, Shawe and others, 1987) associated with coarse potassium feldspar of sample 7.

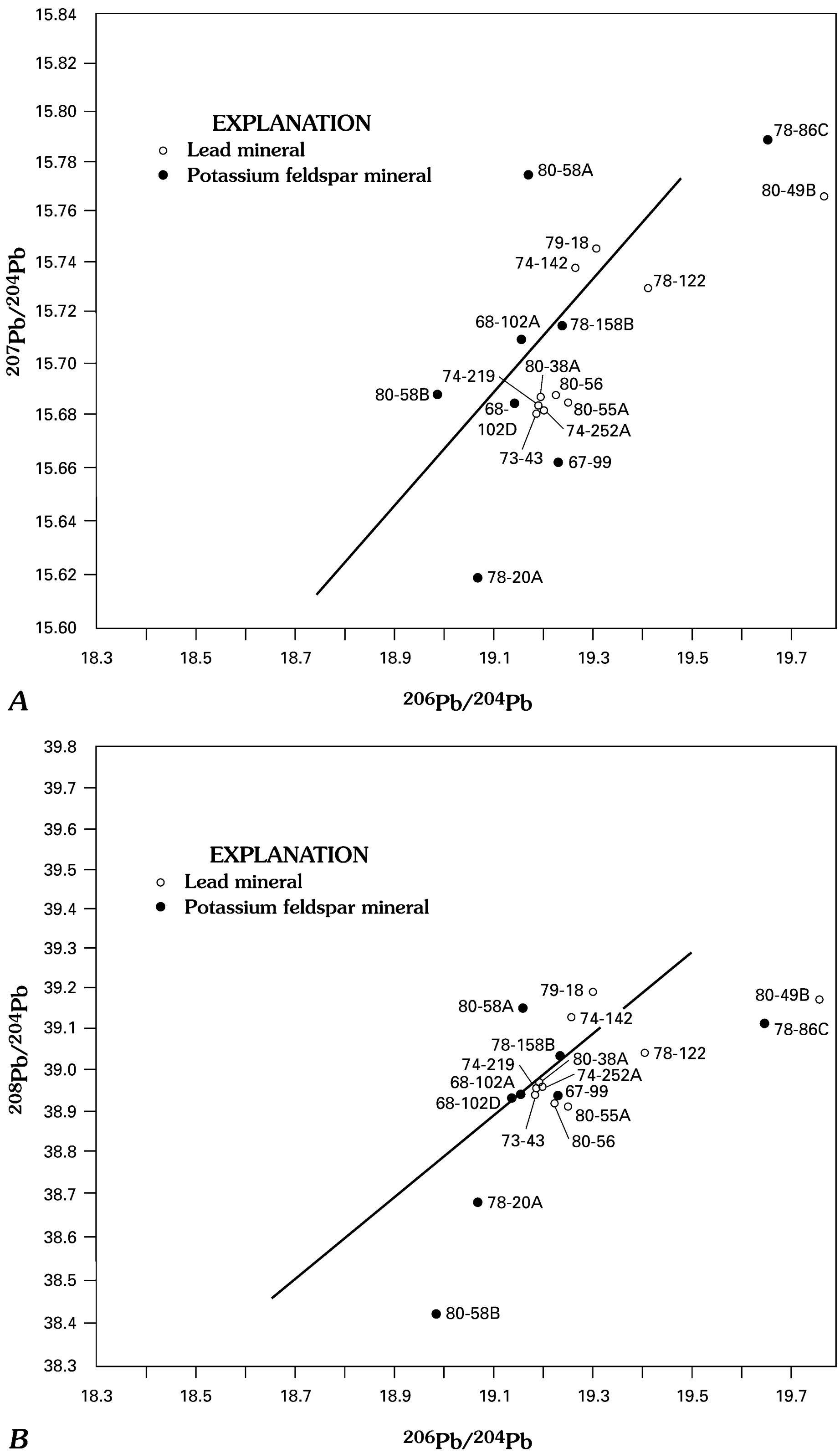

Figure 1. Lead-isotope compositions of ten lead minerals and eight potassium feldspars from the southern Toquima Range. *A*, $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$. *B*, $^{208}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$.

Two samples of microcline (DRS-68-102A and DRS-68-102D, samples 2 and 3, table 1) from the Late Cretaceous Round Mountain granite pluton have lead-isotope compositions similar but not identical to the isotopic composition of leads in lead minerals deposited in quartz veins in and adjacent to granite (samples 1, 3, 4, and 7, table 2). The compositions suggest the lead in the veins had its source in the granite or more likely in a differentiated pool of granite magma at depth from which the granite earlier was derived. Possibly the granite was slightly inhomogeneous in its lead-isotope composition or the veins had minor lead added from external sources (unlikely).

Potassium feldspar (DRS-78-20A, sample 4, table 1) from a pegmatite dike at the contact between the Pipe Spring granite pluton and Cambrian schist is less radiogenic ($^{206}Pb/^{204}Pb$, $^{207}Pb/^{204}Pb$, and $^{208}Pb/^{204}Pb$) than feldspars from the older Round Mountain pluton, suggesting separate sources of magmas that formed the two plutons.

Sanidine (DRS-67-99, sample 1, table 1) from a rhyolite sill in Ordovician rocks near the margin of the Round Mountain pluton has a lead isotopic composition somewhat more radiogenic than the feldspars from the pluton, by about 1.25 percent in $^{206}Pb/^{204}Pb$. The difference is much larger than the difference between the lead-mineral samples from veins within the pluton and the feldspar samples from the granite of the pluton. Because the rhyolite sill is about 55 m.y. younger than the Round Mountain pluton, the trend in $^{206}Pb/^{204}Pb$ is in the expected direction (more radiogenic) for younger igneous rock, possibly suggesting derivation of sanidine lead from an evolved magma pool that was emplaced in Cretaceous time.

Potassium feldspar (DRS-78-86C, sample 5, table 1) collected from a quartz ladder vein in a limestone layer in Cambrian Gold Hill Formation near the Pipe Spring granite pluton has a lead-isotope composition indicating a more radiogenic source than the igneous rocks, and a likely contribution from the sedimentary rock host or other sedimentary rocks. Similarly, potassium feldspar (DRS-78-158B, sample 6, table 1) from mineralized limestone (tactite) in the Gold Hill Formation collected on April Fool Hill in the east part of the Manhattan district contains more radiogenic lead than the igneous rocks, and it too probably had a contribution of lead from a sedimentary rock source.

The potassium feldspar of sample DRS-78-86C gives a K-Ar date of about 69 Ma (Shawe and others, 1986). The date is interpreted to indicate resetting, by a younger thermal event, of the feldspar initially deposited during mineralization associated with the Pipe Spring pluton at about 75 Ma. The potassium feldspar of sample DRS-78-158B (sample 6, table 1) is a coarse crystal enclosing small crystals of pyrite, molybdenite, and chalcopyrite. It gives a K-Ar date of about 63 Ma (Shawe and others, 1986), also interpreted as a reset date following initial deposition.

Two feldspars from a sample of mineralized limestone (tactite) of the Gold Hill Formation collected from the Union Amalgamated mine dump in the east part of the Manhattan district have lead-isotope compositions suggestive of the lead sources, as here indicated. A potassium feldspar (DRS-80-58A, sample 7, table 1) contains slightly more radiogenic lead than feldspars from the granite, and thus it too may have a lead contribution from host rocks, or from a magma pool at depth evolved from the original granite magma. However, adularia (DRS-80-58B, sample 8, table 1) from the same sample is significantly less in uranogenic (^{238}U) lead and thorogenic (^{232}Th) lead, and similar in uranogenic (^{235}U) lead compared to the leads of potassium feldspars from both the Round Mountain and Pipe Spring plutons. The differences suggest that the adularia in DRS-80-58B had a different source for lead than did potassium feldspar in DRS-80-58A, corroborating the inference of at least two distinct mineralizing events in the Manhattan district.

Potassium feldspar (DRS-80-58A, sample 7, table 1) from the tactite collected on the Union Amalgamated mine dump has a K-Ar date of about 45 Ma (Shawe and others, 1987), indicating either resetting from a 75-Ma event or initial deposition at about 45 Ma. Adularia (DRS-80-58B, sample 8, table 1), collected from the same material as DRS-80-58A, gives a K-Ar date of about 17 Ma (Shawe and others, 1987). The adularia was deposited during the widespread gold mineralizing event in the Manhattan district at 17–16 Ma.

Lead-mineral lead-isotope data

Locations of 10 lead minerals analyzed for lead-isotope compositions (table 2 and fig. 1) are shown on the lead map (Map H).

Fairview mine

No lead-isotope data are available for Fairview mine lead minerals.

Lead-Silver King prospect

The lead-isotope composition of sample DRS-74-142 (sample 2, table 2; mixture of 142A and 142B) suggests a Tertiary age of mineralization at the Lead-Silver King prospect (as is also shown by the geologic setting of the deposit). The sample has a slightly higher $^{207}Pb/^{204}Pb$ value relative to its $^{206}Pb/^{204}Pb$ value than do leads from the southern Toquima area that definitely are Cretaceous. A similar relationship exists between the lead compositions of Tertiary and of older igneous rocks in north-central Nevada (Rye and others, 1974), indicating a possible means of identifying the younger leads. If this criterion is valid, galena from The Shale Pit quartz pod, galena in quartzite at the Greenfield claim, and lillianite ($Pb_3Bi_2S_6$) from a quartz vein in Ordovician limestone northeast of the White Caps mine may also be Tertiary (see later discussion, however).

Table 2. Lead-isotope compositions of lead minerals from the Round Mountain and Manhattan quadrangles

[Analyses by surface emission (silica gel) ionization method of solid source mass spectrometry (Doe and Delevaux, 1980). Ratios are within 0.1 percent of absolute]

Sample	Mineral	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$
1. DRS-73-43	Aikinite	19.186	15.678	38.921
2. DRS-74-142	Galena	19.260	15.682	38.887
3. DRS-74-219	Galena	19.189	15.681	38.932
4. DRS-74-252A	Galena	19.202	15.679	38.938
5. DRS-78-122	Galena	19.409	15.727	39.019
6. DRS-79-18	Galena	19.303	15.743	39.170
7. DRS-80-38A	Aikinite	19.194	15.684	38.946
8. DRS-80-49B	Galena	19.763	15.763	39.144
9. DRS-80-55A	Lillianite	19.252	15.682	38.887
10. DRS-80-56	Galenobismutite and bismuthinite.	19.226	15.685	38.897

SAMPLE DESCRIPTIONS

1. Quartz vein (muscovite K-Ar age of 81.1 Ma, Shawe and others, 1986) at contact between granite of the Round Mountain pluton and schist at Outlaw prospect.
2. Quartz vein between Tertiary ash-flow tuff and Ordovician limestone at Lead-Silver King prospect.
3. Quartz vein in granite of the Round Mountain pluton at prospect 5 km southeast of Round Mountain.
4. Quartz vein in granite near the southwest margin of the Round Mountain pluton.
5. Quartz pod in Ordovician carbonaceous argillite at The Shale Pit.
6. Same occurrence as sample 2.
7. Quartz vein in granite of the Round Mountain pluton near Oligocene rhyolite dike swarm 2 km southeast of Round Mountain.
8. Quartz vein and Ordovician quartzite at Greenfield claim 2 km southwest of Manhattan.
9. Quartz vein in Ordovician limestone 0.7 km north-northeast of the White Caps mine.
10. Same occurrence as sample 9.

Outlaw prospect

Isotopic composition of lead from aikinite from the Outlaw prospect (sample 1, table 2) is virtually the same as other lead compositions of minerals from Late Cretaceous quartz veins in the Late Cretaceous granite of the Round Mountain pluton (samples 3, 4, and 7, table 2), and similar to lead compositions of feldspars from the same granite (samples 2 and 3, table 1). We conclude that lead in the lead minerals of quartz veins in or adjacent to granite was derived from magma genetically related to the granite (see additional discussion in other sections), and further that the isotopic composition of lead in the aikinite, remobilized from that in the initially deposited galena, reflects the composition of lead in the galena.

Prospect 2 km southeast of Round Mountain

Lead-isotope composition of sample DRS-80-38A from the prospect 2 km southeast of Round Mountain (aikinite, sample 7, table 2), and that of aikinite from the Outlaw prospect, are within analytical uncertainties. The compositions are indicative of affinity to the granite of the Round Mountain pluton, and the leads likely had their source in magma genetically related to the granite. Lead apparently was remobilized locally during the Tertiary thermal events suggested by the fission-track dates at the prospect southeast of Round Mountain, but the aikinites do not contain a significant component of Tertiary lead.

Prospect 5 km southeast of Round Mountain

Galena from the quartz vein 5 km southeast of Round Mountain (DRS-74-219, sample 3, table 2) has a lead-isotope composition also similar to that of lead minerals in other quartz veins in and adjacent to granite, and to that of feldspar from the granite. Again, apparent Tertiary modification of the vein mineralogy seems not to have significantly modified the original galena lead-isotope composition.

Prospect at southwest margin of Round Mountain pluton

Lead-isotope composition of galena from one of the quartz veins at the southwest margin of the Round Mountain pluton (DRS-74-252A, sample 4, table 2) is indicative of Late Cretaceous quartz vein formation.

Prospects 0.7 km north-northeast of White Caps mine

Lead-isotope compositions of lillianite ($Pb_3Bi_2S_6$); (DRS-80-55A, sample 9, table 2) from one of the quartz veins north-northeast of the White Caps mine, and galenobismutite ($PbSBi_2S_3$)-bismuthinite (Bi_2S_3) mixture (DRS-80-56, sample 10, table 2) from a second, nearby quartz vein are similar to leads from Cretaceous quartz veins in or adjacent to granite, except that ^{206}Pb is slightly enriched and ^{208}Pb slightly depleted in the veins in Ordovician limestone.

The Shale Pit

A relatively high $^{207}Pb/^{204}Pb$ value for galena from the quartz pod at The Shale Pit mine is characteristic of shale (argillite), in which the deposit is located, and the low $^{208}Pb/^{204}Pb$ value is characteristic of carbonate, which lies closely adjacent to the deposit. Lead-isotope data (DRS-78-122, sample 5, table 2) thus indicate a composition typical of Carlin-type gold deposits (Rye and others, 1974).

Greenfield claim

Lead-isotope composition of a galena sample from the Greenfield claim (DRS-80-49B, sample 8, table 2) is typical of lead derived from the sedimentary section and not from igneous rocks (Rye and others, 1974). However, high silver and bismuth content of the galena is suggestive of derivation of those elements from the Cretaceous granite, and therefore the deposit may be of Cretaceous age; the silver and bismuth may not have the same source as the lead.

Discussion of lead-isotope data

Lead-isotope data (tables 1,2) show that regardless of mineralogy, isotopic compositions of lead minerals deposited in Cretaceous granite are close to those of feldspars in the granite, though not isotopically identical. Lead isotopic compositions of lead minerals in Paleozoic and Tertiary rocks, on the other hand, are widely varied. The data suggest that lead in lead-mineral concentrations in granite is derived largely from granite, or more likely from a differentiated pool of granite magma at depth from which the granite earlier was derived. Lead in mineral deposits in sedimentary and volcanic rocks may have been derived in part from host rocks.

All the lead-mineral samples from the Round Mountain pluton (samples 1, 3, 4, and 7, table 2) have similar lead-isotope ratios (within 0.1 percent, which is within analytical uncertainties). The two aikinites, for example, are within analytical uncertainties, yet they were collected about 6.5 km apart. There is a small but analytically significant difference, however, between feldspar leads of the Round Mountain pluton (samples 2 and 3, table 1) and the lead minerals in the pluton. A similar example in the Butte Quartz Monzonite of the Boulder batholith of Montana was reported by Doe and others (1968). The feldspar sample location (about 4 km southeast of Round Mountain) is roughly between the two northernmost lead-mineral samples (quartz vein 5 km southeast of Round Mountain, sample 3, and quartz vein 2 km southeast of Round Mountain, sample 7, table 2).

Lead in the aikinites was not derived directly from the sampled igneous rock (host granite), either from the magma or by "sweating" or "leaching" out, unless perhaps the sweating-leaching occurred much later when the whole rocks had time to evolve some easily mobilized radiogenic lead from radioactive decay of in-situ uranium. Such a process could raise the value of $^{206}Pb/^{204}Pb$ from 19.148 originally in the igneous rock at the time of its formation, as represented by the ratio in feldspars, to an average value of 19.190 in the lead minerals.

At a $^{238}U/^{204}Pb$ of 9.0, such an evolution would take about 20 m.y., assuming no modification by other factors. Much of the uranium in the rock may be loosely held so the "effective" $^{238}U/^{204}Pb$ may be higher than 9.0 (that is, ^{238}U initially relatively more abundant) and the time period needed may be shorter than 20 m.y., possibly as little as 10 m.y.

In the area of study, different igneous rocks have somewhat different lead-isotope ratios; for example, the rhyolite sill (sample 1, table 1), which is near the contact of the Round Mountain pluton, has a $^{206}Pb/^{204}Pb$ composition somewhat more radiogenic than the feldspars from the pluton and the lead-mineral samples by about 1.25 percent, which is much larger than the difference between isotopic compositions of lead minerals and of feldspars in the pluton. The rhyolite sill is about 55 m.y. younger than the Round Mountain pluton, and the trend in $^{206}Pb/^{204}Pb$ is in the expected direction (more radiogenic) for younger igneous rock. The Pipe Spring pluton (pegmatite, sample 4, table 1), though younger than the Round Mountain pluton, has lead-isotope composition less radiogenic than the Round Mountain pluton. These differences suggest that the magmas from which the cited igneous bodies were derived had individual, unique $^{238}U/^{204}Pb$ ratios.

Somewhat more radiogenic than the lead minerals in the Round Mountain pluton are those associated with Ordovician limestone (sample 2, table 2, from a vein between limestone and Tertiary tuff and samples 9 and 10, table 2, from a vein northeast of the White Caps mine). Sample 6 (table 2), also from the vein between limestone and tuff, is even more radiogenic. Although these lead minerals come from two localities about 22 km apart, three of the four lead mineral samples have remarkably similar lead-isotope ratios, essentially within analytical uncertainties. The $^{206}Pb/^{204}Pb$ and $^{208}Pb/^{204}Pb$ values are also within analytical uncertainties of the feldspar sample from the rhyolite sill in Ordovician strata adjacent to the Round Mountain pluton (sample 1, table 2). The mineralization in the limestones likely is related to the Tertiary calderas or to Tertiary intrusives either older than or similar in age to the calderas. (We note, however, that the quartz vein northeast of the White Caps mine, which shows mineralogic evidence of more than one episode of mineralization, contains quartz characteristic of the Cretaceous veins.) Even more radiogenic than lead in minerals deposited in granite is lead in the galena from a quartz pod in Ordovician argillite at The Shale Pit (sample 5, table 2); the most radiogenic lead mineral is in a quartz vein in Ordovician quartzite at the Greenfield claim (sample 8, table 2). Based on the fact that significant base-metal deposits are commonly associated with lead minerals whose lead-isotope ratios are closest to nearby igneous rocks (Doe, 1979), most likely prospects for such mineral deposits in sedimentary rocks in the southern Toquima Range would be those in Ordovician limestone.

SUMMARIES OF INDIVIDUAL ZONES OF MINERALIZATION

The descriptions of individual element concentrations provide a means of characterizing element associations in each zone of mineralization, which in the context of the geologic setting of the system, allows inferences to be made in several cases as to the types of mineral system formed and in some instances the sources of the introduced elements. These data, together with available age and mineralogical information, permit identification of some specific mineralizing episodes. However, complexity as well as incompleteness of the data prevent a comprehensive evaluation of the history of mineralizing events in the southern Toquima Range. Only principal zones of mineralization are characterized and evaluated here.

In the following discussion, element abundances in areas of concentration, as described earlier, are designated subjectively as high (major or significant), moderate or minor, sparse, and virtually absent. These values are based on the “dominant” concentration ranges in a particular area as shown on the separate maps. Thus, for example, although gold may be described as major, it is in much lower concentrations than arsenic that may be described as minor.

Zones of mineralization discussed below are those that are considered to be definable mineralized systems, based on coherence of element assemblages in a particular area. Mostly these areas already are evident from concentrations of mining or prospecting activity. The zones considered are Round Mountain, including the adjacent Fairview mine (gold and silver); Manhattan, including the Gold Hill mined area in the west part of the district (gold), and an area surrounding the White Caps mine in the east part of the district (gold, mercury, arsenic, and antimony); Jefferson (gold and silver), including the Lead-Silver King prospect (silver and lead) near the northwest end of the mineralized zone along the Jefferson Canyon fault; Belmont (silver); Keystone and Jumbo mines (gold and silver); Barcelona mine and vicinity (silver and molybdenum); Flower mine (mercury); Silver Reef prospect (silver and gold); Silver Point mine (silver); Dry Canyon stock (gold, silver, and base metals); Van Ness and Red Bird Toquima mines (mercury), including the Outlaw prospect (mercury) and Mariposa Red Dog prospect farther west (mercury); The Shale Pit (gold); and the Bald Mountain Canyon belt (gold).

Element abundances and associations are presented in tabular form to facilitate visualization of the data.

ROUND MOUNTAIN

Major: gold, silver, arsenic.
Minor: mercury, zinc, molybdenum, iron, cobalt, beryllium, sulfur.
Sparse: copper, lead, vanadium, fluorine.
Virtually absent: antimony, bismuth, titanium, boron.

The bulk of the Round Mountain gold-silver deposit and gold component of the adjacent Fairview mine appear to have formed from a relatively simple mineralizing system during a single episode. However, the Fairview deposit appears to have been superimposed upon a Late Cretaceous deposit that may have contributed silver and molybdenum to the younger mineralizing system. The younger system was deposited at about 26 Ma and according to Mills and others (1988) it was localized along the margin of a caldera mostly buried beneath the alluvium of Big Smoky Valley. It is a shallow-level, low-sulfidation epithermal system and gold was transported in the hydrothermal mineralizing solutions as a bisulfide complex according to Sander and Einaudi (1990). Formation of silver-rich veins characterized by manganese oxide and alunite at Round Mountain at about 10 Ma may have been either a young hydrothermal event, or the result of supergene action. Presence of Paleozoic marine sedimentary rocks, favorable structures, and possible buried intrusions in deeper levels suggests the possibility of high-grade vein or skarn (tactite) gold deposits.

MANHATTAN

Vicinity of White Caps mine (east part of district):
Major: gold, mercury, arsenic, antimony, sulfur.
Minor: copper, lead, molybdenum, beryllium, fluorine.
Sparse: silver, zinc, iron, titanium, vanadium, cobalt, boron.
Virtually absent: bismuth.

Gold Hill area (west part of district):
Major: gold.
Minor: silver, copper, cobalt, sulfur.
Sparse: mercury, arsenic, molybdenum, iron, titanium, vanadium, beryllium.
Virtually absent: antimony, zinc, lead, bismuth, boron, fluorine.

Two distinctive mineralized systems are present in the Manhattan district. Adularia K-Ar dates from the west part of the Manhattan district indicate an age of about 16 Ma for those ores. Adularia K-Ar dates from the east part of the Manhattan district also show an age of about 17–16 Ma, at least for the youngest episode of mineralization there. Other age data from the eastern area, however, show that deposition of potassium feldspar in mineralized limestone occurred at 75 Ma and perhaps at 45 Ma, and a thermal event affected the rocks at about 55–40 Ma (Shawe and others, 1986, 1987); the event probably was accompanied by hydrothermal activity that deposited gold and other elements not introduced during the mineralizing event that later deposited gold ores in the western part of the district.

In the vicinity of the White Caps mine a gold-mercury-arsenic-antimony-sulfur system formed at moderate to shallow depth, probably at about 45 Ma. Because the zone is characterized also by minor molybdenum, copper, lead, beryllium, and fluorine, it may indicate presence of a zone of base-metal sulfides at greater depth, possibly a porphyry molybdenum-copper system associated with an intermediate-composition stock. Presence of 75-Ma tactite in the vicinity of the White Caps mine shows that an early mineralization, probably related to the nearby Pipe Spring granite pluton (possibly the 76-Ma granodiorite satellitic to the granite?), had occurred. This earlier mineralization may have brought in base metals and silver as well as did the hypothesized 45-Ma event proposed as the cause of gold-mercury-arsenic-antimony deposition.

The second system at Manhattan is a simple shallow epithermal gold-rich system, formed at about 16 Ma. In the Gold Hill area it formed a gold-bearing quartz-adularia deposit; in the White Caps area it modified the earlier systems, and added gold and low-temperature quartz-adularia.

Presence of gold-mineralized limestone of Ordovician age (much of the limestone is carbonaceous), lead-isotope data from lead minerals deposited in the limestone indicative of favorableness of the limestone, and evidence of Tertiary periods of mineralization suggest the possibility of Carlin-type gold deposits in the area.

JEFFERSON

Major: gold, arsenic.
Minor: silver, mercury, antimony, lead, sulfur.
Sparse: zinc, copper, molybdenum, bismuth, iron, titanium, vanadium, cobalt, beryllium, boron, fluorine.

