Alaska Resource Data File, Mount McKinley quadrangle, Alaska

By Charles C. Hawley [1]

Open-File Report 2004-1200

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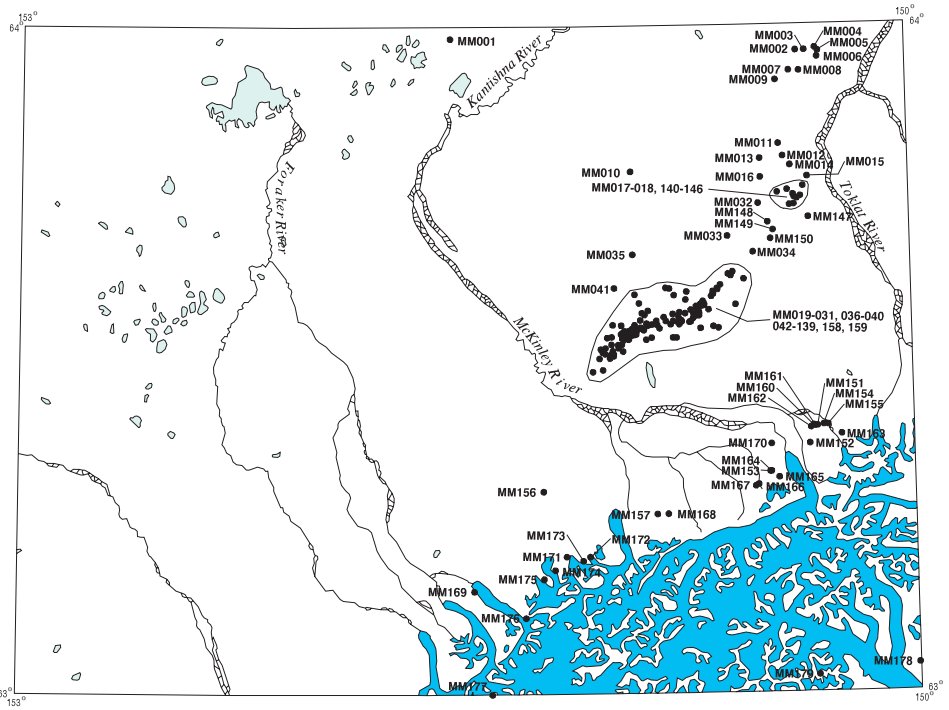
Alaska Resource Data File

Mount McKinley quadrangle

Descriptions of the mineral occurrences shown on the accompanying figure follow. See U.S. Geological Survey (1996) for a description of the information content of each field in the records. The data presented here are maintained as part of a statewide database on mines, prospects and mineral occurrences throughout Alaska.



Distribution of mineral occurrences in the Mount McKinley 1:250,000-scale quadrangle, Alaska

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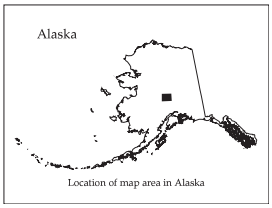
Charles C. Hawley
Anchorage, AK



OPEN-FILE REPORT 2004-1200

Site name(s): Unnamed (north of Chilchukabena Lake)

Site type: Occurrence

ARDF no.: MM001

Latitude: 63.9829 **Quadrangle:** MM D-4

Longitude: 151.5474

Location description and accuracy:

This occurrence is on the west side of the range of low hills that extends north from Chilchukabena Lake. The location is approximately at the midpoint of the boundary between sections 6 and 7, T 11 S., R. 20 W., Fairbanks Meridian. It is probably accurate within about 1000 feet. The location correponds to that of rock samples 5 and 6 of Hawley and Associates (1978).

Commodities:

Main: Be, Sn, Th, U

Other: Pb, Zn

Ore minerals:

Gangue minerals: Feldspar, quartz

Geologic description:

A stock of McKinley-type granite (Reed and Lanphere, 1973) forms hills north of Chilchukabena Lake. The outcrop of the stock is about 3 miles long and 1.3 miles across; a small granite cupola crops out northeast of the stock. Only the approximate southern two-thirds of the stock is in the Mt. McKinley quadrangle.

In 1975, Hawley and Associates (1978) made an airborne radiometric survey of the area using a hand-held spectrometer. The aircraft flew about 150 feet above the ground at 90 miles per hour. Background radiation over the granite mass was relatively high, partly due to its potassium feldspar content, but the radiation level was more than twice background over the cupola. Hawley and Associates collected samples of slightly altered, fine- and coarse-grained granite onn the south side of the stock (the location of this occurrence). The samples contained up to 50 ppm lead, 200 ppm zinc, 20 ppm beryllium, and 10 ppm tin.

The granite at this site resembles the granite that hosts beryllium and base-metal prospects in the Boulder Creek or Tonzona area west of the old park boundary (Hawley and Associates, 1978, p. 4,124-126).

Alteration:

Weak argillic(?) alteration.

Age of mineralization:

The stock is tentatively correlated with McKinley-type granite, which is about 55 Ma (Reed and Lanphere, 1973).

Deposit model:

Weakly-altered tin(?) granite.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
Hawley and Associates (1978) conducted an airborne radiometric survey and reconnaissance-sampled the stock.

Production notes:

Reserves:

Additional comments:
The south part of the granite stock is in Denali National Park and Preserve.

References:
Reed and Lanphere, 1973; Hawley and Associates, 1978.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Quartz lode No. 1

Site type: Occurrence

ARDF no.: MM002

Latitude: 63.9610 **Quadrangle:** MM D-1

Longitude: 150.3704

Location description and accuracy:

The Quartz lode No. 1 occurrence is at an elevation of about 1500 feet on the west side of the canyon of Chitsia Creek. It is about 2 miles above the mouth of the canyon, near the center of section 18, T. 11 S., R. 14 W., Fairbanks Meridian. The location is probably accurate within 1500 feet.

The occurrence is number 73 of Bundtzen, Smith, and Tosdal (1976), 32 of MacKevett and Holloway (1977), 53 of Hawley and Associates (1978), and 82 of Bundtzen (1981), and corresponds to an unnamed vein in Cobb (1980 [OFR 80-363]).

Commodities:

Main: Cu

Other: Ag, Mo, Pb

Ore minerals: Chalcopyrite, galena, malachite

Gangue minerals: Quartz

Geologic description:

This deposit consists of a chalcopyrite- and galena-bearing quartz vein that cuts metarhyolite porphyry of the Upper Devonian and Mississippian Totatlanika Formation (Bundtzen, 1981). The vein is 2- to 3-feet thick, strikes about N 40 W, and dips 70 W. Rocks at the occurrence are coated with malachite. Grab samples assayed 0.58-1 percent copper, as much as 210 ppm lead, 51 ppm molybdenum, and 0.24 ounce of silver per ton. Bundtzen (1981) suggests that molybdenum is a characteristic trace element in deposits affiliated with the metarhyolite.

The age of the vein is uncertain. It may be as old as Devonian or Mississippian, the depositional age of the Totatlanika Formation, or as young as Eocene (see MM091).

Alteration:

Oxidation of copper mineral.

Age of mineralization:

The age of the vein is uncertain. It may be as old as Devonian or Mississippian, the depositional age of the Totatlanika Formation, or as young as Eocene (see MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: No

Site Status: Inactive

Workings/exploration:

The vein was discovered, mapped, and sampled by Bundtzen, Smith, and Tosdal (1976). There are no significant workings.

Production notes:

Reserves:

Additional comments:

The occurrence is in Denali National Park and Preserve.

References:

Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 02/06/01

Site name(s): Unnamed (west-southwest of Chitsia Mountain)

Site type: Occurrence

ARDF no.: MM003

Latitude: 63.9610 **Quadrangle:** MM D-1

Longitude: 150.3411

Location description and accuracy:
This occurrence is at an elevation of about 2300 feeton an unnamed ridge about 1.4 miles west-southwest of Chitsia Mountain. The location is accurate within 500 feet. It corresponds to number 33 of MacKevett and Holloway (1977), 74 of Bundtzen, Smith, and Tosdal (1976), 55 of Hawley and Associates (1978), and 83 of Bundtzen (1981), and is cited as an unnamed location by Cobb (1980 [OFR 80-363]).

Commodities:

Main: Pb

Other: Ag, Au, Mo, Th, U, Zn

Ore minerals: Cerussite, galena, limonite, sphalerite

Gangue minerals: Quartz

Geologic description:
The country rock at this occurrence is metarhyolite porphyry of the Totatlanika Formation, a volcanic-rich unit of Late Devonian and Mississippian age (Bundtzen, 1981). The deposit is a mineralized quartz vein 1 to 3 feet thick that strikes N 20-40 W, and is almost vertical. The vein is oxidized to a lead- and silver-bearing limonitic boxwork (gossan) that contains cerussite and, probably, small amounts of remnant galena and sphalerite. Selected samples of the vein assayed 3.10-10.5 percent lead, 1.17-2.73 ounces of silver per ton, 0.24 percent zinc, 0.02 ounce of gold per ton, and up to 72 ppm molybdenum, 24 ppm uranium, and 15 ppm thorium (Bundtzen, 1981, table 10, number 83).
Although speculative, the trace element geochemistry of this vein is at least permissive of a syngenetic or diagenetic origin, related to Upper Devonian or Mississippian Totatlanika volcanism (Bundtzen, 1981). An Eocene age is also possible (see MM091).

Alteration:
Oxidation of iron and lead minerals.