The mineralized zone along the Jefferson Canyon fault includes the Jefferson mining district itself, and minor prospects southeast and northwest of the district, including the Lead-Silver King prospect at the northwest end of the zone. Because of the irregular distribution and variety of elements present, and areal extent of mineralized ground, the zone appears to have resulted from multiple mineralizing events. Indirect evidence for the age of gold ores in the Jefferson district is a zircon fission-track date of 25.9±1.1 Ma from mineralized tuff of Mount Jefferson otherwise dated at about 26.8 Ma (Shawe, 1999; Shawe and others, 2000). This date previously (Shawe, 1988, p. 354) was interpreted erroneously to reflect the age of rhyolite intruded at the structural margin of the Mount Jefferson caldera just north of Jefferson.

Presence of molybdenum, copper, lead, zinc, and sulfur suggests a base-metal system, possibly related to the nearby granodiorite of Dry Canyon stock just to the south. Andesite porphyry clasts in the eruptive megabreccia dike that parallels the east part of the southeast-trending Jefferson mineralized zone indicate a porphyry intrusion at depth, probably related to the granodiorite of Dry Canyon stock (Shawe, 1999). The andesite porphyry is dated at about 33 Ma (possibly reset from about 36 Ma by a younger thermal event, Shawe, 1999). Potential may exist for a porphyry-type mineral system at depth. The younger mineralizing event, probably at about 26 Ma, consisted of extensive alteration of ash-flow tuff of the tuff of Mount Jefferson surrounding the rhyolite plug north of the Jefferson district. This event, appearing similar to the shallow-level epithermal system at Round Mountain, introduced gold and silver and possibly as well arsenic, antimony, and mercury. At the Lead-Silver King prospect northwest of the main Jefferson district Tertiary deposition of silver and lead occurred during possibly two post-Mount Jefferson caldera episodes different from the gold-silver system near the rhyolite plug north of the district. The complex assemblage of elements in the mineralized zone along the Jefferson Canyon fault represents multiple separate mineralizing events occurring at different times.

As in the vicinity of Manhattan, favorable lithology (carbonaceous limy and silty argillite) and evidence of Tertiary mineralization suggest the possibility of Carlin-type deposits.

BELMONT

Major: silver, antimony, zinc, copper, lead.
Minor: mercury, arsenic, molybdenum, vanadium, sulfur.
Sparse: iron, titanium, cobalt, beryllium, boron, fluorine.
Virtually absent: gold, bismuth.

Silver deposits in the Belmont mining district were formed as a result of hydrothermal activity associated with metamorphism of the Belmont granite pluton and formation of molybdenum- and tungsten-bearing quartz veins in the pluton at about 80 Ma. The deposits are considered to be of mid-level origin, when the pluton was still at a depth of a few kilometers. Presence of antimony and minor mercury and arsenic suggests a possible addition of metal during a Tertiary hydrothermal event, although cause of such an event is not evident, and absence of gold is a suggestion that mineralization was not Tertiary. Principal localization of the deposits was along a thrust fault and intersecting north-striking, high-angle faults; similar deposits may occur elsewhere where the thrust fault is buried near the pluton (see Shawe, 1999, and Shawe and Byers, 1999, for location of the thrust fault).

KEYSTONE AND JUMBO MINES

Major: gold, silver, mercury.
Minor: zinc, copper, lead, iron, cobalt, fluorine.
Sparse: molybdenum, titanium, vanadium, beryllium, sulfur.
Virtually absent: arsenic, antimony, bismuth, boron.

A small amount of gold has been produced from the area of the Keystone and Jumbo mines. Proximity to the granite of Pipe Spring is suggestive of a Cretaceous age, and major silver concentrations hint that the granite was a source of that metal. However, because of significant gold and mercury, a younger additional source also seems possible. Virtual absence of arsenic, antimony, bismuth, and boron indicates a source unlike that of any of the other systems discussed herein.

BARCELONA MINE

Major: silver, mercury, molybdenum, fluorine.
Minor: zinc, copper, lead, iron, vanadium, cobalt, beryllium, sulfur.
Sparse: gold, arsenic, antimony.
Virtually absent: bismuth, titanium, boron.

The area around the Barcelona silver mine probably was mineralized at the time of metamorphism of the Round Mountain and Belmont plutons, at about 80 Ma. Silver mineralization is typical of that associated with the plutons; presence of molybdenite in tactite in the vicinity is suggestive of contact metamorphism adjacent to the granite bodies. Zinc, copper, lead, iron, vanadium, cobalt, beryllium, and sulfur enrichments are compatible with a Late Cretaceous mineralization related to the granite. Antimony, arsenic, and gold, along with significant mercury, are suggestive of a Tertiary component because other such assemblages probably are Tertiary. Because molybdenum occurs adjacent to the (plutonic) granite as an element in tactite, it is not likely that the occurrence is indicative of a molybdenum-porphyry (mid-level) environment. Although tungsten was not detected in appreciable quantity in the area, the possibility of a tungsten-molybdenum tactite deposit in carbonate rock adjacent to granite should be considered.

FLOWER MINE

Major: mercury, arsenic, boron.
Minor: antimony, lead, iron.
Sparse: zinc, copper, molybdenum, cobalt, sulfur.
Virtually absent: gold, silver, bismuth, titanium, vanadium, beryllium, sulfur.

The Flower mercury mine is the center of a mineralized zone distinctive in its metal association. Presence of boron is suggestive of a buried intermediate-composition stock at depth, analogous to the granodiorite of Dry Canyon stock east of Round Mountain and to an inferred intrusive beneath the White Caps area at Manhattan. Unlike those centers, however, gold and silver are absent at the Flower center, bespeaking a unique mineralized system. Proximity to the Mount Jefferson caldera is suggestive of association with that center, and a possible age of mineralization of about 26 Ma.

SILVER REEF PROSPECT

Major: silver, sulfur.
Minor: gold, mercury, arsenic, molybdenum.
Sparse: antimony, copper, lead, iron, titanium, beryllium.
Virtually absent: zinc, bismuth, vanadium, cobalt, boron, fluorine.

Presence of sparse iron probably reflects the iron-rich ash-flow tuff of Corcoran Canyon (Shawe and others, 2000). The Silver Reef system appears to be unique in the southern Toquima Range. The mineralized zone is proximal to a megabreccia diatreme interpreted to have been emplaced along the structural margin of Mount Jefferson caldera (Shawe and others, 2000); hydrothermal fluids that brought metals into the Silver Reef area may have been channeled from depth up through the megabreccia diatreme, which is no older than about 23 Ma. If so, age of mineralization was at least that young.

SILVER POINT MINE

Major: silver, copper, lead.
Minor: mercury, antimony, zinc, vanadium.
Sparse: molybdenum, bismuth, cobalt, fluorine.
Virtually absent: gold, arsenic, iron, titanium, beryllium, boron, sulfur.

The silver deposit at Silver Point is similar to those in the Belmont district, and likely of the same age (Late Cretaceous) and of similar origin. It also was localized along a thrust fault, this just west of the Round Mountain pluton (see Shawe, 1995, for location of the thrust fault). Potential for deposits of the Belmont and Silver Point type may occur elsewhere along the thrust fault in proximity to the Round Mountain pluton.

DRY CANYON STOCK

Major: lead, iron, boron, sulfur.
Minor: gold, silver, fluorine.
Sparse: mercury, arsenic, zinc, copper, molybdenum, bismuth, titanium, cobalt, beryllium.
Virtually absent: antimony, vanadium.

The mineralized zone mostly south and southeast of the 36-Ma granodiorite of Dry Canyon stock east of Round Mountain probably was initiated in Late Cretaceous time with deposition of molybdenum- and tungsten-bearing quartz veins that were modified at the time of intrusion of the granodiorite stock by addition of precious and base metals (Shawe, 1988). Had the stock intruded Paleozoic sedimentary rocks (particularly carbonate rocks, possibly beneath a sill-like granite pluton intrusive), a base-metal porphyry deposit with significant precious-metal values may have formed.

VAN NESS AND RED BIRD TOQUIMA MINES AND OUTLAW AND MARIPOSA RED DOG PROSPECTS

Van Ness, Red Bird Toquima, Outlaw:
Major: mercury (minor at Outlaw).
Minor: molybdenum.
Sparse: silver, copper, lead, iron, vanadium, cobalt, beryllium, fluorine, sulfur.
Virtually absent: gold, arsenic, antimony, zinc, titanium, boron, bismuth.

Mariposa Red Dog:
Major: mercury.
Minor: molybdenum, iron.
Sparse: copper, beryllium, fluorine, sulfur.
Virtually absent: gold, silver, arsenic, antimony, zinc, lead, bismuth, titanium, vanadium, cobalt, boron.

The Van Ness and Red Bird Toquima (old Senator mine, Bailey and Phoenix, 1944) mercury mines are at or near the south margin of the Round Mountain granite pluton. The Outlaw prospect at the south margin of the pluton contains minor mercury. The Mariposa Red Dog prospect is in the pluton about 5 km farther west. Both the Red Bird Toquima and the Mariposa Red Dog deposits consist of quartz veins that are brecciated and filled with late-stage barite, chalcedony, and mercury minerals. The quartz vein at the Mariposa Red Dog was dated at about 83 Ma and the quartz vein at the Outlaw prospect was dated at about 81 Ma (K-Ar on muscovites, Shawe and others, 1986). The Mariposa Red Dog, Red Bird Toquima, and Van Ness mine, along with the Barcelona and Flower mines to the east, form an east-west belt of Tertiary mercury mineral deposits that are superimposed on older deposits, mostly Late Cretaceous in age.

THE SHALE PIT

Major: arsenic, vanadium.
Minor: gold, zinc, copper, molybdenum, iron.
Sparse: silver, mercury, lead, titanium, cobalt, boron, fluorine.
Virtually absent: antimony, bismuth, beryllium, sulfur.

The deposit at The Shale Pit is unique among known deposits in the southern Toquima Range in that it appears to be a Carlin-type sediment-hosted gold deposit. Host rock for the deposit is carbonaceous argillite of Ordovician age containing occult gold. An unusual galena-bearing quartz pod found near the deposit contains massive white quartz typical of nearby Cretaceous quartz veins in granite, as well as drusy quartz typical of Tertiary deposits. The deposit may have been the result of more than one mineralizing event, the galena-bearing quartz pod having been deposited in Cretaceous time and modified in the Tertiary, and the bulk of The Shale Pit deposit formed in Tertiary time. Potential may exist for deposits similar to The Shale Pit in organic-rich Ordovician argillite-carbonate strata elsewhere in the southern Toquima Range.

BALD MOUNTAIN CANYON BELT

Major: gold.
Minor: mercury.
Sparse: silver, lead, molybdenum, beryllium.
Virtually absent: arsenic, antimony, zinc, copper, bismuth, iron, titanium, vanadium, cobalt, boron, fluorine, sulfur.

In the west part of the Manhattan caldera a well-defined northwest-trending belt of small gold-quartz veins called here Bald Mountain Canyon belt is undated other than that it is younger than the 24.5-Ma ash-flow tuffs that fill the caldera. The Bald Mountain Canyon belt is similar in some respects to the Round Mountain gold-silver deposit in many element associations as well as in geologic setting. Analogous to Round Mountain, it has high-level gold-bearing quartz veins in ash-flow tuff as well as mineralized volcanic rocks. Volcanic deposits deeper in the Manhattan caldera are in part poorly consolidated ash-flow tuffs similar in character to the poorly consolidated tuff at Round Mountain, which is the major host to that immense gold-silver deposit. Potential for such a deposit may exist in the deeper parts of the Manhattan caldera beneath the Bald Mountain Canyon belt.

CONCLUSIONS: MINERALIZED SYSTEMS AND SOURCES OF TRACE ELEMENTS

Because of the unique distributions of each of the 18 elements evaluated in this study, and the common, apparently random, overlapping of the individual element distributions as well as the clear evidence that successive mineralizing events modified earlier deposits, it is difficult to define specific mineralized zones as characterized by a particular element association. Mineralized zones in the southern Toquima Range described earlier (Shawe, 1988), and based on much fewer samples than are considered in this study, coincide in general with the principal zones here defined. However, probably in large part because of the greatly increased number of samples treated in the present study, the picture now emerging is one of more complexity.

The southern Toquima Range has been subjected to recurring, discrete thermal events that took place at identifiable dates of about 90 Ma, 85 Ma, 80 Ma, 75 Ma, 55–40(?) Ma, 36 Ma, 32 Ma, 27.2 Ma, 26.7 Ma, 26.5 Ma, 26.0 Ma, 25.4 Ma, 24.5 Ma, and 16 Ma (possibly as young as about 10? Ma). Perhaps other as-yet unidentified events may have occurred. Mineralization occurred at numerous sites, some close together and others isolated. Geologic and mineralogic evidence discussed earlier supports this long and complex history of magmatic-hydrothermal activity. A question still not well understood is whether or not major mineralization took place during only a few of these events, or instead was a result of many.

The unique pattern of distribution of each of the elements evaluated in this study is perhaps the most striking aspect of the geochemistry of the area. Although many of the elements are associated in several of the mineralized zones, each also shows at least minor variation in distribution from every other element. And some of the variations are major, and striking.

Gold and silver occur together in many centers of mineralization, including Round Mountain, Jefferson district, Manhattan district (more notably in the west than in the east part of the district), Bald Mountain Canyon belt, Silver Reef, old Spanish silver belt, and Jumbo and Keystone mines. But gold is virtually absent at Belmont and at the Silver Point mine where silver is abundant. As earlier detailed, these relations lead to the conclusion that silver was introduced initially (unaccompanied by gold) in Cretaceous time in association with the granite plutons, and gold was introduced initially in the Tertiary with the advent of volcanic magmatism. Silver probably was remobilized during some of the Tertiary mineralizing events, although additional silver also may have been introduced then.

Mercury occurs with gold and silver in Jefferson district, at Silver Reef, Bald Mountain Canyon belt, and Round Mountain, and with only silver at Belmont and Silver Point. At the Flower mine mercury is abundant and gold and silver are virtually absent.

Arsenic is present with gold and silver at Round Mountain, Jefferson district, Spanish silver belt, The Shale Pit, Silver Reef prospect, and Manhattan (although absent in the west part of the district, Gold Hill mined area). It occurs with mercury at the Flower mine, where gold and silver are virtually absent, and it is absent in the Bald Mountain Canyon belt where silver, gold, and mercury all are present.

Antimony is present at the White Caps mine, Jefferson district, Belmont, Silver Point mine, Spanish silver belt, and Flower mine. It is absent at The Shale Pit, Round Mountain, and Bald Mountain Canyon belt.

Distributions of zinc and copper are quite similar, being associated mostly with the Paleozoic marine sedimentary rocks. Lead also shows a somewhat similar distribution, but its distribution is different in the sense that it is also closely associated with silver and likely related to the Cretaceous granite plutons.

Molybdenum distribution appears to be different from that of all other metals. Its association with silver and tungsten in Cretaceous quartz veins in granite, and its abundance in some Tertiary gold deposits, suggest that it may have been introduced during both Cretaceous and Tertiary mineralizing episodes.

Boron occurs commonly in or near the Cretaceous granite plutons, but it also is localized near a Tertiary intrusion in granite east of Round Mountain and it is concentrated in mineralized zones near Manhattan and near the Flower mercury mine where it may be related in part to inferred buried Tertiary intrusions. It may have been introduced during both Cretaceous and Tertiary mineralizing events.

Iron, titanium, vanadium, and cobalt are generally associated. Part of the association can be attributed to their common occurrence in rock-forming minerals in mafic rocks, but some distribution variation is evident in mineralized zones. Most notable is the very sparse occurrence of titanium at the Flower mine and in the Spanish silver belt, where the other ferrous metals are common.

The unique element associations just described could have developed in different places in the southern Toquima Range as the many successive magmatic-hydrothermal events affected different combinations of sources (magmas, leached country rocks), evolving structural framework, and varied host rocks. Conversely, the complex of mineralized zones now evident could have resulted from introduction of each element, as one or only a few impulses in a long-lasting series of events, into a complex, structurally evolving zone of varied lithologies.

The data pertaining to emplacement of the granite plutons and to subsequent mineralization associated with the plutons provide insight into a possible fundamental mineralizing process. Age data on plutons and associated mineral deposits consistently show mineralization occurring several million years following pluton emplacement. Lead-isotope data show that the lead minerals deposited in granite contain lead that is somewhat more radiogenic than do the potassium feldspars in the granite that are reflective of lead composition of the original magma. If both granite and lead minerals were derived from the same magma at depth, as seems likely, a lag of a few million years between granite emplacement and lead-mineral deposition would allow evolution of a more radiogenic lead in the magma pool before lead-mineral deposition. Thus the timing of mineralization relative to emplacement of associated igneous rocks may be significant; that is, lead may have been derived from an evolved magma pool at depth (deep crust?) rather than from the associated igneous rock. Details of chemistry of igneous rocks therefore may be misleading in respect to derivation of the elements in associated mineral deposits.

Recurring magmatic and mineralizing episodes through a long period of time in the area of the southern Toquima Range suggest a long-lasting "hot spot" in the deep crust or upper mantle causing generation of the systems.

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Appendix

Descriptions of chemically analyzed rock samples, southern Toquima Range
[G, Rock sample collected for geochemical analysis;
P, Rock sample collected for petrographic study and geochemical analysis;
RM, Round Mountain quadrangle;
M, Manhattan quadrangle;
BW, Belmont West quadrangle;
J, Jefferson quadrangle;
BE, Belmont East quadrangle;
CC, Corcoran Canyon quadrangle.

Sample locations are shown on Sheet 5

Job Number refers to the MF-2327C_data.zip file at http://pubs.usgs.gov/mf/2003/mf-2327-c
This file contains 37 dBASE files of field numbers, latitudes and longitudes, sample media,
and analytical data]

Field number	Job number	Latitude			Longitude			Description
		°	'	"	°	'	"	
DRS-67-031	N684	38	41	45	117	1	10	Granite, Round Mtn pluton (G; RM)
DRS-67-032	N685	38	41	31	117	1	17	Aplite, Round Mtn pluton (P; RM)
DRS-67-034A	N685	38	40	57	116	59	50	Aplite, Round Mtn pluton (P; J)
DRS-67-034B	N685	38	40	56	116	59	51	Granite, Round Mtn pluton (P; J)
DRS-67-036	N685	38	41	58	117	3	34	Granite, Round Mtn pluton (P; RM)
DRS-67-041	N684	38	41	7	117	4	52	Ash-flow tuff, lower unit, ash-flow member, tuff of Round Mtn (P; RM)
DRS-67-042	N685	38	40	56	117	4	21	Rhyolite ash-flow tuff fragment in megabreccia of Jefferson Canyon(?) (P; RM)
DRS-67-043	N684	38	39	5	117	0	50	Granite, Round Mtn pluton (G; RM)
DRS-67-051	N684	38	38	44	117	5	13	Andesite, middle (megabreccia) member, Round Rock Fm (P; RM)
DRS-67-052	N685	38	38	45	117	5	12	Rhyolite block in latite, middle (megabreccia) member, Round Rock Fm (P; RM)
DRS-67-053	N684	38	38	47	117	5	10	Quartz latite ash-flow tuff, middle (megabreccia) member, Round Rock Fm (P; RM)
DRS-67-054	N685	38	38	48	117	5	8	Rhyolite block in latite, middle (megabreccia) member, Round Rock Fm (P; RM)
DRS-67-070	N684	38	39	30	117	3	50	Rhyolite dike, southwest part of Round Mtn pluton (P; RM)
DRS-67-071	N684	38	39	29	117	3	50	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-67-072	N685	38	39	26	117	3	58	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-67-073	N685	38	39	24	117	4	5	Limy schist in limestone-argillite unit, Ordovician Zanzibar Fm (P; RM)
DRS-67-074	N684	38	39	36	117	4	22	Limy argillite, Ordovician Zanzibar Fm (P; RM)
DRS-67-075	N684	38	39	29	117	4	37	Quartzite, Ordovician Toquima Fm (P; RM)
DRS-67-077	N684	38	32	5	117	4	37	Quartzite, Cambrian Gold Hill Fm (G; M)
DRS-67-078	N684	38	32	3	117	2	40	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-67-079	N685	38	32	26	117	2	27	Siltite, Cambrian Gold Hill Fm (P; M)

DRS-67-080	N685	38	33	0	117	3	10	Ash-flow tuff, unit 3 of upper member, Round Rock Fm, (P; M)
DRS-67-081	N684	38	33	20	117	3	19	Volcanic sandstone, base of middle member, Diamond King Fm (P; M)
DRS-67-095	N685	38	40	43	117	4	42	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-67-096	N685	38	40	39	117	4	34	Molybdenite-bearing quartz vein in granite, Round Mtn pluton (G; RM)
DRS-67-097	N684	38	40	33	117	4	37	Granite sill intruded into Cambrian(?) Mayflower Schist from Round Mtn pluton (P; RM)
DRS-67-098	N684	38	40	26	117	4	37	Rhyolite dike in Cambrian(?) Mayflower Schist (P; RM)
DRS-67-099	N684	38	40	9	117	4	24	Rhyolite sill in Cambrian(?) Mayflower Schist (P; RM)
DRS-67-100	N684	38	40	8	117	4	23	Rhyolite sill in Cambrian(?) Mayflower Schist (P; RM)
DRS-67-101	N685	38	40	4	117	4	33	Iron-mineralized rhyolite of 36-Ma system in argillite unit of Ordovician Zanzibar Fm (G; RM)
DRS-67-109	N685	38	39	14	117	0	13	Barite-metacinnabar vein material, Red Bird Toquima mine in granite, Round Mtn pluton (G; R
DRS-67-119	N685	38	42	14	117	4	39	Altered rhyolitic ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-67-121	N684	38	31	35	117	4	20	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-67-123B	N684	38	40	30	117	4	35	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-67-125	N685	38	39	56	117	5	47	Quartzite, Ordovician Toquima Fm (P; RM)
DRS-67-126	N685	38	39	56	117	5	44	Jaspilite in argillite-limestone unit, Ordovician Toquima Fm (P; RM)
DRS-68-101	N685	38	42	57	116	59	31	Stibnite-bearing vein in chert of limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-68-111	N685	38	42	55	116	58	50	Quartz vein in altered tuff of Mount Jefferson (G; J)
DRS-68-118B	N685	38	31	55	117	2	59	Sulfide-bearing quartz vein, White Caps mine, Manhattan district (G; M)
DRS-68-120	N685	38	32	9	117	4	34	Mineralized quartzite, Gold Hill Fm (G; M)
DRS-68-121	N685	38	42	16	117	3	43	Altered granite adjacent to mineralized fault east of Fairview mine, Round Mtn district (G; RM)
DRS-68-122	N685	38	42	13	117	4	3	Chloritic vein material, Los Gazabo vein, lower unit, ash-flow tuff member, tuff of Round Mtn (G
DRS-68-123	N685	38	42	16	117	3	57	Mineralized ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-68-124	N684	38	42	14	117	3	52	Ash-flow tuff, lower unit, ash-flow member, tuff of Round Mtn (P; RM)
DRS-68-126	N685	38	42	3	117	40	0	Mineralized shear in lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-68-141	N684	38	42	15	117	4	21	Ash-flow tuff, lower unit, ash-flow member, tuff of Round Mtn (P; RM)
DRS-68-142	N685	38	42	14	117	4	20	Mineralized ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-68-143	N684	38	42	17	117	4	23	Ash-flow tuff, upper unit, ash-flow member, tuff of Round Mtn (P; RM)
DRS-68-144	N685	38	42	16	117	4	24	Silicified siltstone-sandstone, epiclastic member, tuff of Round Mtn (G; RM)
DRS-68-145	N684	38	42	20	117	4	29	Ash-flow tuff, upper unit, ash-flow member, tuff of Round Mtn (P; RM)
DRS-68-146	N685	38	42	20	117	4	31	Adularia-quartz vein in upper unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-68-147	N685	38	42	24	117	4	35	Mineralized ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-68-150	N685	38	42	5	117	4	38	Clay gouge, Automatic fault zone in lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM
DRS-68-152A	N685	38	42	33	117	4	44	Mineralized ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-68-152B	N685	38	42	34	117	4	43	Mineralized ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-69-005A	N685	38	42	20	117	3	50	Mineralized granite, Fairview mine dump, Round Mtn district (G; RM)
DRS-69-005B	N685	38	42	21	117	3	49	Mineralized schist, Cambrian(?) Mayflower Schist(?), Fairview mine dump, Round Mtn district
DRS-69-005C	N685	38	42	19	117	3	51	Mineralized quartzite, fm unknown, Fairview mine dump, Round Mtn district (G; RM)
DRS-73-011	N218	38	42	5	117	2	58	Granite, Round Mtn pluton (P; RM)
DRS-73-013	N218	38	41	53	117	2	46	Andesite dike in granite of Round Mtn pluton (P; RM)