Age of mineralization:
Although speculative, the trace element geochemistry of this vein is at least permissive of a syngenetic or diagenetic origin, related to Upper Devonian or Mississippian Totatlanika volcanism (Bundtzen, 1981). An Eocene age is also possible (see MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Unnamed (on Chitsia Mountain)

Site type: Occurrence

ARDF no.: MM004

Latitude: 63.9643 **Quadrangle:** MM D-1

Longitude: 150.3046

Location description and accuracy:
This 300-foot-long mineral occurrence (Cobb, 1980 [OFR 80-363]) is on a ridge crest about 2500 feet west-southwest of the top of Chitisia Mountain. The location is at the approximate midpoint of the occurrence and is accurate within 250 feet. The occurrence correponds to number 77 of Bundtzen, Smith, and Tosdal (1976), 58 of Hawley and Associates (1978), and 84 of Bundtzen (1981).

Commodities:

Main: Ba

Other: Ag, Pb, Zn

Ore minerals: Barite, galena, pyrite, sphalerite

Gangue minerals:

Geologic description:
This occurrence is a stratiform deposit in schistose metarhyolite porphyry in the Upper Devonian to Mississippian Totatlanika Formation (Bundtzen, 1981, p. 82). The outcrop of the deposit is about 300 feet long and about 10 feet wide; it strikes ENE and dips about 30 NW (Hawley and Associates, 1978; fig. 4.1-A(3)). The deposit consists of barite-rich layers 1 to 6 inches thick in silicified(?) schist containing pyrite, galena, and sphalerite. Selected barite-rich samples contain 36-52 percent barium. Pyrite is fairly abundant; galena and sphalerite less so. Some grab samples assayed up to 3.1 percent lead and 0.8 ounce of silver per ton, but most contained 1 percent or less each of lead and zinc (Buntzen, Smith, and Tosdal (1976); Hawley and Associates, 1978; Bundtzen, 1981). The deposit is probably volcanogenic in origin, and formed in Late Devonian or Mississippian time.

Alteration:
Silification of Totatlanika schistose metarhyolite.

Age of mineralization:
The deposit is probably Late Devonian or Mississippian, the depositional age of the Totatlanika metarhyolite hostrock (Bundtzen, 1981).

Deposit model:
Distal, barite-rich, kuroko massive sulfide deposit (Cox and Singer, 1986; model 28a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
28a

Production Status: No

Site Status: Inactive

Workings/exploration:

The deposit was discovered during reconnaissance geologic mapping of the Kantishna district (Bundtzen, Smith, and Tosdal, 1976). There are no significant workings.

Production notes:

Reserves:

Additional comments:

The occurrence exemplifies stratiform, volcanogenic deposits in metarhyolite schist of the Upper Devonian to Mississippian Totatlanika Formation. It is in Denali National Park and Preserve.

References:

Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Unnamed (south of the peak of Chitsia Mountain)

Site type: Occurrence

ARDF no.: MM005

Latitude: 63.9596 **Quadrangle:** MM D-1

Longitude: 150.2948

Location description and accuracy:
This occurrence is about 2500 feet south of the peak of Chitsia Mountain. The location is taken from Bundtzen, Smith, and Tosdal's (1976, pl. 2) reconnaissance map and is probably accurate within 1000 feet. The occurrence correponds to number 76 of Bundtzen, Smith, and Tosdal (1976) and 85b of Bundtzen (1981).

Commodities:

Main: Ag, Au

Other: Cu, Mo, Sb

Ore minerals: Chalcopyrite, pyrite, stibnite(?)

Gangue minerals: Calcite, quartz

Geologic description:
The country rock in the area of this occurrence consists of phyllite and metarhyolite of the Upper Devonian and Mississippian Totatlanika Formation (Hawley and Associates, 1978, fig. 4.1-A(3); Bundtzen, 1981). The deposit is a vein that strikes NNW and is nearly vertical. It contains quartz, calcite, pyrite, some chalcopyrite, and, possibly, stibnite. Grab samples assayed up to 0.09 ounce of gold per ton, 0.96 ounce of silver per ton, 0.45 percent antimony, 100 ppm molybdenum, and 400 ppm each of copper, lead, and zinc (Bundtzen, 1981, occurrence 85a, table 10). The age and affiliation of the vein is uncertain. Elevated molybdenum is characteristic of deposits in Totatlanika metarhyolite (Bundtzen, 1981).

Alteration:

Age of mineralization:
Uncertain: possibly Late Devonian or Mississippian (Bundtzen, 1981), or Eocene (see record MM091).

Deposit model:
Low-sulfide Au(?)-quartz vein (Cox and Singer, 1986; model 36a?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a?

Production Status: None

Site Status: Inactive

Workings/exploration:
The area has been reconnaissnce mapped and sampled (Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978). There are no significant workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Unnamed (south flank of Chitsia Mountain)

Site type: Occurrence

ARDF no.: MM006

Latitude: 63.9507 **Quadrangle:** MM D-1

Longitude: 150.2977

Location description and accuracy:
The approximate location of this occurrence is on the south flank of Chitsia Mountain at an elevation of about 2800 feet. It probably is the NE1/4 of section 21, T. 11 S., R. 14 W., Fairbanks Meridian. The occurrence corresponds to number 75 of Bundtzen, Smith, and Tosdal (1976) and 85a of Bundtzen (1981).