DRS-73-014	N218	38	41	49	117	2	47	Rhyolite dike in granite of Round Mtn pluton (P; RM)
DRS-73-015	N218	38	41	46	117	3	0	Granite, Round Mtn pluton (P; RM)
DRS-73-016	N218	38	41	46	117	2	47	Granite, Round Mtn pluton (G; RM)
DRS-73-018	N218	38	41	43	117	2	24	Granite, Round Mtn pluton (G; RM)
DRS-73-020	N218	38	41	27	117	2	12	Biotite-rich inclusion in granite, Round Mtn pluton (P; RM)
DRS-73-022	N215	38	41	27	117	2	14	Granite, Round Mtn pluton (P; RM)
DRS-73-023A	N218	38	41	21	117	2	17	Granite, Round Mtn pluton (G; RM)
DRS-73-023B	N218	38	41	20	117	2	16	Granite, Round Mtn pluton (G; RM)
DRS-73-024	N218	38	41	42	117	2	29	Silicified disks (magadiite chert) in granite, Round Mtn pluton (P; RM)
DRS-73-025	N218	38	41	41	117	2	28	Granite, Round Mtn pluton (G; RM)
DRS-73-026	N218	38	41	30	117	2	3	Granite, Round Mtn pluton (G; RM)
DRS-73-029	N215	38	40	56	117	1	48	Aplite dike in granite of Round Mtn pluton (P; RM)
DRS-73-030	N218	38	40	55	117	2	0	Granite, Round Mtn pluton (P; RM)
DRS-73-031A	N218	38	40	59	117	2	14	Granite, Round Mtn pluton (G; RM)
DRS-73-031B	N218	38	40	58	117	2	13	Granite, Round Mtn pluton (G; RM)
DRS-73-032	N218	38	41	6	117	2	15	Granite, Round Mtn pluton (G; RM)
DRS-73-033	N218	38	39	27	117	3	44	Mineralized quartz veinlets in granite, Round Mtn pluton (G; RM)
DRS-73-034	N218	38	39	26	117	3	26	Granite, Round Mtn pluton (G; RM)
DRS-73-035	N215	38	39	25	117	3	25	Granite, Round Mtn pluton (P; RM)
DRS-73-037	N218	38	39	32	117	3	9	Granite, Round Mtn pluton (G; RM)
DRS-73-039	N218	38	39	8	117	3	39	Schist, Cambrian(?) Mayflower Schist (G; RM)
DRS-73-040	N218	38	38	59	117	3	14	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-73-041	N218	38	38	29	117	1	21	Porphyritic granite, Belmont pluton (P; RM)
DRS-73-047	N218	38	38	44	117	0	31	Mineralized quartz vein in granite, Round Mtn pluton (G; RM)
DRS-73-048	N218	38	38	46	117	0	14	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-73-049	N218	38	38	45	117	0	13	Mineralized quartz veinlets in granite, Round Mtn pluton (G; RM)
DRS-73-051	N218	38	38	20	117	0	52	Quartz latite ash-flow tuff, tuff of Mount Jefferson (P; RM)
DRS-73-053	N218	38	39	42	117	3	45	Biotite-rich igneous rock at schist contact with Round Mtn pluton (P; RM)
DRS-73-054	N218	38	39	46	117	3	48	Granite, Round Mtn pluton (G; RM)
DRS-73-055	N215	38	39	51	117	3	43	Rhyolite dike in granite of Round Mtn pluton (P; RM)
DRS-73-056	N218	38	40	5	117	3	28	Quartz vein in granite, Round Mtn pluton (G; RM)
DRS-73-058	N218	38	40	12	117	3	27	Granite, Round Mtn pluton (G; RM)
DRS-73-059	N218	38	39	43	117	3	48	Mineralized schist, Cambrian(?) Mayflower Schist (G; RM)
DRS-73-061	N218	38	38	55	117	3	51	Ash-flow tuff, welded ash-flow tuff unit in lower member, Round Rock Fm (P; RM)
DRS-73-062	N215	38	38	48	117	3	36	Welded ash-flow tuff unit, lower member of Round Rock Fm (P; RM)
DRS-73-064	N218	38	38	56	117	2	41	Porphyritic granite, Belmont pluton (P; RM)
DRS-73-065	N215	38	38	32	117	3	16	Ash-flow tuff, upper member, Round Rock Fm (P; RM)
DRS-73-066	N218	38	38	35	117	2	58	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-067	N218	38	38	38	117	2	44	Megabreccia of Silver Creek, upper member, Round Rock Fm (G; RM)

DRS-73-068	N218	38	38	37	117	2	43	Megabreccia of Silver Creek, upper member, Round Rock Fm (G; RM)
DRS-73-069	N215	38	38	30	117	3	6	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-070	N218	38	42	47	117	2	58	Ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-73-071	N218	38	38	26	117	2	42	Manganese oxide nodule, middle member, Diamond King Fm (G; RM)
DRS-73-072	N215	38	38	25	117	2	41	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-073	N215	38	38	41	117	2	38	Granite dike in porphyritic granite of Belmont pluton (P; RM)
DRS-73-074	N218	38	38	39	117	2	27	Flow-layered rhyolite dike in porphyritic granite of Belmont pluton (P; RM)
DRS-73-075	N218	38	38	39	117	2	24	Porphyritic granite, Belmont pluton (P; RM)
DRS-73-076	N215	38	38	9	117	3	15	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-077	N218	38	37	59	117	3	0	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-078	N218	38	37	58	117	2	42	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-079	N218	38	37	44	117	2	18	Ash tuff, upper member, Round Rock(?) Fm (P; RM)
DRS-73-080	N218	38	37	43	117	2	15	Water-laid tuff, upper member, Round Rock Fm(?) (P; RM)
DRS-73-081	N218	38	37	52	117	2	5	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-082	N215	38	37	49	117	2	1	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-083	N218	38	37	48	117	1	58	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-084	N218	38	37	57	117	2	5	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-085	N218	38	38	32	117	4	31	Volcanic sandstone at base of lower member, Diamond King Fm (P; RM)
DRS-73-086	N215	38	33	36	117	3	12	Andesite porphyry, Crone Gulch Andesite (P; M)
DRS-73-087	N215	38	33	32	117	3	36	Ash-flow tuff, middle member, Diamond King Fm (P, M)
DRS-73-088	N218	38	33	34	117	3	35	Andesite dike in middle member, Diamond King Fm (P; M)
DRS-73-089	N215	38	33	37	117	3	33	Volcanic siltstone, sandstone unit below upper member, Diamond King Fm (P; M)
DRS-73-090	N218	38	33	39	117	3	33	Ash tuff in sandstone unit, top of middle member, Diamond King Fm (P; M)
DRS-73-092	N215	38	33	56	117	3	42	Volcanic sandstone, tuffaceous lakebeds unit, Bald Mtn Fm (P; M)
DRS-73-093	N218	38	34	15	117	3	34	Conglomerate at top of tuffaceous lakebeds unit, Bald Mtn Fm (P; M)
DRS-73-094	N215	38	34	18	117	3	32	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-73-095	N215	38	37	35	117	3	59	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-096	N218	38	37	34	117	3	58	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-097	N215	38	37	29	117	2	47	Ash-flow tuff, lower member, Round Rock Fm (P; M)
DRS-73-098	N215	38	37	26	117	2	36	Rhyolite in middle (megabreccia) member, Round Rock Fm (P; M)
DRS-73-099	N215	38	37	30	117	2	28	Rhyolite in middle (megabreccia) member, Round Rock Fm (P; M)
DRS-73-100	N218	38	37	40	117	2	10	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-101	N218	38	37	51	117	3	25	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-102	N215	38	37	54	117	3	5	Ash-flow tuff, upper member, Diamond King Fm (P; RM)
DRS-73-103	N215	38	38	5	117	2	38	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-104	N218	38	38	34	117	3	29	Volcanic sandstone in upper member, Diamond King Fm (P; RM)
DRS-73-105	N218	38	38	35	117	3	29	Rhyolite in megabreccia of Silver Creek, upper member, Round Rock Fm (P; RM)
DRS-73-106	N215	38	38	41	117	3	33	Ash-flow tuff, upper member, Round Rock Fm (P; RM)
DRS-73-107	N218	38	38	10	117	1	52	Porphyritic granite, Belmont pluton (P; RM)

DRS-73-108	N215	38	37	35	117	0	52	Ash-flow tuff, upper member, Round Rock Fm (P; RM)
DRS-73-109	N215	38	37	26	117	1	8	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-73-110	N215	38	37	22	117	1	19	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-73-111	N215	38	37	36	117	1	17	Ash-flow tuff, upper member, Round Rock Fm (P; RM)
DRS-73-112	N215	38	37	36	117	1	16	Ash-flow tuff, upper member, Round Rock Fm (P; RM)
DRS-73-113	N218	38	37	37	117	1	15	Quartz latite ash-flow tuff, upper member, Round Rock Fm (P; RM)
DRS-73-114	N218	38	37	43	117	1	19	Porphyritic granite, Belmont pluton (P; RM)
DRS-73-115	N218	38	37	40	117	0	57	Ash-flow tuff clast in megabreccia of Silver Creek, upper member, Round Rock Fm (P; RM)
DRS-73-116	N215	38	37	39	117	0	50	Tuff matrix, megabreccia of Silver Creek, upper member, Round Rock Fm (P; RM)
DRS-73-117	N218	38	37	37	117	0	31	Manganese oxide nodule, upper member, Diamond King Fm (G; RM)
DRS-73-118	N215	38	37	46	117	1	13	Aplite dike in porphyritic granite of Belmont pluton (P; RM)
DRS-73-119	N218	38	37	57	117	1	32	Granite and aplite, Belmont pluton (G; RM)
DRS-73-120	N218	38	38	13	117	1	46	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-121	N218	38	38	10	117	1	23	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-123	N215	38	38	15	117	1	2	Flow-layered rhyolite dike in porphyritic granite of Belmont pluton (P; RM)
DRS-73-124	N215	38	38	19	117	0	58	Ash-flow tuff, tuff of Mount Jefferson on porphyritic granite of Belmont pluton (P; RM)
DRS-73-125	N218	38	38	20	117	0	49	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-126	N215	38	38	19	117	0	48	Porphyritic granite, Belmont pluton (P; RM)
DRS-73-127	N218	38	37	55	117	0	52	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-128	N218	38	37	58	117	0	25	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-129	N218	38	38	10	117	0	4	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-130	N218	38	38	22	117	0	22	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-131	N218	38	38	15	117	0	30	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-132	N215	38	38	42	117	1	7	Aplite dike in porphyritic granite of Belmont pluton (P; RM)
DRS-73-133	N218	38	38	47	117	0	50	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-134	N218	38	38	49	117	0	49	Schist, Cambrian(?) Mayflower Schist (G; RM)
DRS-73-135	N218	38	38	52	117	0	40	Granite, Round Mtn pluton (P; RM)
DRS-73-136	N218	38	38	52	117	0	50	Granite, Round Mtn pluton (G; RM)
DRS-73-137	N218	38	38	53	117	1	11	Quartz veins on contact, Mayflower Schist and granite of Round Mtn pluton (G; RM)
DRS-73-139B	N218	38	38	51	117	1	14	Schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-73-140	N218	38	38	48	117	1	36	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-141	N218	38	38	37	117	1	48	Porphyritic granite, Belmont pluton (G; RM)
DRS-73-142	N218	38	37	40	117	2	21	Ash tuff, upper member, Round Rock Fm (P; RM)
DRS-73-143	N218	38	41	29	117	5	27	Quartz latite tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (P; RM)
DRS-73-144	N215	38	39	2	117	5	18	Welded ash-flow tuff unit, lower member of Round Rock Fm (P; RM)
DRS-73-145	N215	38	37	43	117	1	42	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-146	N215	38	37	31	117	4	21	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-147	N218	38	37	36	117	5	3	Volcanic sandstone in lower member, Diamond King Fm (P; RM)
DRS-73-148	N215	38	37	36	117	5	6	Ash-flow tuff at top of upper member, Round Rock Fm (P; RM)

DRS-73-150	N218	38	37	32	117	5	25	Ash-flow tuff, middle member, Diamond King Fm (P; RM)
DRS-73-151	N218	38	37	36	117	5	30	Ash-flow tuff, lower member, Diamond King Fm (P; RM)
DRS-73-152	N218	38	38	8	117	4	53	Ash-flow tuff, lower member, Diamond King Fm (P; RM)
DRS-73-153	N215	38	38	37	117	4	2	Volcanic sandstone at base of middle member, Diamond King Fm (P; RM)
DRS-73-154	N215	38	38	39	117	3	34	Rhyolite fragment in middle (megabreccia) member, Round Rock Fm (P; RM)
DRS-73-155	N218	38	38	42	117	4	4	Rhyolite block in middle (megabreccia) member, Round Rock Fm (P; RM)
DRS-73-157	N215	38	38	53	117	4	32	Ash tuff, middle member, Diamond King Fm (P; RM)
DRS-73-158	N218	38	38	38	117	4	47	Volcanic sandstone at base of lower member, Diamond King Fm (P; RM)
DRS-73-159	N215	38	38	37	117	4	46	Ash-flow tuff at base of lower member, Diamond King Fm (P; RM)
DRS-73-160	N215	38	38	43	117	3	19	Ash-flow tuff, tuff of Mount Jefferson (P; RM)
DRS-73-161	N218	38	42	34	117	2	49	Brecciated granite in megabreccia of Jefferson Canyon (P; RM)
DRS-73-162	N218	38	44	43	117	1	48	Ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-73-163	N218	38	44	27	117	1	42	Jasperized limestone in argillite unit, Ordovician Zanzibar Fm (G; RM)
DRS-73-164	N218	38	42	15	117	4	41	Mineralized ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-73-165	N218	38	42	14	117	4	40	Manganese-rich Keane vein (700 level), Sunnyside mine, Round Mtn hill (G; RM)
DRS-73-166	N218	38	42	16	117	4	42	Manganese-rich Keane vein (900 level), Sunnyside mine, Round Mtn hill (G; RM)
DRS-73-167	N215	38	41	50	117	1	53	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-73-169	N215	38	40	43	117	5	12	Ash-flow tuff, basal ash-flow tuff unit, ash-flow tuff member, tuff of Round Mtn (P; RM)
DRS-73-171	N218	38	39	14	117	5	34	Gossan in silicified argillite-siltite unit, Ordovician Toquima Fm (G; RM)
DRS-73-172	N215	38	39	14	117	5	28	Thin-bedded limestone-silicified shale, silicified argillite-siltite unit(?), Toquima Fm (P; RM)
DRS-73-173	N215	38	39	17	117	5	10	Thin-bedded limestone, limestone unit, Zanzibar Fm (P; RM)
DRS-73-174	N215	38	39	16	117	5	9	Mineralized slaty argillite, argillite-limestone unit, Zanzibar Fm (G; RM)
DRS-73-175	N218	38	39	17	117	5	9	Argillitic schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-73-176	N218	38	39	14	117	4	59	Organic-rich shale in cherty limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-73-177	N218	38	39	13	117	4	58	Shale and quartz vein in cherty limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-73-178	N215	38	39	38	117	4	42	Siltite, argillite unit, Zanzibar Fm (P; RM)
DRS-73-179	N218	38	39	37	117	4	41	Quartzite, Ordovician Toquima Fm (G; RM)
DRS-73-180	N218	38	39	40	117	4	47	Rhyolite dike in cherty limestone unit, Ordovician Zanzibar Fm (P; RM)
DRS-73-181	N218	38	39	43	117	4	45	Mineralized limestone, Ordovician Zanzibar Fm (G; RM)
DRS-73-182	N218	38	39	22	117	5	27	Mineralized quartz lens in argillite-limestone unit, Ordovician Toquima Fm (G; RM)
DRS-73-183	N218	38	39	20	117	5	37	Silicified shale in argillite unit, Ordovician Toquima Fm (G; RM)
DRS-73-185	N218	38	39	0	117	4	42	Quartzite, Ordovician Toquima Fm (P; RM)
DRS-73-191	N218	38	39	12	117	4	20	Quartzite, Ordovician Toquima Fm (P; RM)
DRS-73-194	N218	38	39	3	117	4	59	Siliceous layer in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-73-195	N218	38	39	4	117	5	0	Quartz-veined jasperized limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-73-196	N215	38	39	8	117	4	55	Altered latite(?) dike (G; RM)
DRS-73-197	N215	38	39	9	117	4	47	Limy argillite, argillite-limestone unit, Zanzibar Fm (P; RM)
DRS-73-204	N218	38	39	5	117	5	16	Tremolitized limestone, argillite-limestone unit, Ordovician Zanzibar Fm (P; RM)
DRS-73-205	N218	38	39	11	117	5	6	Quartz vein in cherty limestone unit, Ordovician Zanzibar Fm (G; RM)

DRS-73-220	N218	38	39	54	117	5	4	Silicified limy siltstone layer in schist, Cambrian(?) Mayflower Schist (P; RM)
DRS-73-223	N218	38	39	56	117	4	58	Brecciated and iron-mineralized dolomite unit, Ordovician Zanzibar Fm (G; RM)
DRS-73-224A	N218	38	40	3	117	4	41	Rhyolite dike in Ordovician Zanzibar Fm (P; RM)
DRS-73-224B	N218	38	40	2	117	4	40	Rhyolite dike in Ordovician Zanzibar Fm (P; RM)
DRS-73-225	N218	38	39	5	117	2	36	Granite, Round Mtn pluton (G; RM)
DRS-73-226	N218	38	38	55	117	2	9	Porphyritic granite and vein material, Belmont pluton (G; RM)
DRS-73-228	N218	38	42	21	117	3	52	Mineralized stockwork in silicified granite(?) underlying tuff of Round Mtn (G; RM)
DRS-74-001	PC65	38	42	30	117	2	30	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-002	PC65	38	42	20	117	2	19	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-003	PC65	38	42	0	117	2	9	Mineralized rhyolite dike in granite of Round Mtn pluton (G; RM)
DRS-74-004	PC65	38	41	59	117	2	8	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-005	PC65	38	42	7	117	2	4	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-006	PC65	38	42	4	117	1	46	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-007	PC65	38	42	1	117	1	37	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-008	PC65	38	41	48	117	1	48	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-009	PC65	38	41	49	117	1	7	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-010	PC65	38	41	41	117	1	12	Greizenized granite, Round Mtn pluton (G; RM)
DRS-74-011	PC65	38	41	40	117	1	11	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-012	PC65	38	41	41	117	1	13	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-013	PC65	38	41	32	117	0	37	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-014	PC65	38	41	41	117	1	36	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-015	PC65	38	41	37	117	1	47	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-016	PC65	38	41	22	117	1	30	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-017	PC65	38	41	22	117	1	11	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-018	PC65	38	41	8	117	1	2	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-019	PC65	38	41	7	117	1	19	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-020	PC65	38	40	53	117	1	23	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-021	PC65	38	40	53	117	1	1	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-022	PC65	38	40	34	117	0	49	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-023	PC65	38	40	29	117	0	26	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-024	PC65	38	40	17	117	0	31	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-025	PC65	38	39	59	117	0	29	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-026	PC65	38	39	55	117	0	41	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-027	PC65	38	39	52	117	0	21	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-028	PC65	38	39	48	117	0	52	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-029	PC65	38	40	0	117	1	5	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-030	PC65	38	39	54	117	1	22	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-031	PC65	38	39	55	117	1	37	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-032	PC65	38	39	55	117	1	51	Iron-mineralized granite, Round Mtn pluton (G; RM)

DRS-74-033	PC65	38	39	54	117	2	10	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-034	PC65	38	39	34	117	1	59	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-035	PC65	38	39	17	117	1	53	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-036	PC65	38	39	30	117	1	39	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-037	PC65	38	39	43	117	1	21	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-038	PC65	38	39	31	117	1	11	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-039	PC65	38	39	30	117	0	43	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-040	PC65	38	39	26	117	0	17	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-041	PC71	38	39	25	117	0	16	Granite, Round Mtn pluton (P; RM)
DRS-74-042	PC65	38	39	9	117	0	9	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-043	PC65	38	38	58	117	1	7	Iron-mineralized aplite, Round Mtn pluton (G; RM)
DRS-74-044	PC65	38	39	3	117	0	57	Iron-mineralized aplite, Round Mtn pluton (G; RM)
DRS-74-045	PC65	38	39	15	117	0	12	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-051	PC65	38	40	15	117	0	51	Mineralized quartz vein and granite, Round Mtn pluton (G; RM)
DRS-74-052	PC65	38	40	19	117	1	16	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-053	PC65	38	40	47	117	0	46	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-054	PC65	38	40	49	117	0	32	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-055	PC65	38	40	59	117	0	14	Aplite dike in granite, Round Mtn pluton (G; RM)
DRS-74-056	PC65	38	41	1	117	0	44	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-057	PC65	38	42	1	117	0	8	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-058	PC65	38	41	50	117	0	0	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-059	PC65	38	41	40	116	59	50	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-74-060	PC65	38	41	24	116	59	54	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-74-061	PC65	38	41	17	117	0	13	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-062	PC65	38	41	37	117	0	31	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-063	PC72	38	41	36	117	0	30	Sericitized granite, Round Mtn pluton (G; RM)
DRS-74-064	PC65	38	41	45	117	0	31	Huebnerite-bearing quartz vein in granite, Round Mtn pluton (G; RM)
DRS-74-065	PC65	38	41	49	117	0	30	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-067	PC65	38	42	1	117	0	14	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-068	PC65	38	41	41	117	0	11	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-069	PC65	38	42	8	117	0	37	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-073	PC65	38	42	20	117	0	24	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-074	PC65	38	42	19	117	0	23	Altered rhyolite dike in granite, Round Mtn pluton (G; RM)
DRS-74-075	PC65	38	42	9	117	0	11	Mineralized quartz vein in granite, Round Mtn pluton (G; RM)
DRS-74-077	PC65	38	42	17	117	0	2	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-078	PC72	38	42	24	117	0	8	Magnetite vein in iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-081	PC65	38	42	31	117	0	19	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-082	PC65	38	42	33	117	0	5	Mineralized granite, Round Mtn pluton (G; RM)
DRS-74-083	PC65	38	42	41	117	0	8	Mineralized aplite, Round Mtn pluton (G; RM)

DRS-74-084	PC72	38	42	41	117	0	26	Tourmalinized granite, Round Mtn pluton (G; RM)
DRS-74-085	PC65	38	42	34	117	0	24	Mineralized rhyolite dike in granite of Round Mtn pluton (G; RM)
DRS-74-086	PC72	38	42	33	117	0	23	Mineralized granite, Round Mtn pluton (G; RM)
DRS-74-087	PC72	38	42	35	117	0	25	Mineralized granite, Round Mtn pluton (G; RM)
DRS-74-088	PC65	38	42	35	117	0	23	Tourmaline- and hematite-mineralized rhyolite dike in granite of Round Mtn pluton (G; RM)
DRS-74-091	PC72	38	42	34	117	0	22	Magnetite-limonite veinlets in rhyolite dike in Round Mtn pluton (G; RM)
DRS-74-094	PC71	38	42	35	117	0	19	Rhyolite dike in granite, Round Mtn pluton (P; RM)
DRS-74-095	PC72	38	42	32	117	0	33	Tourmalinized granite, Round Mtn pluton (G; RM)
DRS-74-096	PC65	38	42	32	117	0	41	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-097A	PC65	38	42	31	117	0	40	Tourmalinized granite, Round Mtn pluton (G; RM)
DRS-74-098	PC65	38	42	45	117	0	46	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-099	PC65	38	42	36	117	0	46	Tourmalinized granite, Round Mtn pluton (G; RM)
DRS-74-100	PC65	38	42	46	117	1	25	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-101	PC65	38	42	24	117	1	15	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-102A	PC65	38	42	13	117	1	13	Mineralized vein in granite, Round Mtn pluton (G; RM)
DRS-74-102B	PC65	38	42	12	117	1	12	Mineralized vein in granite, Round Mtn pluton (G; RM)
DRS-74-102C	PC71	38	42	14	117	1	15	Tourmaline-bearing greisenized granite, Round Mtn pluton (G; RM)
DRS-74-102D	PC71	38	42	14	117	1	12	Sericitized granite adjacent to vein, Round Mtn pluton (G; RM)
DRS-74-103	PC71	38	42	5	117	0	50	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-104	PC71	38	42	14	117	1	2	Tourmalinized rhyolite dike in granite, Round Mtn pluton (G; RM)
DRS-74-106	PC65	38	41	46	117	0	47	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-107	PC65	38	42	1	117	1	19	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-108	PC65	38	42	11	117	1	26	Iron-mineralized rhyolite dike in granite, Round Mtn pluton (G; RM)
DRS-74-110	PC72	38	42	46	117	2	22	Mineralized quartzite in megabreccia of Jefferson Canyon (G; RM)
DRS-74-111A	PC72	38	42	31	117	2	11	Mineralized rhyolite dike in iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-114	PC65	38	42	17	117	1	44	Iron-mineralized rhyolite dike and granite, Round Mtn pluton (G; RM)
DRS-74-115	PC71	38	42	22	117	1	42	Granodiorite of Dry Canyon (P; RM)
DRS-74-116	PC71	38	42	24	117	1	43	Andesite dike in granodiorite of Dry Canyon (P; RM)
DRS-74-117	PC71	38	42	29	117	1	48	Andesite dike in granodiorite of Dry Canyon (P; RM)
DRS-74-118	PC71	38	42	29	117	1	47	Andesite dike in granite, Round Mtn pluton (P; RM)
DRS-74-119	PC65	38	43	21	117	0	2	Mineralized quartzite, Cambrian Gold Hill Fm (G; RM)
DRS-74-120	PC65	38	43	26	117	0	0	Mineralized phyllitic schist, Cambrian Gold Hill Fm (G; RM)
DRS-74-121	PC65	38	43	32	117	0	1	Mineralized fault zone in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-122	PC65	38	43	39	117	0	13	Brecciated jasperoid in brecciated jasperized limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-123	PC65	38	43	37	117	0	26	Brecciated jasperized limestone in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-125	PC65	38	43	11	117	0	31	Mineralized rhyolite dike in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-126	PC65	38	43	10	117	0	30	Organic-rich shale adjacent to rhyolite dike in Ordovician Zanzibar Fm (G; RM)
DRS-74-127	PC65	38	43	19	117	0	43	Limestone and silicified shale in argillite unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-128	PC65	38	43	26	117	0	58	Mineralized quartz pod in argillite unit, Ordovician Zanzibar Fm (G; RM)

DRS-74-133A	PC71	38	43	22	117	1	12	Brecciated block of quartzite in black glass matrix of megabreccia of Jefferson Canyon (P; RM
DRS-74-133B	PC71	38	43	21	117	1	11	Black glass matrix of megabreccia of Jefferson Canyon (P; RM)
DRS-74-135	PC65	38	43	56	117	0	1	Mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-136	PC71	38	44	15	117	0	0	Ash-flow tuff, tuff of Mount Jefferson (P; RM)
DRS-74-137	PC65	38	44	40	117	0	7	Mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-138	PC65	38	44	28	117	0	24	Mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-139	PC71	38	44	10	117	0	25	Ash-flow tuff, tuff of Mount Jefferson (P; RM)
DRS-74-140	PC65	38	43	49	117	0	15	Mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-141	PC65	38	43	53	117	0	21	Jasperoid in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-142	PC72	38	43	59	117	0	26	Galena-bearing quartz vein, Lead-Silver King prospect (G; RM)
DRS-74-144A	PC72	38	44	56	117	0	7	Altered ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-145	PC65	38	44	51	117	0	32	Mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-146	PC65	38	44	56	117	0	57	Ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-147A	PC72	38	45	0	117	1	25	Ash-flow tuff, tuff of Mount Jefferson (P; RM)
DRS-74-149	PC65	38	44	24	117	1	3	Ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-150	PC65	38	44	10	117	0	57	Iron-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-152	PC65	38	44	6	117	0	44	Jasperoid and gossan along fault in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-153	PC72	38	43	55	117	0	29	Iron-mineralized shale, argillite unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-155	PC65	38	43	41	117	0	49	Gossan along fault in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-156	PC65	38	43	49	117	1	4	Iron-mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-158A	PC72	38	44	21	117	1	49	Iron-mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-160	PC65	38	44	55	117	2	7	Iron-mineralized ash-flow tuff, tuff of Mount Jefferson (G; RM)
DRS-74-162	PC65	38	43	9	117	0	9	Carbonaceous shale in argillaceous unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-165	PC65	38	42	44	117	0	19	Iron-mineralized quartz vein in granite, Round Mtn pluton (G; RM)
DRS-74-167A	PC72	38	43	7	117	0	42	Iron-mineralized rhyolite dike in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-170A	PC72	38	42	49	117	0	28	Iron-mineralized rhyolite dike in iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-171A	PC72	38	42	49	117	0	38	Granodiorite of Dry Canyon (P; RM)
DRS-74-171D	PC72	38	42	48	117	0	37	Calc-silicate-mineralized limestone in granodiorite of Dry Canyon (G; RM)
DRS-74-173A	PC71	38	42	53	117	0	52	Granodiorite of Dry Canyon (P; RM)
DRS-74-173B	PC71	38	42	52	117	0	51	Andesite of composite dike in granodiorite of Dry Canyon (P; RM)
DRS-74-173C	PC71	38	42	54	117	0	54	Felsic rock of composite dike in granodiorite of Dry Canyon (P; RM)
DRS-74-174	PC71	38	42	46	117	1	9	Andesite dike in granodiorite of Dry Canyon (P; RM)
DRS-74-175	PC65	38	42	38	117	1	10	Mineralized material along faulted rhyolite dike in granite, Round Mtn pluton (G; RM)
DRS-74-176	PC71	38	42	48	117	1	15	Andesite dike in granodiorite of Dry Canyon (P; RM)
DRS-74-177	PC65	38	42	35	117	1	22	Tourmalinized granite and rhyolite dike, Round Mtn pluton (G; RM)
DRS-74-178	PC71	38	42	21	117	1	17	Tourmalinized rhyolite dike in granite, Round Mtn pluton (G; RM)
DRS-74-179	PC72	38	42	27	117	1	3	Tourmalinized granite, Round Mtn pluton (G; RM)
DRS-74-180	PC72	38	42	31	117	0	53	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-182	PC65	38	42	42	117	1	33	Iron-mineralized vein in granite, Round Mtn pluton (G; RM)

DRS-74-183A	PC72	38	42	45	117	1	37	Mineralized granite at contact with granodiorite of Dry Canyon (G; RM)
DRS-74-183B	PC72	38	42	44	117	1	36	Mineralized granite at contact with granodiorite of Dry Canyon (G; RM)
DRS-74-184	PC65	38	42	31	117	1	35	Iron-mineralized and tourmalinized granite, Round Mtn pluton (G; RM)
DRS-74-185	PC72	38	42	44	117	1	50	Tourmalinized granite, Round Mtn pluton (G; RM)
DRS-74-188	PC72	38	43	2	117	1	49	Tourmalinized granite block in megabreccia of Jefferson Canyon (G; RM)
DRS-74-194	PC72	38	42	52	117	2	14	Mineralized quartz vein in iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-195	PC72	38	42	47	117	2	25	Quartzite block, Cambrian Gold Hill Fm, in megabreccia of Jefferson Canyon (G; RM)
DRS-74-197	PC65	38	40	57	117	1	46	Iron-mineralized aplite-pegmatite dikes in granite, Round Mtn pluton (G; RM)
DRS-74-198	PC65	38	41	19	117	1	59	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-199	PC65	38	41	39	117	2	15	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-200	PC72	38	41	49	117	2	8	Huebnerite-bearing quartz vein in iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-201	PC65	38	42	34	117	3	10	Iron-mineralized granite and ash-flow tuff in megabreccia of Jefferson Canyon (G; RM)
DRS-74-203	PC65	38	42	38	117	3	27	Iron-mineralized quartzite of Cambrian Gold Hill Fm in megabreccia of Jefferson Canyon (G; R
DRS-74-204	PC71	38	41	42	117	3	54	Ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-74-205	PC65	38	41	18	117	3	0	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-206	PC65	38	41	6	117	2	45	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-207	PC71	38	41	10	117	3	19	Rhyolite dike in granite, Round Mtn pluton (P; RM)
DRS-74-208	PC65	38	41	12	117	3	33	Granite, Round Mtn pluton (P; RM)
DRS-74-209	PC65	38	40	54	117	3	22	Granite, Round Mtn pluton (P; RM)
DRS-74-210	PC65	38	40	32	117	3	4	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-211	PC65	38	40	11	117	2	46	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-212	PC65	38	40	14	117	2	23	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-213	PC65	38	40	33	117	2	39	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-214	PC65	38	40	44	117	2	48	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-215	PC71	38	40	50	117	2	48	Andesite plug in granite, Round Mtn pluton (P; RM)
DRS-74-216	PC65	38	40	58	117	2	54	Granite, Round Mtn pluton (P; RM)
DRS-74-217	PC65	38	40	20	117	2	5	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-220	PC65	38	40	27	117	1	46	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-221	PC72	38	40	21	117	1	40	Mineralized quartz vein in iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-222	PC65	38	40	41	117	1	32	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-223	PC65	38	40	46	117	1	59	Granite, Round Mtn pluton (P; RM)
DRS-74-225	PC65	38	41	56	117	4	5	Ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (P; RM)
DRS-74-226	PC71	38	41	29	117	4	5	Ash-flow tuff, lower unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-74-227	PC65	38	41	26	117	3	55	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-228	PC65	38	40	38	117	3	31	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-230	PC65	38	40	26	117	3	43	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-231	PC65	38	40	40	117	3	51	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-232	PC65	38	40	58	117	3	53	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-233	PC65	38	40	28	117	3	52	Iron-mineralized granite, Round Mtn pluton (G; RM)

DRS-74-235	PC65	38	40	46	117	4	3	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-236	PC72	38	40	46	117	4	33	Granite and rhyolite fragments in megabreccia of Jefferson Canyon (P; RM)
DRS-74-237A	PC65	38	40	45	117	4	30	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-237B	PC65	38	40	44	117	4	29	Molybdenite-bearing quartz vein in granite, Round Mtn pluton (G; RM)
DRS-74-238	PC65	38	40	35	117	4	21	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-239	PC65	38	40	22	117	4	14	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-240	PC65	38	40	20	117	3	45	Gossan in vein in granite, Round Mtn pluton (G; RM)
DRS-74-241	PC71	38	40	4	117	3	44	Andesite dike in granite, Round Mtn pluton (P; RM)
DRS-74-242	PC65	38	40	1	117	3	55	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-244	PC65	38	39	13	117	2	50	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-245	PC65	38	39	27	117	2	40	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-246	PC65	38	39	33	117	2	30	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-247	PC65	38	39	35	117	2	25	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-248	PC65	38	39	43	117	2	51	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-251	PC65	38	39	15	117	3	7	Quartz and pegmatite veinlets in granite, Round Mtn pluton (G; RM)
DRS-74-252A	PC72	38	39	4	117	3	11	Mineralized quartz vein in granite, Round Mtn pluton (G; RM)
DRS-74-252B	PC72	38	39	5	117	3	10	Mineralized quartz vein in granite, Round Mtn pluton (G; RM)
DRS-74-254	PC71	38	37	35	117	1	31	Ash-flow tuff, upper member, Round Rock Fm (P; RM)
DRS-74-255	PC72	38	40	31	117	5	2	Altered rock in limestone-argillite unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-258	PC65	38	40	36	117	4	5	Iron-mineralized granite, Round Mtn pluton (G; RM)
DRS-74-259	PC71	38	39	55	117	4	8	Granite, Round Mtn pluton (P; RM)
DRS-74-260A	PC65	38	40	2	117	4	11	Mineralized quartz vein in granite, Round Mtn pluton (G; RM)
DRS-74-262	PC65	38	41	37	117	3	12	Mineralized quartz veins in granite, Round Mtn pluton (G; RM)
DRS-74-265	PC65	38	42	44	116	58	35	Mineralized quartz vein in ash-flow tuff, tuff of Mount Jefferson (G; J)
DRS-74-271	PC65	38	40	33	117	4	45	Iron-mineralized phyllitic argillite in argillite unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-272	PC65	38	40	33	117	4	47	Organic-rich silty limestone in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-275	PC65	38	40	36	117	4	57	Iron-mineralized silicified limestone in limestone unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-276A	PC65	38	40	38	117	4	57	Quartz veinlets in argillite below thrust fault, Ordovician Zanzibar Fm, The Shale Pit mine (G; R
DRS-74-276B	PC65	38	40	39	117	4	56	Gouge along thrust fault, The Shale Pit mine (G; RM)
DRS-74-276C	PC65	38	40	37	117	4	59	Mineralized limestone above thrust fault, Ordovician Zanzibar Fm, The Shale Pit mine (G; RM
DRS-74-277	PC65	38	40	42	117	4	50	Iron-mineralized limy shale, argillite unit, Ordovician Zanzibar Fm (G; RM)
DRS-74-278A	PC65	38	40	15	117	5	22	Mineralized vein material from thrust fault, Silver Point mine area (G; RM)
DRS-74-279	PC65	38	40	17	117	5	26	Mineralized vein material from thrust fault, Silver Point mine (G; RM)
DRS-74-282	PC72	38	40	44	117	4	58	Mineralized ash-flow tuff, basal unit, ash-flow tuff member, tuff of Round Mtn (G; RM)
DRS-75-001	PQ86	38	35	14	117	3	19	Ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-75-002	PQ86	38	35	15	117	3	35	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-75-003	PQ86	38	35	3	117	3	28	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-75-004	PQ86	38	35	15	117	3	23	Ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-75-005	PQ86	38	35	18	117	3	16	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)

DRS-75-006	PQ86	38	35	17	117	3	10	Tuffaceous sandstone, float from higher middle member, Diamond King Fm (P; M)
DRS-75-007	PQ86	38	35	18	117	3	8	Ash-flow tuff, float from higher middle member, Diamond King Fm (P; M)
DRS-75-008A	PQ86	38	35	16	117	3	0	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-75-009	PQ86	38	37	19	117	0	45	Ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-75-010	PQ86	38	37	25	117	0	27	Mineralized tuffaceous sandstone underlying middle member, Diamond King Fm (G; M)
DRS-75-011	PQ86	38	37	20	117	0	20	Ash-flow tuff matrix, megabreccia of Silver Creek, upper member, Round Rock Fm (P; M)
DRS-75-012	PQ86	38	37	24	117	0	21	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-75-013	PQ86	38	37	14	117	0	3	Porphyritic granite, Belmont pluton (P; M)
DRS-75-014B	PQ86	38	37	11	117	0	9	Matrix of rhyolite megabreccia unit, upper member, Round Rock Fm (P; M)
DRS-75-015	PQ86	38	37	29	117	0	37	Ash-flow tuff, upper member, Diamond King Fm (P; M)
DRS-75-016A	PQ86	38	37	17	117	4	23	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-75-016B	PQ86	38	37	18	117	4	24	Ash-flow tuff, upper member, Diamond King Fm (P; M)
DRS-75-017	PQ86	38	36	50	117	4	3	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-75-018	PQ86	38	36	50	117	3	56	Andesite in small plug of Crone Gulch Andesite (P; M)
DRS-75-019	PQ86	38	36	45	117	3	45	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-75-020	PQ86	38	36	44	117	3	33	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-75-021A	PQ86	38	37	1	117	3	24	Altered ash-flow tuff, welded tuff unit, lower member, Round Rock Fm (P; M)
DRS-75-021B	PQ86	38	37	0	117	3	25	Vitrophyre fragment in welded tuff unit, lower member, Round Rock Fm (P; M)
DRS-75-022	PQ86	38	37	1	117	3	6	Rhyolite flow breccia, middle (megabreccia) member, Round Rock Fm (P; M)
DRS-75-023	PQ86	38	36	51	117	3	7	Andesite mass in heterogeneous rhyolite, middle (megabreccia) member, Round Rock Fm (P;
DRS-75-024	PQ86	38	36	44	117	3	9	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-75-032	PQ86	38	36	31	117	4	3	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-75-033A	PQ86	38	36	14	117	4	18	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-75-033B	PQ86	38	36	15	117	4	17	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-75-034	PQ86	38	36	11	117	3	40	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-75-035	PQ86	38	36	12	117	3	34	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-75-036	PQ86	38	36	6	117	2	58	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-75-037	PQ86	38	37	13	117	3	0	Ash-flow tuff, welded tuff unit, lower member, Round Rock Fm (P; M)
DRS-75-038	PQ86	38	36	34	117	3	1	Ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-75-039	PQ86	38	36	19	117	2	31	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-75-040	PQ86	38	36	4	117	1	56	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-75-041	PQ86	38	36	34	117	2	20	Ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-75-042	PQ86	38	37	4	117	2	44	Iron-mineralized ash-flow tuff, welded tuff unit, lower member, Round Rock Fm (G; M)
DRS-75-043	PQ86	38	37	5	117	2	50	Iron-mineralized ash-flow tuff, welded tuff unit, lower member, Round Rock Fm (G; M)
DRS-75-044	PQ86	38	37	1	117	2	39	Rhyolite fragment in middle (megabreccia) member, Round Rock Fm (P; M)
DRS-75-045	PQ86	38	36	38	117	2	0	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-75-046	PQ86	38	36	41	117	1	54	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-75-047A	PQ86	38	36	38	117	1	25	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-75-047B	PQ86	38	36	37	117	1	26	Granite, rhyolite fragments in ash-flow tuff, lower member, tuff of The Bald Sister (P; M)

DRS-75-048	PQ86	38	36	39	117	1	23	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-75-049	PQ86	38	36	39	117	1	15	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-75-050	PQ86	38	36	51	117	1	24	Andesite in small plug of Crone Gulch Andesite (P; M)
DRS-75-051	PQ86	38	36	58	117	2	0	Ash-flow tuff, upper member, Diamond King Fm (P; M)
DRS-75-052	PQ86	38	37	23	117	1	20	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-75-053A	PQ86	38	37	23	117	1	20	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-75-053B	PQ86	38	37	22	117	1	21	Tuffaceous sandstone, base of middle member, Diamond King Fm (P; M)
DRS-75-054	PQ86	38	37	13	117	1	18	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-75-055A	PQ86	38	36	56	117	1	19	Sandstone-siltstone in sandstone unit, Bald Mtn Fm (P; M)
DRS-75-056	PQ86	38	36	54	117	1	9	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-75-057	PQ86	38	36	40	117	1	4	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-76-012	PV92	38	35	28	117	1	43	Iron-mineralized siltstone, lakebeds unit, Bald Mtn Fm (G; M)
DRS-76-014	PV90	38	35	19	117	1	30	Andesite in sill of Crone Gulch Andesite (P; M)
DRS-76-017	PV90	38	34	52	117	1	38	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-76-018	PV90	38	34	46	117	1	39	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-76-019	PV90	38	34	43	117	1	39	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-76-020	PV92	38	34	41	117	1	37	Iron-mineralized ash-flow tuff, upper member, tuff of The Bald Sister (G; M)
DRS-76-021	PV90	38	34	39	117	1	48	Ash-flow tuff, upper member, tuff of The Bald Sister (P; M)
DRS-76-022	PV92	38	34	49	117	2	7	Iron-mineralized ash-flow tuff, upper member, tuff of The Bald Sister (G; M)
DRS-76-023	PV90	38	34	44	117	2	20	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-76-024	PV92	38	34	45	117	2	21	Iron-mineralized ash-flow tuff, lower member, tuff of The Bald Sister (G; M)
DRS-76-025	PV91	38	34	50	117	2	31	Andesite in small andesite plug of Crone Gulch Andesite (P; M)
DRS-76-026	PV90	38	35	1	117	2	35	Andesite in sill of Crone Gulch Andesite (P; M)
DRS-76-027	PV90	38	35	18	117	1	51	Andesite in sill of Crone Gulch Andesite (P; M)
DRS-76-028	PV91	38	35	30	117	1	13	Ash-flow tuff, upper member, Diamond King Fm (P; M)
DRS-76-029	PV92	38	35	36	117	1	27	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-030	PV91	38	35	47	177	1	41	Ash-flow tuff, upper member, Diamond King Fm (P; M)
DRS-76-031	PV92	38	36	0	117	1	6	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-033	PV92	38	35	58	117	0	40	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-034	PV90	38	35	38	117	0	51	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-76-035	PV92	38	35	31	117	0	24	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-76-036	PV91	38	35	17	117	0	56	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-76-037	PV92	38	35	14	117	1	14	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-038	PV92	38	35	10	117	1	19	Altered andesite in sill, Crone Gulch Andesite (G; M)
DRS-76-039	PV92	38	34	54	117	1	4	Altered andesite in sill, Crone Gulch Andesite (G; M)
DRS-76-040	PV92	38	35	46	117	1	50	Iron-mineralized andesite and quartz veinlets in sill, Crone Gulch Andesite (G; M)
DRS-76-041	PV91	38	36	8	117	1	31	Tuffaceous sandstone, sandstone unit, Bald Mtn Fm (P; M)
DRS-76-042	PV91	38	36	6	117	1	33	Tuffaceous sandstone, lakebeds unit, Bald Mtn Fm (P; M)
DRS-76-043	PV91	38	35	48	117	0	34	Ash-flow tuff, upper member, Round Rock Fm (P; M)

DRS-76-044	PV90	38	35	33	117	0	36	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-76-045	PV92	38	35	58	117	0	21	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-76-046	PV91	38	34	55	117	0	7	Ash-flow tuff, upper member, Diamond King Fm (P; M)
DRS-76-047	PV90	38	35	0	117	1	1	Tuffaceous sandstone of lakebeds unit, Bald Mtn Fm (P; M)
DRS-76-048	PV92	38	34	44	117	0	57	Altered ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-049	PV92	38	34	32	117	0	41	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-051	PV92	38	36	12	117	0	25	Rhyolite clast in rhyolite megabreccia, upper member, Round Rock Fm (P; M)
DRS-76-052	PV90	38	36	33	117	0	11	Tuffaceous sandstone at base of middle member, Diamond King Fm (P; M)
DRS-76-053	PV91	38	36	34	117	0	10	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-76-055	PV92	38	37	6	117	0	9	Iron-mineralized brecciated rhyolite in megabreccia, upper member, Round Rock Fm (G; M)
DRS-76-056	PV92	38	37	8	117	0	16	Iron-rich nodule in ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-057	PV92	38	36	48	117	0	37	Iron- and quartz-mineralized andesite in small plug(?), Crone Gulch Andesite (G; M)
DRS-76-058	PV91	38	36	40	117	0	31	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-76-070	PV92	38	37	8	117	0	14	Manganese-oxide-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-071	PV92	38	37	4	117	0	41	Manganese-oxide nodule in ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-072	PV92	38	36	23	117	0	37	Mineralized fractures in ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-073	PV92	38	36	25	117	0	59	Mineralized andesite in sill, Crone Gulch Andesite (G; M)
DRS-76-074	PV92	38	36	29	117	1	30	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-076	PV90	38	34	32	117	1	4	Andesite in sill of Crone Gulch Andesite (P; M)
DRS-76-078	PV91	38	34	24	117	1	14	Tuffaceous sandstone, lakebeds unit, Bald Mtn Fm (P; M)
DRS-76-079	PV91	38	34	20	117	1	14	Ash-flow tuff, thin layer in lakebeds unit, Bald Mtn Fm (P; M)
DRS-76-080	PV91	38	37	18	117	1	56	Ash-flow tuff, upper member, Diamond King Fm (P; M)
DRS-76-081	PV90	38	36	34	117	3	15	Andesite in middle (megabreccia) member, Round Rock Fm (P; M)
DRS-76-083	PV92	38	37	18	117	3	35	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-084	PV90	38	37	24	117	3	54	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-76-085	PV92	38	37	22	117	3	59	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-086	PV91	38	37	17	117	4	0	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-76-087	PV90	38	37	11	117	4	12	Andesite in small plug, Crone Gulch Andesite (P; M)
DRS-76-088	PV92	38	37	12	117	4	20	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-089	PV90	38	37	8	117	4	25	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-76-090	PV92	38	36	54	117	4	16	Iron-mineralized ash-flow tuff, lower member, tuff of The Bald Sister (G; M)
DRS-76-091	PV92	38	37	0	117	4	36	Iron-mineralized shale in breccia at detachment fault (G; M)
DRS-76-092	PV92	38	37	11	117	4	44	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-093	PV91	38	36	23	117	5	45	Ash-flow tuff, middle member, Diamond King Fm (P; M)
DRS-76-094	PV91	38	36	22	117	5	2	Ash-flow tuff, upper member (baked near basalt dike), Diamond King Fm (P; M)
DRS-76-095	PV90	38	36	20	117	5	0	Basalt in Miocene(?) basalt dike (P; M)
DRS-76-096	PV90	38	36	20	117	4	59	Ash-flow tuff, lower member, tuff of The Bald Sister (P; M)
DRS-76-097	PV91	38	36	19	117	4	58	Ash tuff layer in lakebeds unit (baked near basalt dike) Bald Mtn Fm (P; M)
DRS-76-098	PV92	38	36	26	117	4	56	Iron-mineralized ash-flow tuff, lower member, tuff of The Bald Sister (G; M)