Commodities:

Main: Cu

Other: Pb, Zn

Ore minerals: Chalcopyrite, limonite, pyrite

Gangue minerals:

Geologic description:
The area of this occurrence is probably underlain by phyllite and porphyritic metarhyolite of the Upper Devonian and Mississippian Totatlanika Formation (Hawley and Associates, 1978, fig. 4.1-A(3); Bundtzen, 1981). The occurrence consists of limonitic gossan developed on pyritic metarhyolite and phyllite; small amounts of chalcopyrite are associated with the pyrite. Grab samples of the limonitic material contained up to 400 ppm each of copper and lead, and 500 ppm zinc. Gold was not detected, but three samples each assayed 0.01 ounce of silver per ton (Bundtzen, 1981, occurrence 85a, table 10). The occurrence is similar geologically to those at MM007 and MM009, which are also in the Totatlanika Formation.

Alteration:
Iron-oxide alteration.

Age of mineralization:
Possibly Late Devonian or Mississippian, the depositional age of the Totatlanika Formation.

Deposit model:
Stratabound sulfide deposit in metarhyolite.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The area has been reconnaissance mapped and sampled (Hawley and Associates, 1978, fig. 4.1-A(3); Bundtzen, 1981). There are no siginificant workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Unnamed (southeast of hill 2910, west of Chitsia Creek)

Site type: Occurrence

ARDF no.: MM007

Latitude: 63.9309 **Quadrangle:** MM D-1

Longitude: 150.3955

Location description and accuracy:

This occurrence is a mineralized bedrock unit several hundred feet across that trends northeasterly about a half-mile southeast of hilltop 2910. The hill is about 3.5 miles southwest of Chitsia Mountain. For this record, the location is at an elevation of about 2200 feet, in the SE1/4 of section 25, T. 11 S., R. 15 W., Fairbanks Meridian. The site is the approximate midpoint of the mineralized outcrop, which is partly in section 25, and partly in section 30, T. 11S., R. 14 W. The location is accurate.

The occurrence described in this record includes 'gossan 2' and 'gossan 3' (numbers 71 and 72) of Bundtzen, Smith, and Tosdal (1976), and numbers 80b and 81 of Bundtzen (1981). It is briefly noted by Cobb (1980 [OFR 80-363]).

Commodities:

Main: Ag, Zn

Other: Au, Mo, Pb

Ore minerals: Galena, limonite, pyrite, sphalerite

Gangue minerals:

Geologic description:

This occurrence is a zone of pyritic schist marked on the surface by limonitic gossan. The most strongly mineralized part of the zone can be followed ENE for more than 3000 feet. The schist is a unit in metarhyolite tuff of the Upper Devonian and Mississippian Totatlanika Formation (Bundtzen, 1981).

The area was mapped and sampled in 1976 as part of a U. S. Bureau of Mines-sponsored evaluation of lands adjacent to then McKinley National Park (Hawley and Associates, 1978, fig. 4.1-A(3)). Samples of soil overlying the gossan suggest that the deposit is at least 400 feet across and trends east-northeast. On an eastern soil line, in a 400-foot-wide zone, the soil contained 45-195 ppm lead, 130-600 ppm zinc, and 0.02-1.2 ppm silver. On a soil line 3000 feet to the west, values were as much as 220 ppm lead, 210 ppm zinc, 1.0 ppm silver, and 0.03 ppm gold (Hawley and Associates, 1978, fig. and table no 4.1-A(3)). Samples of the gossan collected by Bundtzen (1981) contained as much as 330 ppm molybdenum, 0.52 percent zinc, and 10 ppm silver. Lead and zinc values this high indicate galena and sphalerite, or their oxidation products. Bundtzen, Smith, and Tosdal (1976) identified microscopic sphalerite, exsolved in pyrite. The deposit may extend to the west, but is covered by colluvium. Stream- sediment samples collected from drainages west of the deposit contained as much as 810 ppm zinc.

The deposit is probably of syngenetic or diagenetic origin, roughly contemporaneous with deposition of the Totatlanika metarhyolite tuff.

Alteration:

Iron-oxide alteration.

Age of mineralization:

Probably Late Devonian and Mississippian, the depositional age of the Totatlanika Formation (Bundtzen, 1981).

Deposit model:
Mineralized metarhyolite tuff.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: No

Site Status: Inactive

Workings/exploration:
There are no workings. The area has been reconnaissance mapped and sampled by Bundtzen, Smith, and Tosdal (1976), Hawley and Associates (1978), and Bundtzen (1981).