DRS-76-100	PV92	38	36	14	117	4	36	Mineralized andesite in small plug, Crone Gulch Andesite (G; M)
DRS-76-101	PV92	38	36	39	117	4	51	Mineralized ash-flow tuff, middle member Diamond King Fm (G; M)
DRS-76-102	PV92	38	37	17	117	5	15	Manganese oxide nodule in ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-104	PV92	38	36	45	117	7	2	Iron-mineralized ash-flow tuff, lower member, Round Rock Fm (G; M)
DRS-76-105	PV92	38	36	22	117	5	57	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-106	PV92	38	36	14	117	6	14	Iron- and manganese-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-76-108	PV92	38	36	10	117	6	30	Iron-mineralized dacite in dike, dacite of Ferguson Hill (G; M)
DRS-76-109	PV91	38	35	54	117	6	21	Dacite dike, dacite of Ferguson Hill (P; M)
DRS-76-110	PV91	38	35	53	117	6	30	Ash-flow tuff, upper member, Round Rock Fm (P; M)
DRS-76-111	PV92	38	35	37	117	2	46	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-76-113	PV91	38	35	22	117	2	30	Ash tuff breccia, ash tuff unit(?), Bald Mtn Fm (P; M)
DRS-77-020	QC93	38	36	5	117	5	54	Mineralized quartz veinlet in ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-77-021	QC93	38	35	47	117	5	48	Mineralized brecciated ash-flow tuff, upper member, Diamond King Fm(?) (G; M)
DRS-77-022	RK59	38	35	39	117	5	46	Dacite(?), dacite of Ferguson Hill (P; M)
DRS-77-025	QC93	38	35	21	117	5	51	Iron-mineralized flow-layered dacite, dacite of Ferguson Hill (G; M)
DRS-77-027	QC93	38	35	7	117	5	58	Iron-mineralized flow-layered dacite, dacite of Ferguson Hill (G; M)
DRS-77-029	QC93	38	34	49	117	5	43	Iron-mineralized flow-layered dacite, dacite of Ferguson Hill (G; M)
DRS-77-031	QC93	38	35	57	117	5	43	Iron- and quartz-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-77-032	QC93	38	36	4	117	5	45	Mineralized quartz veinlets in ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-77-033	QC93	38	35	51	117	5	23	Mineralized quartz veinlets in ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-77-036	QC93	38	35	46	117	5	30	Mineralized brecciated zone along detachment fault north of Ferguson Hill (G; M)
DRS-77-037	QC93	38	35	18	117	4	23	Iron- and quartz-mineralized tuffaceous sandstone, sandstone unit, Bald Mtn Fm (G; M)
DRS-77-039	QC93	38	35	29	117	4	36	Iron- and quartz-mineralized fractures in sandstone unit, Bald Mtn Fm (G; M)
DRS-77-042	QC93	38	36	2	117	5	6	Iron- and quartz-mineralized fractures in ash-flow tuff, upper member, Diamond King Fm (G; M
DRS-77-045	QC93	38	35	42	117	4	2	Iron- and quartz-mineralized ash-flow tuff, lower member, Round Rock Fm (G; M)
DRS-77-047	QC93	38	35	30	117	3	39	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-048	QC93	38	35	26	117	3	38	Iron- and quartz-mineralized vein in ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-051	QC93	38	34	35	117	3	0	Fluorite-bearing quartz vein in andesite sill, Crone Gulch Andesite (G; M)
DRS-77-053	QC93	38	35	44	117	5	19	Iron- and quartz-mineralized vein in tuffaceous rock, sandstone unit(?), Bald Mtn Fm (G; M)
DRS-77-054	QC93	38	34	52	117	5	12	Iron-mineralized flow-layered dacite, dacite of Ferguson Hill (G; M)
DRS-77-055	RK59	38	34	51	117	5	11	Flow-layered dacitic(?) glass, dacite of Ferguson Hill (P; M)
DRS-77-057	QC93	38	35	2	117	4	13	Mineralized fractures in ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-77-058	QC93	38	34	49	117	3	56	Mineralized rock from shaft penetrating through Bald Mtn Fm into Diamond King Fm (G; M)
DRS-77-060	QC93	38	34	28	117	3	29	Mineralized ash-flow tuff, lower member, tuff of The Bald Sister (G; M)
DRS-77-061	QC93	38	33	50	117	3	40	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-77-062	QC93	38	33	47	117	3	16	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-77-063	QC93	38	35	26	117	3	55	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-066	QC93	38	34	49	117	5	27	Iron-mineralized joints in dacite, dacite of Ferguson Hill (G; M)
DRS-77-067	QC93	38	34	45	117	5	42	Iron-mineralized joints in dacite, dacite of Ferguson Hill (G; M)

DRS-77-070	QC93	38	35	50	117	7	0	Iron-mineralized tuffaceous sandstone, lakebeds unit, Bald Mtn Fm (G; M)
DRS-77-072	QC93	38	35	34	117	6	53	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-076	QC93	38	35	18	117	6	13	Iron-mineralized flow-layered dacite, dacite of Ferguson Hill (G; M)
DRS-77-078	QC93	38	35	54	117	6	6	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; M)
DRS-77-084	QC93	38	34	53	117	4	28	Iron-mineralized tuffaceous siltstone, lakebeds unit, Bald Mtn Fm (G; M)
DRS-77-085	RK59	38	34	42	117	7	27	Dacite(?), dacite of Ferguson Hill (P; M)
DRS-77-088	QC93	38	33	38	117	7	30	Iron-mineralized silicified shale, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-77-090	QC93	38	33	36	117	7	25	Mineralized rock along Manhattan fault between Round Rock and Cambrian Harkless Fms (G
DRS-77-091	QC93	38	33	36	117	7	19	Iron-mineralized brecciated argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-77-093	QC93	38	34	5	117	7	18	Iron-mineralized ash-flow tuff block in middle (megabreccia) member, Round Rock Fm (G; M)
DRS-77-097	QC93	38	33	26	117	6	55	Iron-mineralized quartzitic sandstone, sandstone unit, Cambrian Harkless Fm (G; M)
DRS-77-098	QC93	38	33	39	117	6	52	Altered rhyolite, middle (megabreccia) member, Round Rock Fm (G; M)
DRS-77-099	QC93	38	33	39	117	6	53	Iron-mineralized rhyolite, middle (megabreccia) member, Round Rock Fm (G; M)
DRS-77-101	QC93	38	33	22	117	6	31	Iron-mineralized sandstone and quartz vein in sandstone unit, Cambrian Harkless Fm (G; M)
DRS-77-103	QC93	38	33	19	117	6	12	Iron-mineralized sandstone block in megabreccia of Sloppy Gulch, Round Mtn Fm (G; M)
DRS-77-107	QC94	38	33	17	117	6	17	Jasperized argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-77-108	QS96	38	33	9	117	5	43	Rhyolite block in middle (megabreccia) member, Round Rock Fm (P; M)
DRS-77-112	QC94	38	33	4	117	4	54	Mineralized argillite in megabreccia of Sloppy Gulch, Round Rock Fm (G; M)
DRS-77-114	QC94	38	33	2	117	4	6	Iron-mineralized brecciated argillite in megabreccia of Sloppy Gulch, Round Rock Fm (G; M)
DRS-77-116	QC94	38	32	9	117	1	2	Mineralized ash tuff and Paleozoic rocks in megabreccia of Sloppy Gulch, Round Rock Fm (G
DRS-77-118	QC94	38	31	59	117	1	13	Iron- and quartz-mineralized argillite, argillite unit, Ordovician Toquima Fm (G; M)
DRS-77-119	QC94	38	31	31	117	0	34	Iron-mineralized silty limestone, limestone unit, Ordovician Toquima Fm (G; M)
DRS-77-120	QC94	38	31	46	117	0	28	Mineralized Paleozoic rocks in megabreccia of Sloppy Gulch, Round Rock Fm (G; M)
DRS-77-122B	QC94	38	31	45	116	59	59	Mineralized brecciated limestone, limestone-argillite unit, Ordovician Toquima Fm (G; BW)
DRS-77-124	QC94	38	32	32	117	0	17	Iron- and quartz-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-126	QC94	38	33	23	117	0	13	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-130	QC94	38	35	45	117	0	1	Iron-mineralized ash-flow tuff, lower member, tuff of The Bald Sister (G; M)
DRS-77-135	QC94	38	35	5	117	0	1	Iron-mineralized ash-flow tuff, lower member, tuff of The Bald Sister (G; M)
DRS-77-136	QC94	38	33	5	117	2	33	Iron-mineralized andesite dike, Crone Gulch Andesite (G; M)
DRS-77-139	QC94	38	33	39	117	2	18	Iron-mineralized calcite pod in andesite, Crone Gulch Andesite (G; M)
DRS-77-140	QC94	38	33	42	117	2	1	Mineralized brecciated andesite, Crone Gulch Andesite (G; M)
DRS-77-141	QC94	38	33	40	117	1	30	Mineralized quartz vein in andesite, Crone Gulch Andesite (G; M)
DRS-77-152	QC94	38	32	42	117	1	9	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-155	QC94	38	33	22	117	1	7	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; M)
DRS-77-158	QC94	38	32	40	117	1	33	Mineralized fault in ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-159	QC94	38	32	41	117	1	34	Iron- and quartz-mineralized ash-flow tuff at Fletcher mine, upper member, Round Rock Fm (G
DRS-77-163	QC94	38	32	47	117	2	14	Mineralized ash-flow tuff along fault between upper and lower members, Round Rock Fm (G;
DRS-77-165A	QC94	38	32	27	117	1	25	Iron- and quartz-mineralized ash-flow tuff along fault in upper member, Round Rock Fm (G; M
DRS-77-166	QC94	38	32	14	117	1	27	Iron-mineralized feldspar vein in quartzite unit, Ordovician Toquima Fm (G; M)

DRS-77-167	QC94	38	32	4	117	1	34	Iron-mineralized argillite, argillite unit, Ordovician Toquima Fm (G; M)
DRS-77-168B	QC94	38	32	20	117	1	47	Mineralized limestone, calc-silicate-mineralized limestone unit, Ordovician Toquima Fm (G; M)
DRS-77-169	QC94	38	32	21	117	1	46	Mineralized limestone, calc-silicate-mineralized limestone unit, Ordovician Toquima Fm (G; M)
DRS-77-170	QC94	38	32	24	117	1	39	Mineralized limestone, calc-silicate-mineralized limestone unit, Ordovician Toquima Fm (G; M)
DRS-77-172	QC94	38	32	28	117	2	5	Huebnerite-bearing quartz vein in limestone, limestone unit, Ordovician Toquima Fm (G; M)
DRS-77-173	RK59	38	32	30	117	2	12	Aplite dike in limestone, limestone unit, Ordovician Toquima Fm (P; M)
DRS-77-175	QC94	38	32	12	117	2	1	Iron-mineralized silicified argillite, argillite unit, Ordovician Toquima Fm (G; M)
DRS-77-176	RK59	38	32	18	117	2	15	Calc-silicate-mineralized limestone, limestone unit, Ordovician Toquima Fm (P; M)
DRS-77-178A	RK59	38	34	15	117	3	1	Andesite in rhyolite-andesite composite plug (P; M)
DRS-77-178B	RK59	38	34	14	117	3	1	Rhyolite in rhyolite-andesite composite plug (P; M)
DRS-77-179	QC94	38	34	31	117	2	55	Mineralized sandstone, lakebeds unit, Bald Mtn Fm (G; M)
DRS-77-180	QC94	38	34	28	117	3	8	Mineralized quartz vein in andesite sill, Crone Gulch Andesite (G; M)
DRS-77-181	QC94	38	33	9	117	2	45	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-182	QC94	38	32	31	117	2	57	Iron-mineralized limestone in brecciated block in megabreccia of Sloppy Gulch, Round Rock F
DRS-77-183C	QC94	38	32	16	117	2	51	Mineralized pegmatitic quartz vein in limestone unit, Ordovician Zanzibar(?) Fm (G; M)
DRS-77-184	QC94	38	32	20	117	2	43	Iron-mineralized argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-77-186	QC94	38	32	43	117	2	36	Iron-mineralized ash-flow tuff, upper member, Round Rock Fm (G; M)
DRS-77-187A	QC94	38	32	41	117	2	55	Gossan on fault in ash-flow tuff, between upper and lower members, Round Rock Fm (G; M)
DRS-77-187B	QC94	38	32	40	117	2	54	Mineralized rock mined from fault between upper and lower members, Round Rock Fm (G; M)
DRS-77-188	QC94	38	32	30	117	4	21	Iron-mineralized argillite fragment in megabreccia of Sloppy Gulch, Round Rock Fm (G; M)
DRS-77-189	QC95	38	32	36	117	4	2	Iron-mineralized argillite fragment in megabreccia of Sloppy Gulch, Round Rock Fm (G; M)
DRS-77-190	QC95	38	32	38	117	4	1	Sulfide-rich argillite fragment in megabreccia of Sloppy Gulch, Round Rock Fm (G; M)
DRS-77-191	QC95	38	32	23	117	3	51	Iron-mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-77-192	QC95	38	32	21	117	4	1	Mineralized limestone, limestone unit (White Caps unit), Cambrian Gold Hill Fm (G; M)
DRS-77-194	QC95	38	33	6	117	3	50	Mineralized brecciated argillite in breccia unit, upper member, Round Rock Fm (G; M)
DRS-77-195	QC95	38	32	32	117	4	53	Mineralized limestone (and quartzite of Gold Hill?), limestone unit, Ordovician Zanzibar Fm (G
DRS-77-196	QC95	38	32	30	117	4	45	Mineralized dolostone of limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-77-197	QC95	38	32	41	117	4	38	Gossan in mineralized brecciated argillite, megabreccia of Sloppy Gulch, Round Rock Fm (G;
DRS-77-200	QC95	38	33	7	117	5	22	Iron- and quartz-mineralized argillite block, megabreccia of Sloppy Gulch, Round Rock Fm (G
DRS-77-201	QC95	38	32	59	117	5	39	Mineralized argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-77-202	QC95	38	35	33	117	2	0	Mineralized quartz pebble in granite-boulder tuff unit, tuff of The Bald Sister (G; M)
DRS-77-204	QC95	38	35	11	117	1	44	Iron-mineralized granite in granite-boulder tuff unit, tuff of The Bald Sister (G; M)
DRS-78-004	QH32	38	33	23	117	7	8	Iron-mineralized silicified sandstone, sandstone unit, Cambrian Harkless Fm (G; M)
DRS-78-006B	QH32	38	33	22	117	7	29	Iron-mineralized argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-78-007	QH32	38	33	2	117	7	19	Iron- and quartz-mineralized aplite dike(?) in schist unit, Cambrian Harkless Fm (G; M)
DRS-78-009A	QH32	38	32	38	117	7	25	Iron- and quartz-mineralized argillite, schist unit, Cambrian Harkless Fm (G; M)
DRS-78-010A	QH32	38	32	51	117	7	13	Mineralized phyllitic argillite, schist unit, Cambrian Harkless Fm (G; M)
DRS-78-010B	QH32	38	32	50	117	7	14	Iron-mineralized phyllitic argillite, schist unit, Cambrian Harkless Fm (G; M)
DRS-78-011C	QH32	38	33	23	117	7	17	Iron- and quartz-mineralized aplite dike(?) in argillite unit, Cambrian Harkless Fm (G; M)

DRS-78-012	QH32	38	33	10	117	6	53	Pyrite-rich quartz vein in argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-014A	QH32	38	32	56	117	6	29	Pyrite-rich quartzite in small klippe of Ordovician Toquima Fm (G; M)
DRS-78-017	QH32	38	32	57	117	6	57	Mineralized phyllitic argillite, schist unit, Cambrian Harkless Fm (G; M)
DRS-78-019	QH32	38	32	43	117	6	45	Mineralized silicified argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-78-020C	QH32	38	30	40	117	3	32	Mineralized brecciated aplite-granite, granite of Pipe Spring (G; M)
DRS-78-021	QH32	38	30	25	117	3	36	Iron-mineralized aplite, granite of Pipe Spring (G; M)
DRS-78-023	QH32	38	30	14	117	3	18	Iron-mineralized breccia in megabreccia of Sloppy Gulch, Round Rock Fm (G; M)
DRS-78-026	QH32	38	30	5	117	2	27	Iron-mineralized granite, granite of Pipe Spring (G; M)
DRS-78-028	QH32	38	30	29	117	2	46	Iron-mineralized fault between schist unit, Cambrian Gold Hill Fm, and granite of Pipe Spring (
DRS-78-029A	QH32	38	32	40	117	5	25	Gossan in limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-029B	QH32	38	32	39	117	5	24	Mineralized quartz vein in limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-032	QH32	38	32	36	117	5	53	Mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-033A	QH32	38	32	41	117	5	40	Mineralized brecciated jasperized limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-036	QH32	38	33	4	117	5	47	Mineralized fractures in argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-78-037	QH32	38	33	2	117	5	46	Mineralized fault in argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-78-044	QH32	38	31	34	117	6	11	Iron-mineralized brecciated aplite sill in argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-045	QH32	38	31	51	117	6	15	Mineralized brecciated argillite and aplite in argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-046A	QH32	38	32	49	117	6	19	Iron- and manganese-mineralized argillite, argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-78-046B	QH32	38	32	48	117	6	18	Iron-mineralized brecciated quartzite, probably quartzite unit, Ordovician Toquima Fm (G; M)
DRS-78-048	QH32	38	32	34	117	6	36	Gossan along fault zone in argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-78-049	QH32	38	32	24	117	6	59	Iron-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-051	QH32	38	31	54	117	6	3	Galena-bearing quartz veinlets, quartzite unit at Greenfield claim, Ordovician Toquima Fm (G;
DRS-78-052	QH32	38	31	50	117	5	59	Iron-mineralized shaly limestone near quartz vein in limestone unit, Ordovician Toquima Fm (G
DRS-78-053	QH32	38	31	27	117	6	15	Iron-oxide-cemented Quaternary stream gravel (G; M)
DRS-78-054	QH32	38	31	8	117	6	9	Iron-mineralized siliceous argillite, argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-055	QH32	38	31	5	117	5	52	Quartz veinlets in siliceous argillite, argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-058	QH32	38	31	44	117	5	59	Tourquoise-bearing quartz lens in argillite, argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-059	QH32	38	31	41	117	6	8	Iron-mineralized silicified, brecciated argillite, schist unit, Cambrian Harkless Fm (G; M)
DRS-78-062	QH32	38	31	24	117	5	53	Mineralized quartz vein in siliceous argillite, argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-065	QH32	38	30	44	117	6	17	Copper-mineralized quartzite, quartzite unit, Ordovician Toquima Fm (G; M)
DRS-78-066	QH32	38	30	28	117	6	30	Iron-mineralized argillite, argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-067	QH33	38	31	24	117	7	27	Iron- and quartz-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G
DRS-78-069	QH33	38	31	7	117	7	19	Mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-070	RK59	38	31	1	117	7	25	Schistose, schist unit, Cambrian Harkless Fm (P; M)
DRS-78-071	QH33	38	30	53	117	7	23	Iron- and quartz-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G
DRS-78-073	QH33	38	30	55	117	7	7	Copper-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-074	RK59	38	30	41	117	3	8	Aplite in granite apophesis into Cambrian Gold Hill Fm, granite of Pipe Spring (P; M)
DRS-78-077	QH33	38	30	41	117	2	30	Iron-mineralized limestone in quartzite unit, Cambrian Gold Hill Fm (G; M)
DRS-78-078	QH33	38	31	17	117	3	7	Iron-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)

DRS-78-080	QH33	38	31	21	117	2	58	Jasperoid and gossan along fault separating Mayflower Schist and Gold Hill Fm (G; M)
DRS-78-083	QH33	38	31	28	117	2	50	Mineralized argillite and quartzite along fault in schist unit, Cambrian Gold Hill Fm (G; M)
DRS-78-086A	QH33	38	31	0	117	1	19	Mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-78-087	QH33	38	30	44	117	1	40	Iron-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-089A	QH33	38	30	51	117	0	1	Iron-mineralized schist, quartzite-schist unit, Cambrian Gold Hill Fm (G; M)
DRS-78-093	QH33	38	30	36	117	0	29	Iron-mineralized quartzite, quartzite unit, Cambrian Gold Hill Fm (G; M)
DRS-78-094	QH33	38	30	44	117	0	57	Iron-mineralized quartzite, quartzite unit, Cambrian Gold Hill Fm (G; M)
DRS-78-095A	QH33	38	31	56	117	1	44	Mineralized quartz vein, along thrust fault between Mayflower Schist and Gold Hill Fm (G; M)
DRS-78-100A	QH33	38	30	26	117	1	32	Mineralized schist leaf in granite, granite of Pipe Spring (G; M)
DRS-78-101	RK59	38	30	4	117	1	14	Aplite, granite of Pipe Spring (P; M)
DRS-78-102	QH33	38	30	5	117	1	9	Mineralized quartz vein in granite, granite of Pipe Spring (G; M)
DRS-78-103	QH33	38	31	2	117	0	50	Iron-mineralized quartzite, quartzite-schist unit, Cambrian Gold Hill Fm (G; M)
DRS-78-104	QH33	38	31	18	117	0	50	Gossan in mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-78-107	QH33	38	31	15	117	1	15	Mineralized limestone-quartzite, limestone and schist-quartzite units, Cambrian Gold Hill Fm (G
DRS-78-109	QH33	38	31	11	117	2	14	Manganese-mineralized sinterlike material, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-78-110	QH33	38	31	6	117	2	17	Iron-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-117	QH33	38	32	28	117	7	23	Iron-mineralized siliceous argillite, schist unit, Cambrian Harkless Fm (G; M)
DRS-78-118	QH33	38	32	19	117	7	29	Iron-mineralized aplite in schist unit, Cambrian Harkless Fm (G; M)
DRS-78-119B	QH33	38	32	11	117	7	13	Sulfide-rich quartz vein at William Patrick mine in limestone unit, Ordovician Zanzibar Fm (G; M
DRS-78-120	QH33	38	32	2	117	6	56	Iron-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-124	QH33	38	31	18	117	6	19	Iron-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-125	QH33	38	31	18	117	6	52	Iron-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-126	QH33	38	30	23	117	7	20	Iron-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-127	QH33	38	30	13	117	7	29	Iron-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-130	QH33	38	30	47	117	6	12	Mineralized zone along thrust fault separating Cambrian Gold Hill and Ordovician Toquima Fm
DRS-78-135	QH33	38	30	13	117	5	43	Iron-mineralized limestone, limestone unit, Ordovician Toquima Fm (G; M)
DRS-78-139	QH33	38	30	9	117	5	9	Mineralized brecciated quartz in thrust, Cambrian Harkless over Ordovician Toquima Fm (G; M
DRS-78-141	QH33	38	30	0	117	5	34	Iron-mineralized siliceous argillite, siliceous argillite unit, Cambrian Harkless Fm (G; M)
DRS-78-142	QH33	38	30	17	117	5	24	Mineralized brecciated limestone in thrust, Cambrian Harkless over Ordovician Toquima Fm (G
DRS-78-143	QH33	38	30	31	117	5	29	Mineralized quartz vein in limestone, limestone unit, Ordovician Toquima Fm (G; M)
DRS-78-145	QH33	38	30	8	117	4	7	Sulfide-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-146	QH33	38	30	11	117	4	8	Jasperized limestone, jasperized limestone unit, Ordovician Toquima Fm (G; M)
DRS-78-147	QH33	38	30	17	117	4	12	Iron- and manganese-mineralized rock, jasperized limestone unit, Ordovician Toquima Fm (G;
DRS-78-148	RK59	38	30	53	117	3	22	Schist, schist unit, Cambrian Mayflower Schist (P; M)
DRS-78-149	QH33	38	30	39	117	3	30	Fluorite-cemented breccia of argillite, aplite, and granite at Keystone (Summit) mine (G; M)
DRS-78-150	QH33	38	30	37	117	3	28	Iron-mineralized brecciated quartzite and schist, quartzite unit, Cambrian Gold Hill Fm (G; M)
DRS-78-151	QH34	38	30	39	117	3	13	Mineralized skarn in limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-78-152	QH34	38	30	10	117	3	58	Iron-mineralized jasperized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-78-154B	QH34	38	32	15	117	4	4	Iron-mineralized limestone on April Fool Hill, limestone unit, Cambrian Gold Hill Fm (G; M)

DRS-78-157	QH34	38	32	16	117	4	3	Iron-mineralized silicified limestone, limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-78-158D	QH34	38	32	17	117	4	2	Iron-mineralized quartzite in limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-78-159	QH34	38	32	14	117	3	33	Sulfide-mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-78-160	QH34	38	30	55	117	3	49	Iron- and manganese-mineralized schist at Jumbo mine, schist unit, Cambrian Gold Hill Fm (G
DRS-78-161A	QH34	38	30	51	117	3	50	Iron- and manganese-mineralized schist at Jumbo mine, schist unit, Cambrian Gold Hill Fm (G
DRS-78-161B	QH34	38	30	50	117	3	49	Iron- and manganese-mineralized schist at Jumbo mine, schist unit, Cambrian Gold Hill Fm (G
DRS-79-006	QS95	38	31	29	117	4	19	Iron-mineralized quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-79-008	QS95	38	31	22	117	4	35	Iron-mineralized quartzite, quartzite unit, Ordovician Toquima Fm (G; M)
DRS-79-009B	QS95	38	31	36	117	4	16	Iron-mineralized selvage to breccia dike in limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-79-010	QS95	38	31	26	117	4	13	Iron-mineralized brecciated quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (
DRS-79-011	QS95	38	31	24	117	4	20	Calcite vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-79-013A	QS95	38	31	20	117	4	19	Iron-mineralized quartz lenses in schist, schist unit, Cambrian(?) Mayflower Schist (G; M)
DRS-79-014	QS95	38	30	58	117	4	16	Iron- and barite-mineralized gossan, thrust fault, base of quartzite unit, Ordovician Toquima Fm
DRS-79-015	QS95	38	30	50	117	4	15	Iron-mineralized quartz vein in limestone, limestone unit, Ordovician Toquima Fm (G; M)
DRS-79-020	RK59	38	42	59	117	0	44	Granodiorite, stock of granodiorite of Dry Canyon (P; RM)
DRS-79-022	QS95	38	31	9	117	4	29	Jasperoid and gossan, thrust fault at base of limestone unit, Ordovician Toquima Fm (G; M)
DRS-79-023	QS95	38	31	23	117	4	43	Iron- and manganese-mineralized jasperoid, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-79-026	QS95	38	31	1	117	4	44	Iron-mineralized quartz vein, schist unit, Cambrian Harkless Fm (G; M)
DRS-79-027	QS95	38	30	53	117	4	35	Iron-mineralized aplite in schist unit, Cambrian Harkless Fm (G; M)
DRS-79-028A	RK59	38	31	3	117	4	56	Fine-grained shonkinite in syenite plug (P; M)
DRS-79-028B	RK59	38	31	4	117	4	57	Coarse-grained syenite in syenite plug (P; M)
DRS-79-028C	RK59	38	31	2	117	4	57	Medium-grained shonkinite in syenite plug (P; M)
DRS-79-029	QS95	38	30	58	117	5	3	Iron-mineralized quartz vein in limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-79-032	QS95	38	31	11	117	4	0	Iron-mineralized jasperoid in limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-79-034B	QS95	38	31	48	117	4	6	Iron- and calc-silicate-mineralized limestone(?), schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-036	QS95	38	31	28	117	3	27	Ocherous iron oxide and jasperoid, dolostone unit, Cambrian Gold Hill Fm (G; M)
DRS-79-037	QS95	38	31	26	117	3	23	Iron-mineralized fault breccia and gouge, thrust fault between Mayflower and Gold Hill Fms (G
DRS-79-040	QS95	38	32	8	117	2	16	Iron-mineralized silicified limestone, jasperoid unit, Ordovician Toquima Fm (G; M)
DRS-79-041	QS95	38	31	52	117	2	42	Iron-mineralized fault-vein in limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-79-042	QS95	38	31	49	117	2	24	Iron-mineralized silicified limestone, White Caps Limestone Member, Cambrian Gold Hill Fm (G
DRS-79-043	QS95	38	31	49	117	2	11	Iron-mineralized fault breccia in limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-79-045	QS96	38	31	39	117	1	56	Iron-mineralized White Caps Limestone Member, Cambrian Gold Hill Fm (G; M)
DRS-79-046	QS96	38	31	38	117	2	30	Iron-mineralized brecciated limestone, limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-79-047	QS96	38	31	44	117	5	23	Iron-mineralized silicified limestone, jasperized limestone unit, Ordovician Toquima Fm (G; M)
DRS-79-048	QS96	38	31	44	117	5	32	Iron-mineralized brecciated silicified limestone, limestone unit, Ordovician Toquima Fm (G; M)
DRS-79-050A	QS96	38	31	54	117	3	19	Iron-mineralized silicified limestone, limestone unit, Cambrian Gold Hill Fm (G; M)
DRS-79-054	QS96	38	31	24	117	3	6	Iron-mineralized brecciated schist, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-056	QS96	38	32	12	117	2	46	Iron- and calc-silicate-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; M)
DRS-79-057	QS96	38	32	2	117	2	55	Tailings northeast of White Caps mine (G; M)