Production notes:

Reserves:

Additional comments:
This occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Chitsia Creek

Site type: Mine

ARDF no.: MM008

Latitude: 63.9304 **Quadrangle:** MM D-1

Longitude: 150.3606

Location description and accuracy:
Chitsia Creek rises on the west flank of the northern part of the Kantishna Hills and flows generally northwestly for about 20 miles into the Kantishna River. The location marks an inactive placer mine reported by Bundtzen, Smith, and Tosdal (1976, plate 2). It is in the SE1/4 of section 30, T. 11 S., R.14 W., Fairbanks Meridian. The location is accurate within about 1000 feet.

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:
The main part of Chitsia Creek is fed by relatively steep (about 200 feet per mile) headwater forks that flow in bedrock canyons cut in Birch Creek Schist. The placer mine is a half-half below the confluence of the two headwater forks, where the stream gradient flattens to slightly more than 100 feet per mile. Potential lode sources of the gold in this placer deposit are to the west, as at locations MM007 and MM009 (Bundtzen, Smith, and Tosdal, 1976). There is little public information about this placer mine. Chitsia Creek was the site of the discovery of placer gold in the Kantishna district in 1903 (Wickersham, 1938; Cobb, 1973 [B 1374]).

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Small-scale workings.

Production notes:

Reserves:

Additional comments:

Judge Wickersham and party staked placer gold claims on Chitsia Creek, which they called the Chitsiana, on June 4, 1903, after finding fine gold in river bars (Wickersham, 1938, p. 269). Filing the discovery papers in Rampart led to a stampede into the Kantishna district, and the discovery of more important deposits in 1905. The area is in Denali National Park and Preserve.

References:

Wickersham, 1938; Cobb, 1973 (B 1374); Bundtzen, Smith, and Tosdal, 1976; Cox and Singer, 1986.

Primary reference: Wickersham, 1938

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Unnamed (mountain at head of Flume Creek)

Site type: Occurrence

ARDF no.: MM009

Latitude: 63.9170 **Quadrangle:** MM D-1

Longitude: 150.4418

Location description and accuracy:

This occurrence is at an elevaton of about 2000 feet on an unnamed mountain at the northwest head of Flume Creek. It is 0.2 mile west-southwest of the center of section 35, T. 11 S., R. 15 W., Fairbanks Meridian. The occurrence is an unnamed locale of Cobb (1980 [OFR 80-363]), and 'gossan 1' (number 70), of Bundtzen, Smith, and Tosdal (1976). It also corresponds to number 31 of MacKevett and Hollway (1977), B70 of Hawley and Associates (1978), and 80a of Bundtzen (1981). A similar occurrence is in the E1/2 of section 35 near hill 2660 (Hawley and Associates, 1978).

Commodities:

Main: Zn

Other: Mo,Th, U

Ore minerals: Limonite, pyrite, sphalerite

Gangue minerals:

Geologic description:

The western part of sec. 35 is underlain by mineralized metarhyolite tuff of the Devonian or Mississippian Totatlanika Formation (Bundtzen, Smith and Tosdal, 1976). To the east, an infaulted slice of Keevey Peak Formation separates the metarhyolite tuff from similar tuff exposed on hill 2616 (Hawley and Associates, 1978, fig. 4.1-A(3)).

The mineralized metarhyolite strikes NNE, and may dip NW at a shallow angle. The unit is pyritic and the outcrop is conspicuously ironstained. It also contains small amounts of sphalerite, which is exsolved in the pyrite (Bundtzen, Smith, and Tosdal, 1976). Samples assay up to 0.06 ounce of silver per ton, 1600 ppm zinc, 47 ppm molybdenum, and 35 ppm thorium (Bundtzen, 1981, occurrence 80a, table 10). Surface waters in contact with the sulfide-bearing metarhyolite are probably acidic enough to dissolve most of the near-surface zinc in the metarhyolite, but soils are locally anomalous in zinc. One soil sample contained about 425 ppm zinc, and soils collected on hill 2660 contained 275 to 330 ppm zinc (Hawley and Associates, 1978; fig. 4.1-A(3)).

The mineralization probably is Late Devonian and Mississippian, the age of the Totatlanika Formation host rock.

Alteration:

Conspicuous iron-oxide alteration.

Age of mineralization:

Probably related to Totatlanika Formation volcanism in Late Devonian and Mississippian time.

Deposit model:

Volcanogenic deposit associated with acidic volcanic rocks.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The area has been reconnaissance mapped and sampled. There are no workings.

Production notes:

Reserves:

Additional comments:
The area is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Bearpaw River

Site type: Prospects

ARDF no.: MM010

Latitude: 63.7819 **Quadrangle:** MM D-2

Longitude: 150.9391

Location description and accuracy:
Bearpaw River (Cobb, 1980 [OFR 80-363]) is one of the major rivers in the north part of the Kantishna district. It rises against the northern Kantishna Hills across the divide from Little Caribou Creek (MM016) and Crooked Creek (MM013). The river then flows west for about 10 miles to its confluence with Caribou Creek (MM042); from this junction the river flows northerly. For this record, the location is on the north-flowing part of Bearpaw River below its junction with Caribou Creek. It is a generalized location for a part of the river that probably contains river bar deposits of fine gold.

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:
Bearpaw River flows through narrow canyon walls, mainly of Birch Creek schist, on its westerly course above the junction with Caribou Creek. Below the Caribou Creek junction, the river occupies a wide flood-plain. In particular, beginning at about 5 miles upstream from the ghost town of Diamond, the river meanders across a wide, gentle, flood plain.

Gold was found in headwater tributaries of the Bearpaw River shortly after discovery of placer gold in the Kantishna district (Prindle, 1906, p. 125). Brooks reported mining on Bearpaw in 1911 (Brooks, 1912, p. 38). No evidence of extensive mining remains. In 1983, Levell (1984, v. 2) collected samples of alluvium from the Bearpaw River above Caribou Creek. One sample contained 0.0021 ounce of gold per cubic yard, but the rest contained 0.0004 ounce or less per cubic yard, and Levell assigned the river a low placer resource potential. There probably are transient deposits of fine gold in bars of the Bearpaw River below Caribou Creek.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

There is evidence of exploration but not of extensive placer gold mining on the Bearpaw River. Gold was discovered on the river as early as 1905 (Prindle, 1906). In 1983, Levell (1984, v. 2) collected samples of alluvium from the Bearpaw River above Caribou Creek. One sample contained 0.0021 ounce of gold per cubic yard, but the rest contained 0.0004 ounce or less per cubic yard, and Levell assigned the river a low placer resource potential. There probably are transient deposits of fine gold in bars of the Bearpaw River below Caribou Creek.

Production notes:

Reserves:

Levell (1984, v. 2) assigned the river a low placer resource potential. There probably are transient deposits of fine gold in bars of the Bearpaw River below Caribou Creek.

Additional comments:

The Bearpaw River furnished access to the district in gold rush years. Two of the historic ghost towns occupied by stampeders, Diamond and Glacier, are on the river. The main course of the river is in Denali National Park and Preserve.

References:

Prindle, 1906; Brooks, 1912; Cobb, 1980 (OFR 80-363); Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Cobb, 1980; Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Marten Creek (Javhola)

Site type: Prospect

ARDF no.: MM011

Latitude: 63.8214 **Quadrangle:** MM D-1

Longitude: 150.4360

Location description and accuracy:
Marten Creek is a southeast-flowing tributary of Crooked Creek. It enters Crooked Creek about 1.2 miles above the confluence of Little Caribou Creek and Crooked Creek. The location of this placer prospect is about 0.35 mile north of the center of section 3, T. 13 S., R. 15 W., Fairbanks Meridian. It marks the approximate position of mining claims (Heiner and Porter, 1972, KX 66-66; Hawley and Associates, 1978).

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:
Marten Creek rises on the east flank of the Kantishna Hills. The uppermost 1 1/2 miles of the creek is in a steep canyon largely cut in Birch Creek Schist. About 1 1/2 miles above its confluence with Crooked Creek, the valley of Marten Creek opens out and the creek flows with reduced gradient into Crooked Creek. The lower part of Marten Creek flows through Keevey Peak Formation (Hawley and Associates, 1978, fig. 4.1-A(2)).
There is little public information about the gold placer deposit in Marten Creek. The deposit was located in the early 1900s, probably shortly after the discovery of gold in Chitsia Creek (MM008).

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
Claims were located in Marten Creek shortly after 1900 (Heiner and Porter, 1972).

Production notes:
Some gold may have been recovered during prospecting in about

1904-1906.

Reserves:

Additional comments:
This site is in Denali National Park and Preserve.

References:
Heiner and Porter, 1972; Hawley and Associates, 1978.

Primary reference: Heiner and Porter, 1972; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Unnamed (between Crooked Creek and Little Caribou Creek)

Site type: Occurrence

ARDF no.: MM012

Latitude: 63.8026 **Quadrangle:** MM D-1

Longitude: 150.4220

Location description and accuracy:
This site represents two geologically similar occurences that are about 0.2 mile apart. The western occurrence is at an elevation of about 2250 feet; the eastern occurrence is at an elevation of about 2400 feet. For this record, the location is at an elevation of 2200 feet, about 0.4 mile east of the center of section 10, T. 13 S., R. 15 W., Fairbanks Meridian. The site corresponds to the location of sample numbers 67 and 71 of Hawley and Associates (1978).

Commodities:

Main: Zn

Other: Ag, Au, Cu, Pb

Ore minerals: Pyrite, sphalerite(?)