DRS-79-058B	QS96	38	32	3	117	3	33	Sulfide- and calc-silicate-mineralized limestone(?), schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-061	QS96	38	31	55	117	3	43	Sulfide-mineralized limestone, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-066	RK59	38	42	50	117	0	39	Granodiorite injected into calc-silicate-mineralized limestone slab in granodiorite of Dry Canyo
DRS-79-069	QS96	38	32	19	117	5	4	Mineralized quartzite, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-070A	QS96	38	32	5	117	4	33	Mineralized schist and quartz vein material, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-072	QS96	38	31	47	117	5	0	Iron-mineralized quartz vein in argillite unit, Ordovician Zanzibar Fm (G; M)
DRS-79-073	QS96	38	32	10	117	5	6	Pyrite-mineralized schist, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-074	QS96	38	32	3	117	3	10	Iron-mineralized brecciated limestone, schist unit, Cambrian(?) Mayflower Fm (G; M)
DRS-79-075	QS96	38	32	0	117	3	0	Lower tailings pile at White Caps mine (G; M)
DRS-79-076	RK59	38	31	53	117	3	17	Pyrite-mineralized schist, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-077	QS96	38	31	58	117	2	58	Main (upper) tailings pile at White Caps mine (G; M)
DRS-79-078	QS96	38	31	59	117	2	59	Main (upper) tailings pile at White Caps mine (G; M)
DRS-79-079A	QS96	38	31	26	117	3	30	Iron-mineralized limestone, schist unit(?), Cambrian Gold Hill Fm (G; M)
DRS-79-079C	QS96	38	31	25	117	3	31	Pyrite-mineralized schist, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-79-082	QS96	38	30	30	117	4	9	Jasperized limestone, jasperized limestone unit, Ordovician Toquima Fm (G; M)
DRS-80-038C	RK59	38	41	38	117	3	13	Pyrite-mineralized granite, Round Mtn pluton (G; RM)
DRS-80-059	RK59	38	38	53	116	51	37	Ash-flow tuff, tuff of Ryecroft Canyon (P; CC)
DRS-80-060	RK59	38	43	10	116	55	50	Ash-flow tuff, tuff of Mount Jefferson (P; J)
DRS-81-015A	RC83	38	31	57	116	59	20	Iron- and calc-silicate-mineralized limestone unit, Ordovician Toquima Fm (G; BW)
DRS-81-017	RC83	38	31	48	116	59	8	Iron-mineralized brecciated limestone, limestone unit, Ordovician Toquima Fm (G; BW)
DRS-81-018	RC83	38	31	47	116	59	6	Gossan-jasperized limestone, jasperized limestone unit, Ordovician Toquima Fm (G; BW)
DRS-81-021	RC83	38	31	53	116	59	54	Iron-mineralized quartz vein, quartzite unit, Ordovician Toquima Fm (G; BW)
DRS-81-022	RC83	38	31	42	116	59	55	Mineralized fault breccia, jasperized limestone unit, Ordovician Toquima Fm (G; BW)
DRS-81-025	RC83	38	31	11	116	59	51	Iron-mineralized limestone-schist, schist unit, Cambrian Gold Hill Fm (G; BW)
DRS-81-026	RC83	38	31	8	116	59	39	Iron-mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; BW)
DRS-81-034B	RC83	38	31	39	116	59	42	Sulfide-mineralized quartz vein, jasperized limestone unit, Ordovician Toquima Fm (G; BW)
DRS-81-035B	RC83	38	31	34	116	59	32	Iron-mineralized quartzite, quartzite unit, Ordovician Toquima Fm (G; BW)
DRS-81-036	RC83	38	31	20	116	59	36	Iron-mineralized thrust fault between overlying argillite unit, Toquima Fm and Mayflower Schis
DRS-81-038	RC83	38	31	18	116	59	15	Iron-mineralized quartz vein in schist, schist unit, Mayflower Schist (G; BW)
DRS-81-039	RC83	38	31	16	116	58	55	Iron-mineralized quartz lens in schist, schist unit, Mayflower Schist (G; BW)
DRS-81-040A	RC83	38	31	15	116	58	53	Iron- and quartz-mineralized limestone, argillite-limestone unit, Ordovician Zanzibar Fm (G; BW
DRS-81-043	RC83	38	31	11	116	58	38	Iron- and quartz-mineralized limestone, argillite-limestone unit, Ordovician Zanzibar Fm (G; BW
DRS-81-044	RC83	38	31	8	116	58	59	Iron- and quartz-mineralized brecciated quartzite, quartzite unit, Cambrian Gold Hill Fm (G; BW
DRS-81-045	RC83	38	30	52	116	59	17	Iron- and quartz-mineralized quartzite, schist-quartzite unit, Cambrian Gold Hill Fm (G; BW)
DRS-81-046A	RC83	38	30	40	116	59	11	Copper-mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; BW)
DRS-81-049A	RC83	38	30	38	116	59	14	Iron- and calc-silicate-mineralized limestone below schist-quartzite unit, Gold Hill Fm (G; BW)
DRS-81-051	RC83	38	30	48	116	59	33	Mineralized limestone, quartzite, schist, schist-quartzite unit, Cambrian Gold Hill Fm (G; BW)
DRS-81-052	RC83	38	30	50	116	59	57	Iron-mineralized limestone, calc-silicate-mineralized limestone unit, Gold Hill Fm (G; BW)
DRS-81-059	RC83	38	30	4	116	59	3	Iron-mineralized schist, schist unit, Gold Hill Fm (G; BW)

DRS-81-065	RC83	38	31	20	116	58	20	Iron- and quartz-mineralized limestone, calc-silicated limestone unit, Ordovician Toquima Fm (
DRS-81-066	RC83	38	31	23	116	58	17	Iron-mineralized jasperized limestone, jasperized limestone unit, Ordovician Toquima Fm (G; B
DRS-81-067	RC83	38	31	27	116	58	27	Iron-mineralized jasperized limestone, jasperized limestone unit, Ordovician Toquima Fm (G; B
DRS-81-071	RC83	38	32	30	116	58	19	Iron- and quartz -mineralized granite fragment, megabreccia of Sloppy Gulch, Round Rock Fm
DRS-81-076	RC83	38	31	58	116	58	8	Iron- and quartz-mineralized limestone, jasperized limestone unit, Ordovician Toquima Fm (G;
DRS-81-077	VV11	38	32	6	116	58	2	Schistose gabbro, Ordovician(?) gabbro (P; BW)
DRS-81-079B	RC83	38	32	38	116	57	32	Iron-mineralized hot-springs sinter, hot-springs sinter unit, upper member, Round Rock Fm (G
DRS-81-083	RC83	38	41	28	116	53	36	Mineralized ash-flow tuff, Isom-type welded ash-flow tuff (G; J)
DRS-81-094	RC83	38	32	15	116	57	4	Pyritized chert at Maris mine, hot-springs sinter unit, upper member, Round Rock Fm (G; BW)
DRS-81-100	RC83	38	34	10	116	58	20	Iron- and quartz-mineralized fractures in granite, Belmont pluton (G; BW)
DRS-81-106	RC83	38	32	22	117	5	1	Pyrite-mineralized schist, Little Grey open pit in schist unit, Cambrian Gold Hill Fm (G; M)
DRS-81-113	RC83	38	34	44	116	59	26	Iron-mineralized ash-flow tuff, tuff of The Bald Sister (G; BW)
DRS-81-119	RC83	38	34	41	116	59	51	Iron-mineralized ash-flow tuff, middle member, Diamond King Fm (G; BW)
DRS-81-124	RC83	38	34	2	116	57	24	Iron-mineralized fractures in granite, Belmont pluton (G; BW)
DRS-81-126	VV11	38	34	27	116	56	29	Vitric rhyolite air-fall tuff, rhyolite volcanic ash (P; BW)
DRS-81-129	RC83	38	36	23	116	58	0	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-130B	RC84	38	35	4	116	56	55	Sulfide-mineralized quartz vein in granite, Belmont pluton (G; BW)
DRS-81-131A	RC84	38	35	5	116	56	53	Sulfide-mineralized quartz-chalcedony vein in granite, Belmont pluton (G; BW)
DRS-81-132	RC84	38	35	5	116	56	48	Iron-mineralized quartz-chalcedony vein in granite, Belmont pluton (G; BW)
DRS-81-133	RC84	38	35	7	116	56	43	Iron-mineralized quartz veins in granite, Belmont pluton (G; BW)
DRS-81-134	RC84	38	34	55	116	58	22	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-137	RC84	38	35	56	116	59	32	Iron-mineralized ash-flow tuff, upper member, Diamond King Fm (G; BW)
DRS-81-140	RC84	38	35	42	116	57	26	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-141	RC84	38	35	33	116	57	11	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-81-143	RC84	38	35	47	116	56	57	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-145	RC84	38	36	7	116	57	2	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-146	RC84	38	36	25	116	57	0	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-81-147	RC84	38	36	24	116	57	19	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-81-148	RC84	38	37	19	116	56	40	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-81-149	RC84	38	37	14	116	57	7	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-150	RC84	38	37	20	116	57	42	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-81-151	RC84	38	37	1	116	57	44	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-81-156	VV11	38	37	6	116	59	43	Flow-layered biotite-bearing rhyolite fragment in megabreccia of Sloppy Gulch (P; BW)
DRS-81-157	RC84	38	36	50	116	59	35	Iron-mineralized rhyolite clast, megabreccia of Silver Creek, upper member, Round Rock Fm (
DRS-81-158	RC84	38	35	42	116	56	31	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-159A	RC84	38	35	56	116	56	42	Iron-mineralized quartz vein in granite, Belmont pluton (G; BW)
DRS-81-159B	RC84	38	35	55	116	56	43	Altered granite adjacent to iron-mineralized quartz vein, Belmont pluton (G; BW)
DRS-81-160	RC84	38	36	8	116	56	46	Iron-mineralized shear zone in granite, Belmont pluton (G; BW)
DRS-81-161	RC84	38	35	55	116	56	0	Iron-mineralized granite, Belmont pluton (G; BW)

DRS-81-162	RC84	38	35	48	116	55	14	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-81-165C	RC84	38	30	0	116	53	52	Iron- and chalcedony-mineralized flow-layered andesite, andesite lava flow (G; BW)
DRS-81-168	VV11	38	30	14	116	53	52	Pumiceous air-fall tuff, white ash-fall tuff (P; BW)
DRS-81-171	VV11	38	30	21	116	54	3	Perlitic glass, basal vitrophyre of lower member, Isom-type ash-flow tuff (P; BW)
DRS-81-172	VV11	38	30	22	116	53	57	Ash-flow tuff, 5 m above base of lower member, Isom-type ash-flow tuff (P; BW)
DRS-81-173	VV11	38	30	23	116	53	56	Ash-flow tuff, 30 m above base of lower member, Isom-type ash-flow tuff (P; BW)
DRS-81-178B	RC84	38	30	14	116	53	11	Iron-mineralized siltstone in claystone-siltstone-sandstone unit (G; BW)
DRS-81-180	VV11	38	30	14	116	53	6	Ash-flow tuff, greenish-gray (biotite-quartz latite) ash-flow tuff (P; BW)
DRS-81-182	VV11	38	30	24	116	52	49	Andesite plug, andesite plugs and flows (P; BW)
DRS-81-184A	VV11	38	30	24	116	52	40	Tuffaceous sandstone, claystone-siltstone-sandstone unit (P; BW)
DRS-81-184B	RC84	38	30	23	116	52	39	Mineralized(?) volcanic siltstone in claystone-siltstone-sandstone unit (G; BW)
DRS-81-185A	VV11	38	30	8	116	54	17	Flow-layered andesite, andesite plugs and flows (P; BW)
DRS-81-185C	VV11	38	30	9	116	54	18	Andesitic glass, andesite plugs and flows (P; BW)
DRS-81-187	VV11	38	30	25	116	54	4	Basal vitrophyre of upper member, Isom-type ash-flow tuff (P; BW)
DRS-81-189	VV11	38	30	26	116	54	2	Ash-flow tuff, upper part of upper member, Isom-type ash-flow tuff (P; BW)
DRS-81-191	VV11	38	30	41	116	53	42	Ash-flow tuff, crystal-rich ash-flow tuff (P; BW)
DRS-81-195	RC84	38	31	11	116	52	39	Iron-mineralized ash-flow tuff, fragment of Isom-type welded ash-flow tuff in landslide deposit (
DRS-81-196	VV11	38	31	32	116	52	33	Rhyolite plug, flow-layered rhyolite plugs (P; BW)
DRS-81-202	RC84	38	31	30	116	59	9	Iron- and quartz-mineralized quartzite, quartzite unit, Ordovician Toquima Fm (G; BW)
DRS-81-209	RC84	38	31	7	116	59	58	Gossan boxwork in limestone unit, Gold Hill Fm (G; BW)
DRS-81-210	VV11	38	31	52	116	57	44	Gabbro, Ordovician gabbro (P; BW)
DRS-81-211	RC84	38	31	50	116	57	47	Iron-mineralized quartz vein in gabbro intruded into Ordovician Toquima Fm (G; BW)
DRS-82-008A	RE43	38	33	20	116	54	49	Quartz veins in porphyritic granite, Belmont pluton (G; BW)
DRS-82-012	RE43	38	39	0	116	57	47	Sulfide-mineralized quartz vein in granite, Perkins prospect, Round Mtn pluton (G; J)
DRS-82-019A	RE43	38	33	21	116	54	37	Mineralized quartz vein, contact of schist unit, Toquima Fm and granite, Belmont pluton (G; BW
DRS-82-028	RE43	38	33	55	116	52	57	Iron-mineralized quartz vein in schist, Toquima Fm pendant in granite, Belmont pluton (G; BW
DRS-82-037	RE43	38	34	13	116	54	23	Iron-mineralized quartz veinlets in granite, Belmont pluton (G; BW)
DRS-82-039	RE43	38	34	59	116	53	17	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-82-040C	RE43	38	35	2	116	52	29	Sulfide-mineralized quartz vein in granite, Belmont pluton (G; BE)
DRS-82-042	RE43	38	37	35	116	54	49	Iron-mineralized aplite-alaskite, Belmont pluton (G; J)
DRS-82-046A	RE43	38	37	11	116	54	42	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-82-050	RE43	38	36	54	116	53	53	Iron-mineralized quartz vein in granite, Belmont pluton (G; BW)
DRS-82-051	VV11	38	35	58	116	54	3	Ash-flow tuff, middle member, Diamond King Fm (P; BW)
DRS-82-052	RE43	38	36	11	116	54	7	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-82-053	RE43	38	36	21	116	53	48	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-82-054	RE43	38	35	59	116	53	22	Iron- and quartz-mineralized granite, Belmont pluton (G; BW)
DRS-82-055	VV11	38	35	48	116	53	37	Ash-flow tuff, middle member, Diamond King Fm (P; BW)
DRS-82-056	VV11	38	35	46	116	53	38	Ash-flow tuff, tuff of The Bald Sister (P; BW)
DRS-82-057	RE43	38	35	45	116	52	41	Iron-mineralized granite, Belmont pluton (G; BW)

DRS-82-058	RE43	38	35	42	116	52	44	Mineralized quartz vein in schist, Zanzibar Fm pendant in granite, Belmont pluton (G; BW)
DRS-82-061A	RE43	38	36	54	116	53	22	Mineralized quartz vein in limestone, limestone unit, Ordovician Toquima Fm (G; BW)
DRS-82-062A	RE43	38	36	53	116	53	24	Sulfide-mineralized quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; BW)
DRS-82-064A	RE43	38	36	53	116	53	36	Organic-rich limestone, argillite-limestone unit, Ordovician Zanzibar Fm (G; BW)
DRS-82-067A	RE43	38	37	28	116	53	40	Copper-mineralized quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; BW)
DRS-82-069B	RE43	38	36	55	116	53	20	Sulfide-mineralized limestone, limestone unit, Ordovician Toquima Fm (G; BW)
DRS-82-074	RE43	38	36	1	116	52	38	Iron-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; BW)
DRS-82-075	RE43	38	36	13	116	52	36	Iron-mineralized breccia in thrust between limestone units of Zanzibar and Toquima Fms (G; B
DRS-82-076A	RE43	38	36	14	116	52	37	Sulfide-mineralized quartz in thrust between Zanzibar and Toquima Fms (G; BW)
DRS-82-077A	RE43	38	36	15	116	52	39	Sulfide-mineralized quartz in thrust between Zanzibar and Toquima Fms (G; BW)
DRS-82-079A	RE43	38	35	36	116	52	27	Sulfide-mineralized quartz vein in granite, Belmont pluton (G; BE)
DRS-82-081A	RE43	38	35	40	116	52	16	Sulfide-mineralized quartz vein in schist, schist unit, Ordovician Zanzibar Fm (G; BE)
DRS-82-083B	RE43	38	35	30	116	52	19	Sulfide-mineralized quartz vein in fine-grained granite-aplite unit, Belmont pluton (G; BE)
DRS-82-084A	RE43	38	35	24	116	52	8	Sulfide-mineralized quartz veins in granite, Belmont pluton (G; BE)
DRS-82-085	RE43	38	33	25	116	53	9	Iron-mineralized granite and aplite, Belmont pluton (G; BW)
DRS-82-086A	RE43	38	33	37	116	53	36	Huebnerite-bearing quartz vein in granite, Belmont pluton (G; BW)
DRS-82-088	RE43	38	33	34	116	53	22	Iron-mineralized granite, Belmont pluton (G; BW)
DRS-82-089	RE43	38	33	34	116	53	18	Quartz vein in granite, Belmont pluton (G; BW)
DRS-82-090	RE43	38	33	23	116	52	26	Iron-mineralized jasperoid, jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-82-091	RE43	38	33	27	116	52	30	Mineralized thrust fault within argillite unit, Ordovician Toquima Fm (G; BE)
DRS-82-092A	RG61	38	32	49	116	53	31	Porous gossan, metasomatite unit, rocks of the Monarch area (G; BW)
DRS-82-094	VV11	38	32	52	116	53	25	Iron-mineralized metasomatite, metasomatite unit, rocks of the Monarch area (G; BW)
DRS-82-095	RG61	38	32	50	116	53	22	Brecciated gossan, metasomatite unit, rocks of the Monarch area (G; BW)
DRS-82-096A	VV11	38	32	52	116	53	19	Pyroclastic(?) greenstone, greenstone unit of the northern facies, rocks of the Monarch area (P
DRS-82-097	RG61	38	33	2	116	52	51	Iron-mineralized brecciated argillite, argillite unit, Ordovician Toquima Fm (G; BW)
DRS-82-099	RG61	38	33	2	116	52	40	Iron-mineralized fault breccia between Monarch area greenstone and Toquima Fm argillite (G;
DRS-82-100	VV11	38	33	4	116	52	33	Greenstone, greenstone unit of the northern facies, rocks of the Monarch area (P; BW)
DRS-82-101	RG61	38	32	46	116	53	8	Iron-mineralized brecciated rock, metasomatite unit, rocks of the Monarch area (G; BW)
DRS-82-105	RG61	38	33	16	116	53	0	Iron-mineralized quartz in schistose argillite, limestone unit, Ordovician Toquima Fm (G; BW)
DRS-82-106	RG61	38	33	17	116	52	39	Iron- and quartz-mineralized fault breccia between Monarch metasomatite and Toquima Fm a
DRS-82-108	RG61	38	33	8	116	52	28	Iron-mineralized jasperoid, jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-82-110A	RG61	38	33	4	116	52	11	Jasperoid in siliceous argillite unit, Ordovician Toquima Fm (G; BE)
DRS-82-111	RG61	38	33	15	116	52	10	Jasperoid in jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-82-113	RG61	38	32	48	116	52	57	Metasomatite in metasomatite unit, rocks of the Monarch area (G; BW)
DRS-82-114	RG61	38	32	48	116	52	48	Iron- and quartz-mineralized fault zone in argillite unit, Ordovician Toquima Fm (G; BW)
DRS-82-117B	RG61	38	34	37	116	51	52	Silicified pebble dike in limestone unit, Ordovician Zanzibar Fm, Belmont mining area (G; BE)
DRS-82-118	RG61	38	34	31	116	51	49	Mineralized rock on mine dump at thrust fault between Zanzibar Fm and overlying Toquima Fm
DRS-82-119	RG61	38	31	35	116	53	30	Iron-mineralized fault between dolostone and metasomatite units, rocks of the Monarch area (
DRS-82-120	RG61	38	31	32	116	53	34	Iron-mineralized fault between argillite and metasomatite units, rocks of the Monarch area (G;

DRS-82-121	RG61	38	31	30	116	53	44	Iron-mineralized rock, dolostone unit, rocks of the Monarch area (G; BW)
DRS-82-122	RG61	38	31	38	116	53	40	Iron- and manganese-mineralized jasperoid, dolostone unit, rocks of the Monarch area (G; BW
DRS-82-123	RG61	38	31	40	116	53	41	Iron-mineralized rock, fault between argillite and dolostone units, rocks of the Monarch area (G
DRS-82-124	RG61	38	31	42	116	53	45	Iron-mineralized jasperoid, dolostone unit, rocks of the Monarch area (G; BW)
DRS-82-125	VV11	38	31	47	116	53	45	Serpentinite, serpentinite unit, rocks of the Monarch area (P; BW)
DRS-82-126	RG61	38	31	56	116	53	51	Iron-mineralized brecciated serpentinite, serpentinite unit, rocks of the Monarch area (G; BW)
DRS-82-128	RG61	38	31	50	116	53	54	Copper-mineralized serpentinite, serpentinite unit, rocks of the Monarch area (G; BW)
DRS-82-129B	RG61	38	31	48	116	53	39	Iron-mineralized jasperoid in altered serpentinite, serpentinite unit, rocks of the Monarch area
DRS-82-130	VV11	38	31	37	116	53	22	Greenstone, greenstone unit of the southern facies, rocks of the Monarch area (P; BW)
DRS-82-132	VV11	38	31	28	116	52	49	Greenstone, greenstone unit of the southern facies, rocks of the Monarch area (P; BW)
DRS-82-133	VV11	38	31	39	116	53	7	Rhyolite plug, flow-layered rhyolite plugs (P; BW)
DRS-82-134	RG61	38	32	2	117	4	34	Iron-mineralized brecciated limestone in schist, schist unit, Cambrian Gold Hill Fm (G; M)
DRS-82-135A	RG61	38	38	42	116	59	10	Iron- and quartz-mineralized brecciated argillite, schist unit, Cambrian(?) Mayflower Schist (G;
DRS-82-136	RG61	38	38	44	116	59	34	Iron-mineralized granite pod in schist, schist unit, Cambrian(?) Mayflower Schist (G; J)
DRS-82-137	RG61	38	37	57	116	58	32	Quartz and myrmekitic feldspar, quartz pipe in granite, Belmont pluton (G; J)
DRS-82-139B	RG61	38	37	44	116	58	43	Magnetite-rich cumulate layer in granite, Belmont pluton (G; J)
DRS-82-141	VV11	38	31	45	116	53	25	Greenstone, greenstone unit of the southern facies, rocks of the Monarch area (P; BW)
DRS-82-142	RG61	38	38	27	116	57	22	Iron- and quartz-mineralized granite, Belmont pluton (G; J)
DRS-82-146A	RG61	38	38	27	116	57	9	Iron-, quartz-, and barite-mineralized granite, Belmont pluton (G; J)
DRS-82-147	RG61	38	38	18	116	56	56	Iron- and quartz-mineralized fault in granite, Belmont pluton (G; J)
DRS-82-150	RG61	38	37	55	116	55	50	Iron-mineralized granite, Belmont pluton (G; J)
DRS-82-153	RG61	38	39	16	116	59	12	Iron- and quartz-mineralized granite, Round Mtn pluton (G; J)
DRS-82-155	RG61	38	32	16	116	57	3	Sulfide-mineralized fragmental siliceous sinter, Maris mine (G; BW)
DRS-82-156A	RG61	38	32	14	116	57	9	Sulfide-mineralized fragmental siliceous sinter, Maris mine (G; BW)
DRS-82-157A	RG61	38	32	16	116	57	9	Chalcedony layer 1 m thick, hot springs sinter unit, upper member, Round Rock Fm (G; BW)
DRS-82-165B	RG61	38	34	40	116	51	55	Sulfide-mineralized quartz vein in thrust fault between Zanzibar and Toquima Fms (G; BE)
DRS-82-166	RG61	38	34	44	116	51	59	Mineralized quartz vein, siliceous argillite unit, Ordovician Toquima Fm (G; BE)
DRS-84-001	RT33	38	37	44	116	53	31	Pyrite-mineralized quartzite, quartzite unit, Ordovician Toquima Fm (G; J)
DRS-84-002	RT33	38	37	43	116	53	35	Iron-mineralized quartz vein in limestone, limestone unit, Ordovician Toquima Fm (G; J)
DRS-84-003	RT33	38	37	39	116	53	38	Sulfide-mineralized quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-006	RT33	38	38	4	116	53	39	Iron-mineralized quartz in siliceous shale, argillite unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-010	RT33	38	38	14	116	52	54	Iron-mineralized quartz in siliceous shale, argillite unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-019	RT33	38	38	8	116	54	22	Gossan in fault zone in limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-030	RT33	38	40	50	116	53	52	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-84-031	WE51	38	41	17	116	54	0	Vitrophyre, lower member, Shingle Pass Tuff (P; J)
DRS-84-034	WE51	38	41	36	116	53	24	Ash-flow tuff, Isom-type ash-flow tuff (P; J)
DRS-84-042	RT33	38	41	59	116	56	32	Iron-mineralized granite-quartzite breccia, megabreccia of Jefferson Summit (G; J)
DRS-84-044	RT33	38	38	22	116	52	36	Iron-mineralized quartz, phyllitic argillite unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-046	WE51	38	38	36	116	52	39	Ash-flow tuff, tuff of Ryecroft Canyon (P; J)