Gangue minerals:

Geologic description:
This record describes two occurrences of sulfide-bearing schist, about 0.2 mile apart, in siliceous units of the Devonian or Mississippian Keevy Peak Formation (Bundtzen, 1981). In the area of the occurrences, the strata strike NE, and dip steeply (Hawley and Associates, 1978, fig. 4.1-A(2)). The occurrence at Hawley and Associates' location 67 consists of weakly pyritic siliceous schist. In addition to pyrite, the schist probably contains sphalerite and small amounts of other sulfide minerals. A sample assayed 0.1 ppm gold, 2.4 ppm silver, 215 ppm copper, 95 ppm lead, and 1000 ppm zinc. Hawley and Associates' location 71 is in sulfide-bearing metachert. A sample assayed 4.0 ppm silver, 315 ppm copper, 20 ppm lead, and 520 ppm zinc. The occurrences are stratabound, and may be Devonian or Mississippian, the depositional age of the Keevy Peak Formation.

Alteration:
Sulfidization of schist and metachert hostrocks.

Age of mineralization:
Probably Devonian or Mississippian, the protolith age of the Keevy Peak Formation.

Deposit model:
Stratabound; syngenetic; possibly volcanogenic.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

The occurrences were sampled during reconnaissance mapping of the area (Hawley and Associates, 1978). There are no workings.

Production notes:

Reserves:

Additional comments:

The site is in Denali National Park and Preserve.

References:

Hawley and Associates, 1978; Bundtzen, 1981.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/08/01

Site name(s): Crooked Creek

Site type: Mines

ARDF no.: MM013

Latitude: 63.7996 **Quadrangle:** MM D-2

Longitude: 150.5000

Location description and accuracy:
Crooked Creek (Cobb, 1980 [OFR 80-853]) flows northeasterly on the east side of the Kantishna Hills for about 5 miles. The creek has been placer mined in two main segments. An upper segment is centered in section 18, T. 13 S., R. 15 W., Fairbanks Meridian. A lower segment is mainly in section 8 of the same township. For this record, the location is in the lower segment, at the boundary of the Mt. McKinley D-1 and D-2 quadrangles. Crooked Creek is number 55 of Cobb (1972 [MF 366]) and 58 of MacKevett and Holloway (1977).

Commodities:

Main: Au

Other: Ag, Ti

Ore minerals: Gold

Gangue minerals:

Geologic description:
Crooked Creek has a relatively narrow channel incised in bedrock walls. The valley walls are steep enough that landslide material or colluvium are probably mixed with alluvium in the creek. The creek mainly drains Birch Creek Schist.

Crooked Creek has a long history of production, but there is little information about the placer deposit or the source(s) of the placer gold. Bundtzen, Smith, and Tosdal (1976) reported 0.06 to 0.15 ppm of gold in rock samples collected above the placer deposit. Bundtzen (1981, p. 164) reported that apparently barren garnet amphibolite in the Crooked Creek drainage contains free gold, and speculated that a source of the placer gold is a shear zone nearly parallel to the creek.

The placer gold recovered from Crooked Creek was about 850 fine (Bundtzen, 1981, table 19). Its relatively high fineness suggests that its source is different from that of the silver-rich gold in the Little Moose Creek (MM140) and Stampede Creek (MM142) placers.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

Crooked Creek was mined using relatively small mechanical equipment. The mine operated intermittently from about 1926 (Smith, 1929) until World War II (Cobb, 1980 [OFR 80-363]). The creek was also mined after 1960 (Cobb, 1973 [B 1374]).

Production notes:

Recorded production from Crooked Creek is less than 1000 fine ounces of gold (Cobb, 1980 [OFR 80-363]), but its long history of mining suggests that at least 1000 ounces was recovered.

Reserves:

Additional comments:

Crooked Creek is in Denali National Park and Preserve.

References:

Smith, 1929; Cobb, 1972 (MF 366); Cobb, 1973 (B 1374); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Unnamed (between Little Moose Creek and Little Caribou Creek)

Site type: Occurrence

ARDF no.: MM014

Latitude: 63.7891 **Quadrangle:** MM D-1

Longitude: 150.3982

Location description and accuracy:
This occurrence is at an elevation of about 2200 feet on the northwest side of the ridge between Little Moose Creek and Little Caribou Creek. It is about 1 mile above the confluence of Myers Creek and Little Caribou Creek, in the SW1/4NE1/4 section 14, T. 13 S., R. 15 W., Fairbanks Meridian. The occurrence corresponds to number 90 of Hawley and Associates (1978) and 78 of Bundtzen (1981).

Commodities:

Main: Zn

Other: Ag, Fe, Pb

Ore minerals: Galena, magnetite, pyrite, sphalerite

Gangue minerals: Epidote

Geologic description:
This occurrence consists of poorly exposed skarn in calcareous schist of the Birch Creek Schist. A fault, which appears to control the course of Little Caribou Creek, separates the Birch Creek Schist from Keevy Peak Formation west of the fault (Hawley and Associates, 1978, fig. 4.1-A(2)). Intrusive rocks are not known in this area. The skarn consists mainly of epidote, magnetite, pyrite, and small quantities of sphalerite and galena. Two samples contained 0.023 and 0.067 percent lead, 0.132 and 0.188 zinc, and a trace of silver in each (Bundtzen, 1981, number 78, table 10).