DRS-84-048	RT33	38	38	32	116	53	27	Iron- and quartz-mineralized thrust fault between Toquima Fm and Zanzibar Fm (G; J)
DRS-84-052	RT33	38	38	38	116	53	54	Iron-mineralized quartz veinlet in quartzite, quartzite unit, Ordovician Toquima Fm (G; J)
DRS-84-054	RT33	38	38	33	116	54	27	Iron-mineralized brecciated quartz vein, schist unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-056A	RT33	38	38	28	116	54	37	Iron-mineralized quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-057	RT33	38	38	13	116	54	24	Gossan in fault zone in limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-059	WE51	38	38	51	116	52	36	Ash-flow tuff, tuff of Ryecroft Canyon (P; J)
DRS-84-063	WE51	38	41	22	116	52	47	Ash-flow tuff, upper member, Shingle Pass Tuff (P; J)
DRS-84-064	WE51	38	41	41	116	52	49	Ash-flow tuff, unit D, Bates Mtn Tuff (P; J)
DRS-84-065	RT33	38	39	34	116	52	31	Iron-mineralized brecciated quartz vein, argillite unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-068	RT33	38	39	35	116	52	59	Iron-mineralized ash-flow tuff, megabreccia of Meadow Canyon (G; J)
DRS-84-069	RT33	38	39	30	116	53	11	Iron-mineralized brecciated quartzite, quartzite-schist unit, Cambrian Gold Hill Fm (G; J)
DRS-84-070	WE51	38	39	33	116	53	8	Ash-flow tuff block of tuff of Ryecroft Canyon in megabreccia of Meadow Canyon (P; J)
DRS-84-074	WE51	38	40	18	116	53	21	Rhyolite, rhyolite plug (P; J)
DRS-84-075	RT33	38	40	34	116	54	20	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-84-080	RT33	38	38	40	116	58	12	Iron-mineralized limestone-shale-schist in schist unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-082	RT33	38	38	38	116	58	19	Iron-mineralized limestone and shale, schist unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-084	RT33	38	38	39	116	58	41	Iron-mineralized limestone, jasperized limestone unit, Ordovician Toquima Fm (G; J)
DRS-84-086	RT33	38	39	28	116	53	28	Quartz-mineralized thrust fault between Mayflower Fm and Zanzibar Fm (G; J)
DRS-84-087	RT33	38	39	33	116	54	13	Iron-mineralized thrust fault between argillite-limestone and limestone units, Zanzibar Fm (G; J
DRS-84-089	RT33	38	39	13	116	54	12	Mineralized quartz vein in argillite-limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-090	RT33	38	39	0	116	53	34	Iron-mineralized quartz vein in schist, argillite unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-094	WE51	38	42	3	116	53	57	Ash-flow tuff, biotite-bearing ash-flow tuff (P; J)
DRS-84-095	RT33	38	38	52	116	53	48	Iron-mineralized quartz vein in schist, schist unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-096	RT33	38	38	58	116	54	1	Mineralized quartz vein in schist, schist unit, Cambrian(?) Mayflower Fm (G; J)
DRS-84-097A	RT33	38	39	6	116	55	0	Iron-mineralized quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-099	RT33	38	39	27	116	54	38	Iron-mineralized quartz vein in limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-100	RT33	38	39	17	116	55	28	Iron-mineralized limestone-schist in thrust fault between Mayflower Fm and Zanzibar Fm (G; J
DRS-84-101	RT33	38	39	2	116	55	25	Iron- and quartz-mineralized limestone above thrust between Zanzibar Fm and Mayflower Fm
DRS-84-108	RT33	38	38	48	116	56	21	Gossan, iron-mineralized rock, calc-silicate-mineralized limestone unit, Ordovician Zanzibar Fm
DRS-84-113	RT33	38	39	36	116	55	54	Iron-mineralized argillite(?), schist unit, Ordovician Zanzibar Fm (G; J)
DRS-84-114	RT33	38	39	24	116	55	57	Iron-and antimony(?)-mineralized jasperoid, jasperized limestone unit, Ordovician Zanzibar Fm
DRS-84-115	RT33	38	39	30	116	56	12	Iron-mineralized thrust fault between Mayflower Fm and overlying Zanzibar Fm (G; J)
DRS-84-116	RT33	38	39	31	116	56	22	Gossan, quartz vein, and brecciated rock, jasperized limestone unit, Ordovician Zanzibar Fm (
DRS-84-117	RT33	38	39	43	116	55	42	Iron-mineralized jasperoid, jasperized limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-118	RT33	38	39	47	116	54	24	Iron-mineralized, quartz-veined, brecciated limestone, limestone unit, Ordovician Zanzibar Fm
DRS-84-119	RT33	38	39	37	116	54	32	Iron-mineralized fault in Cambrian(?) siltstone Fm (G; J)
DRS-84-120	RT33	38	39	44	116	54	46	Gossan in schist unit, Cambrian Gold Hill Fm (G; J)
DRS-84-122	RT34	38	40	0	116	54	50	Gossan, vein along fault, quartzite unit(?), Cambrian Gold Hill Fm (G; J)
DRS-84-123B	RT34	38	40	0	116	54	50	Mineralized brecciated limestone, quartzite unit(?), Cambrian Gold Hill Fm (G; J)

DRS-84-124B	RT34	38	39	47	116	54	53	Iron-mineralized rock at Flower mine, Cambrian Gold Hill Fm (G; J)
DRS-84-125	RT34	38	40	1	116	54	59	Iron-mineralized quartzite(?), quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-84-126	RT34	38	40	19	116	55	46	Iron-mineralized quartzite, quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-84-129	RT34	38	40	6	116	55	57	Gossan in mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; J)
DRS-84-130	RT34	38	40	7	116	55	47	Gossan in mineralized schist, schist(?) unit, Cambrian Gold Hill Fm (G; J)
DRS-84-134A	RT34	38	39	30	116	56	58	Mineralized quartz vein in schist, schist unit, Cambrian Gold Hill Fm (G; J)
DRS-84-135	RT34	38	39	18	116	56	46	Iron- and quartz-mineralized fault between Zanzibar and Mayflower Fms (G; J)
DRS-84-136	RT34	38	39	56	116	55	35	Gossan in iron-mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; J)
DRS-84-137	RT34	38	40	0	116	55	25	Iron-mineralized schist, schist unit, Cambrian Gold Hill Fm (G; J)
DRS-84-138	RT34	38	39	58	116	54	48	Iron-mineralized quartzite, quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-84-142	RT34	38	41	4	116	56	2	Iron-mineralized brecciated schist, schist-quartzite unit, megabreccia of Jefferson Summit (G;
DRS-84-143A	RT34	38	41	0	116	56	24	Iron-mineralized brecciated granite, vent unit, megabreccia of Jefferson Summit (G; J)
DRS-84-145	RT34	38	41	6	116	56	24	Iron-mineralized brecciated schist, schist unit, Cambrian Gold Hill Fm (G; J)
DRS-84-147B	RT34	38	39	26	116	57	16	Mineralized limestone, calc-silicate-mineralized limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-148	RT34	38	39	8	116	57	20	Mineralized fault gouge, calc-silicate-mineralized limestone unit, Ordovician Zanzibar Fm (G; J
DRS-84-149	RT34	38	39	2	116	57	27	Iron-mineralized fault, jasperized limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-150	RT34	38	31	54	117	3	17	Molybdenite-bearing limestone, Manhattan Consolidated mine, Manhattan mining district (G; M
DRS-84-151B	RT34	38	38	47	116	57	8	Mineralized limestone and shale, jasperized limestone unit(?), Ordovician Zanzibar Fm (G; J)
DRS-84-153	RT34	38	38	55	116	57	33	Sulfide-mineralized quartz vein, Barcelona mine (G; J)
DRS-84-158	RT34	38	38	54	116	57	32	Sulfide-mineralized rock, Barcelona mine (G; J)
DRS-84-159A	RT34	38	38	53	116	57	41	Sulfide-mineralized limestone(?), jasperized limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-161	RT34	38	38	55	116	57	49	Sulfide-mineralized limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-84-162	RT34	38	39	57	116	59	29	Manganese-mineralized granite, Round Mtn pluton (G; J)
DRS-84-163	RT34	38	40	58	117	0	2	Iron-mineralized quartz vein in granite, Round Mtn pluton (G; RM)
DRS-84-166	WE51	38	39	52	116	52	27	Ash-flow tuff fragment in agglomerate(?) within heterolithic breccia (P; CC)
DRS-84-167	WE51	38	39	52	116	52	27	Rhyolite, rhyolite plug (P; CC)
DRS-84-172	RT34	38	39	9	116	57	21	Molybdenite-bearing garnet skarn, calc-silicate-mineralized limestone unit, Zanzibar Fm (G; J)
DRS-84-174	RT34	38	38	54	116	57	48	Sulfide- and calc-silicate-mineralized limestone, Ordovician Zanzibar Fm (G; J)
DRS-84-175	RT34	38	41	22	116	56	47	Iron-mineralized brecciated granite, eruptive unit, megabreccia of Jefferson Summit (G; J)
DRS-84-176	RT34	38	41	35	116	56	53	Iron-mineralized brecciated quartzite, vent unit, megabreccia of Jefferson Summit (G; J)
DRS-85-003	WE51	38	41	26	116	55	54	Ash-flow tuff, unit D, Bates Mtn(?) Tuff (P; J)
DRS-85-004	WE51	38	41	34	116	55	46	Ash-flow tuff, tuff of Clipper Gap (P;J)
DRS-85-006	WE51	38	41	42	116	55	16	Ash-flow tuff, lower member, Shingle Pass Tuff (P; J)
DRS-85-007	WE51	38	41	54	116	55	29	Ash-flow tuff, lower member, tuff of Pipe Organ Spring (P; J)
DRS-85-012	SJ68	38	43	14	116	59	56	Iron-mineralized quartzite, quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-85-014	SJ68	38	42	58	116	59	55	Iron-mineralized quartzite, quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-85-015	SJ68	38	42	56	116	59	45	Iron-mineralized quartz vein in limestone-argillite, limestone unit, Ordovician Zanzibar Fm (G; J
DRS-85-016	SJ68	38	42	49	116	59	46	Iron-mineralized brecciated rock, quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-85-017	SJ68	38	42	33	117	0	2	Iron-mineralized granite, Round Mtn pluton (G; RM)

DRS-85-018	SJ68	38	42	20	117	0	0	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-019	WE51	38	42	23	116	55	13	Ash-flow tuff, upper member, tuff of Pipe Organ Spring (P; J)
DRS-85-020	SJ68	38	42	14	116	55	47	Altered ash-flow tuff, upper member, tuff of Pipe Organ Spring (G; J)
DRS-85-022	WE51	38	41	48	116	54	45	Ash-flow tuff, unit 1, upper member, tuff of Pipe Organ Spring (P; J)
DRS-85-025	WE51	38	41	55	116	54	18	Ash-flow tuff, biotite-bearing ash-flow tuff (P; J)
DRS-85-032	WE51	38	43	15	116	53	59	Ash-flow tuff, Isom-type ash-flow tuff (P; J)
DRS-85-033	WE51	38	43	15	116	53	59	Ash-flow tuff, lower member, Shingle Pass Tuff (P; J)
DRS-85-038	SJ68	38	43	19	116	59	59	Iron-mineralized quartzite, quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-85-039	SJ68	38	43	22	117	0	0	Iron- and quartz-mineralized phyllitic argillite-siltstone, schist unit, Cambrian Gold Hill Fm (G; J
DRS-85-040	SJ68	38	43	24	116	59	52	Iron-mineralized argillite, schist unit, Cambrian Gold Hill Fm (G; J)
DRS-85-042	SJ68	38	43	26	116	59	57	Iron-mineralized and silicified limestone, limestone unit, Ordovician Zanzibar Fm (G; J)
DRS-85-043	SJ68	38	43	39	116	59	20	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-045	WE51	38	44	3	116	58	37	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; J)
DRS-85-049	WE51	38	42	52	116	53	40	Ash-flow tuff, upper member, Shingle Pass Tuff (P; J)
DRS-85-050A	SJ68	38	43	3	116	53	59	Iron-mineralized ash-flow tuff, lower member, Shingle Pass Tuff (G; J)
DRS-85-063	SJ68	38	42	12	116	53	21	Iron-mineralized ash-flow tuff, lower member, tuff of Pipe Organ Spring (G; J)
DRS-85-065	SJ68	38	43	13	116	55	1	Iron-mineralized tuffaceous sandstone, upper member, tuff of Pipe Organ Spring (G; J)
DRS-85-066	SJ68	38	43	58	116	59	12	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-068B	SJ68	38	44	39	116	58	55	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-071	SJ68	38	44	20	116	59	10	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-072	WE51	38	44	9	116	59	52	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; J)
DRS-85-073	SJ68	38	44	3	117	0	0	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-074	SJ68	38	43	53	116	59	57	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-076B	SJ68	38	43	26	116	58	49	Iron-mineralized silicified flow-layered rhyolite, rhyolite plug (G; J)
DRS-85-078	WE51	38	43	26	116	58	40	Ash-flow tuff, vitrophyre unit, principal member, tuff of Mount Jefferson (P; J)
DRS-85-079	SJ68	38	43	25	116	58	21	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-080	SJ68	38	43	23	116	58	18	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-081A	SJ68	38	43	17	116	58	15	Sulfide-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-083	SJ68	38	42	58	116	58	29	Pyrite-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-084A	SJ68	38	42	56	116	58	30	Manganese- and quartz-mineralized flat fault, principal member, tuff of Mount Jefferson (G; J)
DRS-85-087	SJ68	38	43	17	116	58	37	Mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-088	SJ68	38	41	45	116	57	43	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-089	SJ68	38	40	55	116	57	28	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-090	SJ68	38	40	25	116	57	20	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-091	SJ68	38	40	29	116	57	8	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-092	SJ68	38	40	37	116	56	50	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-093	SJ68	38	42	55	116	59	34	Iron-mineralized brecciated limestone, limestone unit, Cambrian Gold Hill Fm (G; J)
DRS-85-095	WE51	38	42	38	116	59	29	Tourmalinized granite, Round Mtn pluton (P; J)
DRS-85-096	SJ68	38	42	31	116	59	26	Iron-mineralized granite, Round Mtn pluton (G; J)

DRS-85-097	SJ68	38	42	26	116	59	16	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-099	SJ68	38	42	51	116	59	15	Iron-mineralized jasperized limestone, jasperized limestone unit, Ordovician Zanzibar Fm (G; J
DRS-85-103	SJ68	38	44	30	116	59	30	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-105	SJ68	38	44	37	116	59	55	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-112	WE51	38	42	8	116	54	7	Vitrophyre, upper member, tuff of Pipe Organ Spring (P; J)
DRS-85-118	SJ68	38	43	12	116	59	25	Iron-mineralized brecciated quartzite, quartzite unit, Cambrian Gold Hill Fm (G; J)
DRS-85-119	SJ68	38	42	51	116	59	10	Iron-mineralized jasperized limestone, jasperized limestone unit, Ordovician Zanzibar Fm (G; J
DRS-85-120	SJ69	38	42	49	116	59	5	Mineralized limestone, calc-silicate-mineralized limestone unit, Cambrian Gold Hill Fm (G; J)
DRS-85-121	SJ69	38	42	38	116	58	51	Iron-mineralized brecciated rock, quartzite-schist unit, Cambrian Gold Hill Fm (G; J)
DRS-85-122B	SJ69	38	42	37	116	58	47	Sulfide-mineralized argillite-quartzite, quartzite-schist unit, Cambrian Gold Hill Fm (G; J)
DRS-85-124B	SJ69	38	43	3	116	59	4	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-125	SJ69	38	42	57	116	58	57	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-127	SJ69	38	42	33	116	58	10	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-128	WE51	38	42	30	116	58	12	Andesite porphyry clast in vent unit of megabreccia of Jefferson Summit (P; J)
DRS-85-129	SJ69	38	42	24	116	58	17	Iron-mineralized limestone, limestone unit, Cambrian Gold Hill Fm (G; J)
DRS-85-131	SJ69	38	42	43	116	58	9	Pyrite-mineralized fault in ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-132A	SJ69	38	42	45	116	58	9	Sulfide-mineralized fault in ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-133B	SJ69	38	42	41	116	58	36	Mineralized rock in mine dump, adit portal in principal member, tuff of Mount Jefferson (G; J)
DRS-85-134B	SJ69	38	41	29	116	59	37	Sulfide-mineralized quartz vein in granite, Round Mtn pluton (G; J)
DRS-85-136	SJ69	38	42	7	116	59	23	Iron-mineralized quartz pod in granite, Round Mtn pluton (G; J)
DRS-85-142	SJ69	38	40	32	116	58	12	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-143	SJ69	38	40	44	116	58	56	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-144	SJ69	38	39	35	116	58	14	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-148	WE51	38	44	23	116	53	37	Ash tuff, upper sediment-tuff unit, volcaniclastic rocks of Little Table Mtn (P; J)
DRS-85-151	SJ69	38	43	0	116	58	13	Iron- and quartz-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-155B	SJ69	38	43	1	116	58	3	Iron- and quartz-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-156	SJ69	38	42	6	116	58	21	Iron- and quartz-mineralized granite, Round Mtn pluton (G; J)
DRS-85-157	SJ69	38	41	40	116	58	13	Iron-mineralized granite, Round Mtn pluton (G; J)
DRS-85-161	SJ69	38	44	35	116	55	26	Jasperoid fragments in altered tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-162	WE51	38	45	0	116	55	34	Ash-flow tuff, upper member, tuff of Mount Jefferson (P; J)
DRS-85-163	WE51	38	44	56	116	55	19	Ash-flow tuff, upper member, tuff of Mount Jefferson (P; J)
DRS-85-164	WE51	38	44	48	116	55	29	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; J)
DRS-85-172	WE51	38	44	2	116	55	25	Vitrophyre, principal member, tuff of Mount Jefferson (P; J)
DRS-85-173	WE51	38	43	39	116	55	31	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; J)
DRS-85-179B	SJ69	38	42	8	116	57	38	Sulfide-mineralized quartz vein in granite, Round Mtn pluton (G; J)
DRS-85-180	SJ69	38	42	24	116	57	55	Mineralized limestone, fault between tuff of Mount Jefferson and megabreccia of Jefferson Su
DRS-85-181B	SJ69	38	42	45	116	58	50	Pyrite-mineralized rock in breccia dike along Jefferson Canyon fault (G; J)
DRS-85-185	SJ69	38	42	3	116	57	5	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-188	SJ69	38	42	35	116	57	10	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)

DRS-85-191C	SJ69	38	42	55	116	58	50	Copper- and quartz-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-192B	SJ69	38	42	46	116	58	35	Mineralized fault gouge in principal member, tuff of Mount Jefferson (G; J)
DRS-85-192F	SJ69	38	42	45	116	58	36	Pyrite-mineralized carbonate rock, dump at lower Kanrohat tunnel north of Jefferson Canyon f
DRS-85-193A	SJ69	38	42	53	116	58	37	Iron- and manganese-mineralized brecciated ash-flow tuff in low-angle vein, tuff of Mount Jeffe
DRS-85-199	WE51	38	44	32	116	53	15	Vitrophyre, principal member, tuff of Mount Jefferson (P; J)
DRS-85-200	WE51	38	44	32	116	53	16	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; J)
DRS-85-206	WE51	38	43	17	116	57	5	Vitrophyre, principal member, tuff of Mount Jefferson (P; J)
DRS-85-213	WE51	38	44	32	116	53	55	Ash tuff, upper sediment-tuff unit, volcaniclastic rocks of Little Table Mtn (P; J)
DRS-85-216	SJ69	38	44	11	116	58	21	Iron-mineralized brecciated ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-220	SJ69	38	44	14	116	58	11	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-222	SJ69	38	41	37	116	56	34	Iron-mineralized brecciated quartzite in vent unit, megabreccia of Jefferson Summit (G; J)
DRS-85-223	WE51	38	38	53	116	51	35	Ash-flow tuff, tuff of Ryecroft Canyon (P; CC)
DRS-85-230	SJ69	38	44	13	116	56	55	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-85-231	SJ69	38	43	51	116	57	0	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; J)
DRS-87-001	VE45	38	35	43	116	52	7	Iron-mineralized quartz vein in cherty limestone, limestone unit, Ordovician Toquima Fm (G; B
DRS-87-002	VE45	38	35	52	116	52	11	Iron-mineralized argillite and quartz vein, argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-004A	VE45	38	36	10	116	51	58	Mineralized aplite sill in argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-006A	VE45	38	36	3	116	51	51	Mineralized quartz vein in quartzite intruded by aplite, Ordovician Toquima Fm (G; BE)
DRS-87-009	VE45	38	35	45	116	51	42	Iron-mineralized quartz vein in limestone, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-012	VE45	38	36	4	116	51	40	Iron-mineralized brecciated quartz vein in schist, Cambrian(?) Mayflower Fm (G; BE)
DRS-87-013	WK62	38	36	2	116	51	10	Ash-flow tuff, tuff of Ryecroft Canyon (P; BE)
DRS-87-014	WK62	38	35	58	116	51	10	Ash-flow tuff, tuff of Ryecroft Canyon (P; BE)
DRS-87-015	VE45	38	35	23	116	51	14	Brecciated jasperoid, jasperized limestone unit, Paleozoic carbonate rocks (G; BE)
DRS-87-016	VE45	38	35	22	116	51	16	Brecciated jasperoid, jasperized limestone unit, Paleozoic carbonate rocks (G; BE)
DRS-87-017	VE45	38	35	30	116	51	14	Silicified argillite-limestone, argillite unit, Paleozoic carbonate rocks (G; BE)
DRS-87-018	VE45	38	36	17	116	51	0	Iron-mineralized quartz vein in phyllitic schist-paper shale, Cambrian(?) Mayflower Fm (G; BE)
DRS-87-020	VE45	38	36	27	116	51	19	Iron-mineralized quartz vein in limestone(?), limestone(?) unit, Ordovician Toquima Fm (G; BE
DRS-87-021	VE45	38	36	25	116	51	16	Iron- and quartz-mineralized paper shale, argillite unit, Cambrian(?) Mayflower Fm (G; BE)
DRS-87-022	VE45	38	35	53	116	52	20	Mineralized fractures in limestone, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-024	VE45	38	36	14	116	52	2	Iron- and quartz-mineralized argillite, argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-025	VE45	38	36	27	116	51	58	Iron- and antimony(?)-mineralized limestone, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-026	VE45	38	36	40	116	51	28	Jasperized limestone, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-027	VE45	38	36	38	116	51	34	Iron-mineralized jasperoid, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-029	VE45	38	36	24	116	52	7	Iron-mineralized graptolitic shale, argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-032A	VE45	38	35	49	116	50	37	Iron-mineralized limestone, limestone unit, Paleozoic carbonate rocks (G; BE)
DRS-87-035A	WK62	38	33	41	116	51	58	Ash-flow tuff, upper member, crystal-rich ash-flow tuff (P; BE)
DRS-87-036	WK62	38	33	42	116	51	54	Ash-flow tuff, upper member, crystal-rich ash-flow tuff (P; BE)
DRS-87-039	VE45	38	33	35	116	51	33	Antimony(?)-mineralized siliceous argillite, siliceous argillite unit, Ordovician Toquima Fm (G; B
DRS-87-040	VE45	38	33	37	116	52	0	Iron- and quartz-mineralized brecciated jasperoid, jasperized limestone unit, Toquima Fm (G;

DRS-87-041	VE45	38	33	30	116	51	59	Iron-mineralized quartz, jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-042A	VE45	38	33	29	116	52	8	Copper-mineralized fault in jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-043A	VE45	38	33	39	116	52	8	Iron-mineralized fault in jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-044	VE45	38	33	34	116	52	21	Mineralized metasomatite, metasomatite unit, rocks of the Monarch area (G; BE)
DRS-87-046	VE45	38	33	6	116	51	58	Iron-mineralized silicified argillite, siliceous argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-048	VE45	38	32	56	116	52	2	Iron-mineralized silicified argillite, siliceous argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-050	VE45	38	32	56	116	51	44	Iron-mineralized brecciated jasperoid, jasperized limestone unit, Ordovician Toquima Fm (G; B
DRS-87-051	WK62	38	32	55	116	51	46	Ash-flow tuff, Isom-type ash-flow tuff (P; BE)
DRS-87-052	WK62	38	32	54	116	51	45	Ash-flow tuff, Isom-type ash-flow tuff (P; BE)
DRS-87-053	WK62	38	32	10	116	51	16	Ash-flow tuff, upper member, rhyolitic ash-flow tuff (P; BE)
DRS-87-054	WK62	38	32	8	116	51	18	Ash-flow tuff, lower member, rhyolitic ash-flow tuff (P; BE)
DRS-87-058	WK62	38	33	7	116	51	29	Vitrophyre, upper member, crystal-rich ash-flow tuff (P; BE)
DRS-87-061	WK62	38	32	53	116	50	54	Ash-flow tuff, tuff of Ryecroft Canyon (P; BE)
DRS-87-063	WK62	38	32	14	116	51	6	Basal vitrophyre, upper member, rhyolitic ash-flow tuff (P; BE)
DRS-87-067	WK62	38	31	39	116	50	19	Flow-layered rhyolite, rhyolite plug (P; BE)
DRS-87-068	WK62	38	31	42	116	50	18	Ash-flow tuff, lower member, rhyolitic ash-flow tuff (P; BE)
DRS-87-073	WK62	38	31	28	116	50	7	Rhyolite glass, rhyolite plug (P; BE)
DRS-87-079	VE45	38	34	19	116	52	7	Iron-mineralized aplite adjacent to quartz veinlets, aplite dike in Belmont pluton (G; BE)
DRS-87-080	WK62	38	34	25	116	52	22	Mafic layer in porphyritic granite, Belmont pluton (P; BE)
DRS-87-081A	VE45	38	34	5	116	51	59	Iron- and quartz-mineralized sheared zone, argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-082	VE45	38	33	59	116	51	45	Iron-mineralized silicified argillite, siliceous argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-083A	VE45	38	34	48	116	51	35	Mineralized siliceous argillite and silicified limestone, siliceous argillite unit, Toquima Fm (G; B
DRS-87-085A	VE45	38	34	51	116	51	37	Sulfide- and quartz-mineralized siliceous argillite, siliceous argillite unit, Toquima Fm (G; BE)
DRS-87-087	VE45	38	36	29	116	50	19	Iron-mineralized paper shale, argillite unit, Cambrian(?) Mayflower Fm (G; BE)
DRS-87-088	VE45	38	36	27	116	50	20	Iron-mineralized quartz veins in argillite unit, Cambrian(?) Mayflower Fm (G; BE)
DRS-87-089	VE45	38	33	43	116	51	49	Mineralized brecciated jasperoid, jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-092	VE45	38	33	49	116	51	28	Iron-mineralized argillite, siliceous argillite unit, Ordovician Toquima Fm (G; BE)
DRS-87-094A	VE45	38	34	43	116	51	31	Copper- and antimony-mineralized quartz lens in siliceous argillite unit, Toquima Fm (G; BE)
DRS-87-096A	VE45	38	34	46	116	51	42	Sulfide-mineralized brecciated quartz vein, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-097	VE45	38	34	44	116	51	44	Mineralized brecciated quartz vein, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-098	VE46	38	34	49	116	51	52	Iron-mineralized brecciated quartz vein, quartzite unit, Ordovician Toquima Fm (G; BE)
DRS-87-099	VE46	38	34	42	116	51	51	Pyrite-mineralized brecciated quartz vein, quartzite unit, Ordovician Toquima Fm (G; BE)
DRS-87-100A	VE46	38	34	36	116	51	42	Pyrite-mineralized quartz vein in limestone, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-87-100B	VE46	38	34	35	116	51	41	Copper- and antimony-mineralized quartz vein, limestone unit, Ordovician Toquima Fm (G; BE
DRS-87-101A	VE46	38	34	30	116	51	38	Mineralized rock, limestone unit, Ordovician Toquima Fm (G; BE)
DRS-90-016	WK62	38	30	24	116	51	17	Ash-flow tuff, tuff of Ryecroft Canyon (P; BE)
DRS-90-017A	UT92	38	30	12	116	51	13	"Gneissic" metamorphic rock, phyllitic schist in argillite unit, rocks of the Monarch area (G; BE)
DRS-90-022	UT92	38	30	8	116	51	3	Iron-mineralized siliceous argillite, argillite unit, rocks of the Monarch area (G; BE)
DRS-90-023	UT92	38	30	23	116	51	9	Iron-mineralized siliceous argillite, argillite unit, rocks of the Monarch area (G; BE)

DRS-90-025	UT92	38	30	9	116	51	31	Iron-mineralized tuff, matrix of megabreccia of Hunts Canyon (G; BE)
DRS-90-028	WK62	38	30	57	116	49	17	Flow-layered rhyolite, rhyolite flows and domes (P; BE)
DRS-90-031	UT92	38	30	15	116	52	12	Iron-mineralized quartz veinlets in claystone-siltstone-sandstone unit (G; BE)
DRS-90-037	UT92	38	30	21	116	51	32	Iron-mineralized siliceous argillite, argillite unit, rocks of the Monarch area (G; BE)
DRS-90-039	WK62	38	30	26	116	51	42	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; BE)
DRS-90-047B	UT92	38	34	59	116	51	43	Sulfide-mineralized quartz vein in argillite, argillite unit, Ordovician Toquima Fm (G; BE)
DRS-90-047C	UT92	38	34	58	116	51	42	Iron-mineralized argillite 2 m from quartz vein, argillite unit, Ordovician Toquima Fm (G; BE)
DRS-90-048B	UT92	38	35	2	116	51	39	Sulfide-mineralized quartz vein in argillite, argillite unit, Ordovician Toquima Fm (G; BE)
DRS-90-052	UT92	38	32	43	116	52	29	Iron-mineralized greenstone, greenstone unit, rocks of the Monarch area (G; BE)
DRS-90-055	UT92	38	32	56	116	52	5	Mineralized jasperoid, jasperized limestone unit, Ordovician Toquima Fm (G; BE)
DRS-90-058	WK62	38	31	35	116	51	29	Ash-flow tuff, lower member, rhyolitic ash-flow tuff (P; BE)
DRS-90-060	UT92	38	32	6	116	52	24	Iron-mineralized quartz vein in siliceous argillite unit, Ordovician Toquima Fm (G; BE)
DRS-90-064	WK62	38	31	54	116	52	35	Greenstone, greenstone unit of northern facies, rocks of the Monarch area (P; BW)
DRS-91-005	WK62	38	32	33	116	45	37	Ash-flow tuff, unit C(?), Bates Mtn Tuff (P; BE)
DRS-91-010	WK62	38	38	10	116	51	3	Ash-flow tuff, unit C, Bates Mtn Tuff (P; CC)
DRS-91-012	UT92	38	37	38	116	52	7	Iron-mineralized quartz vein in platy argillite, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-013	UT92	38	37	31	116	52	14	Iron-mineralized quartz vein in platy argillite, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-014	UT92	38	37	37	116	52	28	Iron-mineralized quartz vein in platy argillite, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-015	UT92	38	37	46	116	52	16	Iron-mineralized quartz vein in platy argillite, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-034	UT92	38	39	13	116	51	35	Mineralized fault in ash-flow tuff, tuff of Ryecroft Canyon (G; CC)
DRS-91-036	WK62	38	39	22	116	49	15	Ash-flow tuff, unit D, Bates Mtn Tuff (P; CC)
DRS-91-038	WK62	38	40	6	116	49	40	Ash-flow tuff, tuff of Ryecroft Canyon(?) (P; CC)
DRS-91-039	UT92	38	39	0	116	50	52	Iron- and manganese-mineralized ash-flow tuff, tuff of Ryecroft Canyon (G; CC)
DRS-91-042B	UT92	38	39	32	116	50	55	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-043	UT92	38	39	32	116	50	50	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-045	UT92	38	39	51	116	50	22	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-047	UT92	38	39	49	116	50	47	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-048	UT92	38	39	53	116	50	50	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-050	UT92	38	39	54	116	50	53	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-051	UT92	38	40	5	116	50	38	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-052	UT92	38	40	2	116	50	30	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-053	UT92	38	40	13	116	50	21	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-054	UT92	38	40	21	116	50	15	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-055	UT92	38	40	38	116	50	31	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-056	UT92	38	40	51	116	50	34	Iron-mineralized fragment of tuff of Corcoran Canyon in megabreccia of Meadow Canyon (G; C
DRS-91-057	UT92	38	40	48	116	50	25	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-058	UT92	38	40	46	116	50	1	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-060	UT92	38	40	18	116	49	41	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-061	UT92	38	40	43	116	48	54	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)

DRS-91-064	UT92	38	40	41	116	49	22	Iron-mineralized ash-flow tuff block in unnamed megabreccia unit (G; CC)
DRS-91-065	UT92	38	40	55	116	49	21	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-066	UT92	38	40	45	116	49	31	Ocherous soil on altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-067	UT92	38	40	35	116	49	4	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-068	WK62	38	39	0	116	52	15	Ash-flow tuff, tuff of Ryecroft Canyon (P; CC)
DRS-91-070	UT92	38	39	29	116	51	59	Iron-mineralized ash-flow tuff, tuff of Ryecroft Canyon (G; CC)
DRS-91-071	UT92	38	39	38	116	52	28	Iron-mineralized quartz vein in platy argillite, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-072	UT93	38	39	38	116	52	26	Iron- and quartz-mineralized brecciated thrust fault between Mayflower and Zanzibar(?) Fms (
DRS-91-073	UT93	38	39	37	116	52	27	Iron-mineralized quartz vein in limestone, Ordovician Zanzibar(?) Fm (G; CC)
DRS-91-077	WK62	38	39	49	116	52	12	Tuff breccia, matrix of megabreccia of Meadow Canyon (P; CC)
DRS-91-078	UT93	38	39	48	116	51	50	Iron-mineralized quartz vein in phyllitic silty shale, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-079	UT93	38	40	58	116	49	23	Iron-mineralized brecciated ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-080	UT93	38	41	3	116	49	51	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-083	UT93	38	41	7	116	49	38	Iron-mineralized fractures in ash-flow tuff, upper(?) member, tuff of Corcoran Canyon (G; CC)
DRS-91-085	UT93	38	41	6	116	49	7	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-086	UT93	38	41	12	116	49	47	Iron- and chalcedony-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC
DRS-91-088	UT93	38	41	4	116	50	11	Iron-mineralized ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-090	UT93	38	41	3	116	50	36	Iron-mineralized brecciated ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-91-100	WK62	38	41	50	116	50	50	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
DRS-91-101	UT93	38	41	29	116	50	42	Iron-, quartz-, and carbonate-mineralized tuff breccia, upper member, tuff of Corcoran Canyon
DRS-91-102	UT93	38	41	25	116	50	56	Iron-mineralized brecciated ash-flow tuff, upper member, tuff of Corcoran Canyon (G; CC)
DRS-91-103	UT93	38	41	23	116	51	2	Iron- and quartz-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
DRS-91-105	UT93	38	41	17	116	51	5	Iron-mineralized tuff breccia, principal member, tuff of Mount Jefferson (G; CC)
DRS-91-106A1	WK62	38	40	48	116	50	51	Ash-flow tuff, upper member, tuff of Corcoran Canyon (P; CC)
DRS-91-106A2	WK62	38	40	48	116	50	51	Ash-flow tuff fiamme, upper member, tuff of Corcoran Canyon (P; CC)
DRS-91-106B	UT93	38	40	48	116	50	51	Iron-mineralized fractures in ash-flow tuff, upper member, tuff of Corcoran Canyon (G; CC)
DRS-91-116	UT93	38	40	37	116	50	51	Iron-mineralized brecciated block of tuff of Corcoran Canyon in megabreccia of Meadow Cany
DRS-91-117	UT93	38	40	18	116	50	52	Iron-mineralized ash-flow tuff, upper member, tuff of Corcoran Canyon (G; CC)
DRS-91-121	UT93	38	40	37	116	51	18	Iron-mineralized ash-flow tuff, upper member, tuff of Corcoran Canyon (G; CC)
DRS-91-125	UT93	38	41	32	116	50	28	Iron-mineralized ash-flow tuff, brecciated large slab in megabreccia of Meadow Canyon (G; CC
DRS-91-128B	UT93	38	41	42	116	50	16	Iron-mineralized ash-flow tuff, brecciated large block in megabreccia of Meadow Canyon (G; C
DRS-91-135	UT93	38	41	47	116	50	7	Iron-mineralized ash-flow tuff, brecciated block in megabreccia of Meadow Canyon (G; CC)
DRS-91-136	UT93	38	41	46	116	50	12	Iron-mineralized ash-flow tuff, brecciated block in megabreccia of Meadow Canyon (G; CC)
DRS-91-140	UT93	38	41	45	116	50	22	Iron-mineralized ash-flow tuff, brecciated block in megabreccia of Meadow Canyon (G; CC)
DRS-91-143	UT93	38	41	35	116	49	23	Iron-mineralized ash-flow tuff fragment in megabreccia of Meadow Canyon (G; CC)
DRS-91-147A	UT93	38	41	43	116	49	33	Calcite-rich breccia with ash-flow tuff fragments, megabreccia of Meadow Canyon (G; CC)
DRS-91-147B	UT93	38	41	42	116	49	32	Calcite-rich breccia with ash-flow tuff fragments, megabreccia of Meadow Canyon (G; CC)
DRS-91-150	UT93	38	41	39	116	49	16	Iron- and quartz-mineralized ash-flow tuff fragment in megabreccia of Meadow Canyon (G; CC
DRS-91-152	UT93	38	39	31	116	51	0	Iron-mineralized brecciated ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)

DRS-91-156	UT93	38	39	53	116	51	30	Iron-mineralized quartz vein in platy shale, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-157	UT93	38	39	40	116	51	48	Iron-mineralized quartz vein in platy shale, Cambrian(?) Mayflower Fm (G; CC)
DRS-91-158A	WK62	38	39	32	116	51	38	Ash-flow tuff, matrix of megabreccia of Meadow Canyon (P; CC)
DRS-91-161C	UT93	38	39	55	116	52	36	Iron-mineralized tuff matrix of heterolithic breccia (G; J)
DRS-91-166A	WK62	38	31	28	116	52	36	Ash-flow tuff, rhyolite ash-flow tuff unit (P; BW)
DRS-91-169	WK62	38	42	4	116	50	35	Vitrophyre, principal member, tuff of Mount Jefferson (P; CC)
DRS-92-002	VE46	38	40	48	116	48	44	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-003	VE46	38	40	52	116	48	38	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-004	VE46	38	41	5	116	48	41	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-005	VE46	38	41	14	116	48	41	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-006	VE46	38	40	54	116	48	50	Iron-mineralized joints in ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-007	VE46	38	41	8	116	48	49	Iron- and silica-mineralized fault in altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-008	VE46	38	41	10	116	48	53	Iron-mineralized fault in altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-009	VE46	38	41	27	116	48	46	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-010	VE46	38	41	34	116	48	42	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-012	VE46	38	41	11	116	49	1	Altered ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-92-013	VE46	38	41	38	116	48	15	Iron-mineralized brecciated ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; C
DRS-92-014	VE46	38	41	35	116	48	15	Iron-mineralized brecciated lens of ash-flow tuff, upper member, tuff of Corcoran Canyon (G; C
DRS-92-015	VE46	38	41	37	116	48	17	Iron-mineralized brecciated ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; C
DRS-92-027	VV11	38	42	29	116	51	57	Zeolitic tuff, zeolitic tuff unit, volcaniclastic rocks of Little Table Mtn (P; BW)
DRS-92-029	VV11	38	42	29	116	51	58	Zeolitic tuff, zeolitic tuff unit, volcaniclastic rocks of Little Table Mtn (P; BW)
DRS-92-032	WK62	38	41	31	116	51	32	Tuff breccia, unnamed megabreccia (P; CC)
DRS-92-038	WK62	38	41	26	116	51	41	Ash-flow tuff block in sediment-fill of channel containing unnamed megabreccia (P; CC)
DRS-92-039	VE46	38	41	23	116	51	38	Iron-mineralized detrital layer in ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC
DRS-92-040	VE46	38	41	55	116	49	15	Altered ash-flow tuff, upper member, tuff of Corcoran Canyon (G; CC)
DRS-92-041	VE46	38	43	12	116	52	14	Iron-mineralized clay in siltstone-sandstone, volcaniclastic rocks of Little Table Mtn (G; CC)
DRS-92-046	WK62	38	41	11	116	52	18	Ash tuff, lower sediment-tuff unit, volcaniclastic rocks of Little Table Mtn (P; CC)
DRS-92-050	VE46	38	41	48	116	51	17	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
DRS-92-051	WK62	38	41	58	116	52	7	Ash-flow tuff, block of lower member, Shingle Pass Tuff in landslide (P; CC)
DRS-92-053	VE46	38	42	7	116	47	54	Iron-mineralized ash-flow tuff, lower(?) member, tuff of Corcoran Canyon (G; CC)
DRS-92-054	VE46	38	42	8	116	47	51	Iron- and antimony(?)-mineralized ash-flow tuff, upper member, tuff of Corcoran Canyon (G; C
DRS-92-055	VE46	38	42	10	116	47	50	Iron-mineralized ash bed in tuffaceous sediment, upper member, tuff of Corcoran Canyon (G;
DRS-92-056	VE46	38	41	52	116	49	10	Altered ash-flow tuff, upper member, tuff of Corcoran Canyon (G; CC)
DRS-92-058	VE46	38	41	52	116	50	3	Molybdenum-mineralized brecciated rhyolite plug marginal to Corcoran Creek diatreme (G; CC
DRS-93-001	WK62	38	43	17	117	1	25	Vitrophyre, part of matrix of megabreccia of Jefferson Canyon (P; RM)
DRS-93-002B	VV20	38	42	1	116	48	18	Iron-mineralized ash tuff, sediment and tuff unit, volcaniclastic rocks of Little Table Mtn (G; CC
DRS-93-003	VV20	38	41	54	116	48	52	Iron-mineralized ash-flow tuff breccia, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-93-004	VV20	38	41	56	116	49	7	Iron-mineralized quartz vein in altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-93-005	VV20	38	41	45	116	48	42	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)

DRS-93-006	VV20	38	41	38	116	48	30	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-93-007	VV20	38	41	40	116	49	1	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-93-008	VV20	38	41	12	116	49	30	Iron-mineralized sheared ash-flow tuff, lower member, tuff of Corcoran Canyon (G; CC)
DRS-93-009	VV20	38	41	32	116	48	13	Iron-mineralized ash-flow tuff, upper member, tuff of Corcoran Canyon (G; CC)
DRS-93-010	WK62	38	41	45	116	48	30	Flow-layered rhyolite, rhyolite plug (P; CC)
DRS-93-013	VV20	38	44	13	116	48	44	Iron-mineralized ash-flow tuff, tuff of Mount Jefferson (G; CC)
DRS-93-014	VV20	38	44	6	116	48	48	Iron-mineralized ash-flow tuff, tuff of Mount Jefferson (G; CC)
DRS-93-015	VV20	38	44	3	116	48	48	Iron-mineralized ash-flow tuff, tuff of Mount Jefferson (G; CC)
DRS-93-016	VV20	38	44	1	116	48	38	Iron-mineralized rhyolite, rhyolite plug (G; CC)
DRS-93-017	VV20	38	43	52	116	48	38	Iron-mineralized rhyolite, rhyolite plug (G; CC)
DRS-93-018	VV20	38	43	45	116	48	51	Iron-mineralized rhyolite, rhyolite plug (G; CC)
DRS-93-019A	VV20	38	43	41	116	48	38	Iron-mineralized rhyolite, rhyolite plug (G; CC)
DRS-93-020	VV20	38	42	36	116	48	48	Iron-mineralized ash-flow tuff, tuff of Clipper Gap (G; CC)
DRS-93-021	VV20	38	43	13	116	48	47	Iron-mineralized ash-flow tuff, upper member, tuff of Pipe Organ Spring (G; CC)
DRS-93-022	VV20	38	42	41	116	48	8	Iron-mineralized ash-flow tuff, Unit D, Bates Mtn Tuff (G; CC)
DRS-93-023	VV20	38	44	30	116	49	5	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
DRS-93-024	VV20	38	44	23	116	48	49	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
DRS-93-025A	VV20	38	41	29	116	49	15	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-93-026A	VV20	38	41	26	116	49	10	Mineralized quartz vein on Silver Reef Hill in altered lower member, tuff of Corcoran Canyon (G
DRS-93-026B	VV20	38	41	27	116	49	11	Iron-mineralized ash-flow tuff near vein, altered lower member, tuff of Corcoran Canyon (G; CC
DRS-93-027A	VV20	38	41	32	116	49	6	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
DRS-93-028	VV20	38	41	48	116	48	32	Iron-mineralized rhyolite, rhyolite plug (G; CC)
DRS-93-029	WK62	38	41	49	116	48	32	Flow-layered rhyolite, rhyolite plug (P; CC)
DRS-94-004	WK62	38	41	26	116	56	25	Volcanic matrix, megabreccia of Jefferson Summit (P; J)
RH-CC-001	UT93	38	42	17	116	49	55	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
RH-CC-002	UT93	38	42	7	116	49	38	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
RH-CC-003	UT93	38	42	6	116	49	38	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
RH-CC-004	UT93	38	42	12	116	49	30	Iron-mineralized ash-flow tuff, principal member, tuff of Mount Jefferson (G; CC)
RH-CC-005	UT93	38	41	48	116	48	4	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
RH-CC-006	UT93	38	41	48	116	48	5	Iron-mineralized ash-flow tuff, altered lower member, tuff of Corcoran Canyon (G; CC)
RH-TP-572	UT94	38	42	20	116	50	0	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-573	UT94	38	42	14	116	50	1	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-576	UT94	38	42	28	116	49	56	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-577	UT94	38	42	20	116	50	1	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-579	UT94	38	42	24	116	50	5	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-581	UT94	38	42	27	116	50	8	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-582	UT94	38	42	31	116	50	9	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-583	UT94	38	42	37	116	50	8	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-589	UT94	38	43	30	116	49	0	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)

RH-TP-591	UT94	38	43	27	116	49	22	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-593	UT94	38	43	30	116	49	32	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-594	UT94	38	43	36	116	49	40	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-595	UT94	38	43	36	116	49	42	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-601	UT94	38	42	35	116	48	0	Ash-flow tuff, upper member, tuff of Pipe Organ Spring (P; CC)
RH-TP-602	UT94	38	42	38	116	48	3	Ash-flow tuff, tuff of Clipper Gap (P; CC)
RH-TP-605	UT94	38	42	55	116	48	18	Ash-flow tuff, tuff of Clipper Gap (P; CC)
RH-TP-606	UT94	38	42	35	116	48	9	Ash-flow tuff, ash-flow tuff unit, Isom-type ash-flow tuff (P; CC)
RH-TP-607	UT94	38	42	38	116	48	13	Ash-flow tuff, lower member, Shingle Pass Tuff (P; CC)
RH-TP-614	UT94	38	42	47	116	49	4	Ash-flow tuff, biotite-bearing ash-flow tuff unit (P; CC)
RH-TP-627	UT94	38	44	55	116	49	38	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-630	UT94	38	44	57	116	49	54	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-632	UT94	38	44	16	116	49	25	Ash-flow tuff, vitrophyre unit, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-645	UT94	38	44	44	116	51	28	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-655	UT94	38	42	54	116	49	39	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)
RH-TP-659	UT94	38	42	52	116	49	15	Ash-flow tuff, tuff of Clipper Gap (P; CC)
RH-TP-674	UT94	38	44	39	116	52	19	Ash-flow tuff, principal member, tuff of Mount Jefferson (P; CC)