Alteration:
Metasomatic replacement of calcareous schist.

Age of mineralization:
The occurrence is of uncertain age. It may be Eocene (see record MM091).

Deposit model:
Zn-Pb skarn deposit (Cox and Singer, 1986; model 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
18c

Production Status: None

Site Status: Inactive

Workings/exploration:
The occurrence was discovered during mapping (Hawley and Associates, 1978). There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Clearwater Barite

Site type: Occurrence

ARDF no.: MM015

Latitude: 63.7717 **Quadrangle:** MM D-1

Longitude: 150.3406

Location description and accuracy:
The Clearwater barite occurrence is exposed on the west bank of the Clearwater River about one mile north of the mouth of Stampede Creek. It is in the NE1/4SW1/4 section 19, T. 13 S., R. 14 W., Fairbanks Meridian. The location is probably accurate within 1000 feet. The occurrence corresponds to number 67 of Bundtzen, Smith, and Tosdal (1976), 149 of Hawley and Associates (1978), 75 of Bundtzen (1981), and 113 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ba

Other: Zn

Ore minerals: Barite, pyrite, pyrrhotite, sphalerite(?)

Gangue minerals: Quartz

Geologic description:
The Clearwater Barite occurrence is probably in quartzite and mica-quartz schist of the Birch Creek Schist, possibly on or close to a projection of the Stampede fault (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-1). The occurrence is a vein in a fault zone. The vein strikes about N50W and dips 40SW (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 113). It is about 6 feet thick and consists of quartz, barite, pyrite, pyrrhotite, and possibly a trace of sphalerite. Bundtzen (1981) estimated about 25 percent barite in one sample, which also contained a trace of gold and 0.017 percent zinc.

Alteration:

Age of mineralization:
Assuming that the vein is distal to the precious- and base-metal deposits of the Kantishna area, it probably is Eocene (see record MM091).

Deposit model:
Quartz-barite vein.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
Minor excavation.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Little Caribou

Site type: Occurrence

ARDF no.: MM016

Latitude: 63.7714 **Quadrangle:** MM D-1

Longitude: 150.4994

Location description and accuracy:
The Little Caribou occurrence (Cobb, 1980 [OFR 80-363]) is at an elevation of about 2900 feet on a ridge about 1/2 mile north of Little Caribou Creek . The location is about on the boundary between the Mt. McKinley D-1 and D-2 quadrangles. It is accurate within 500 feet. The Little Caribou site correponds to location 69 of Bundtzen, Smith, and Tosdal (1976), D of Hawley and Associates (1978), 77a of Bundtzen (1981), and 29 of MacKevett and Holloway (1977).

Commodities:

Main: Cu, Sb, Zn

Other: Ag, Au, Mo

Ore minerals: Chalcopyrite, hematite, magnetite, pyrite, sphalerite, stibnite

Gangue minerals: Epidote, tourmaline

Geologic description:
The Little Caribou occurrence is a skarn deposit in a relatively thin marble layer in contact with mica schist of the Birch Creek Schist. No nearby intrusive is known. The skarn is 3 to 5 feet thick and can be followed for about 500 feet. It consists of epidote and magnetite, accompanied by small amounts of pyrite, chalcopyrite, stibnite, and sphalerite; tourmaline occurs locally. Samples of the skarn assay 0.01-0.03 ounce of gold per ton, 0.01 to 0.17 ounce of silver per ton, up to 0.37 percent zinc, and a little copper and lead (Bundtzen, 1981). Stibnite, in float mainly composed of graphitic schist and marble, occurs near the skarn.
Hawley and Associates (1978, fig. and table 4.1-A(2) conducted a soil survey east of the skarn outcrop. The total of Cu+Pb+Zn in soil generally is less than 700 ppm, but one sample contained more than 3500 ppm combined metals, and one contained more than 700 ppm antimony. Stream-sediment samples collected from small creeks that drain the area northwest of the skarn deposit were relatively rich in zinc.

Alteration:
Replacement of marble by epidote-magnetite(-tourmaline) skarn.

Age of mineralization:
Uncertain; possibly Eocene (see record MM091).

Deposit model:
Pb-Zn(?) skarn deposit (Cox and Singer, 1986; model 18c?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
18c?

Production Status: No

Site Status: Inactive

Workings/exploration:
The area has been mapped and soil sampled but not otherwise explored.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 90-363); Bundtzen, 1981; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Lucky Creek

Site type: Prospect

ARDF no.: MM017

Latitude: 63.7575 **Quadrangle:** MM D-1

Longitude: 150.3560

Location description and accuracy:
Lucky Creek is the local name of a west tributary of the Clearwater Fork of the Toklat River. Its junction with the Clearwater Fork is about midway between the mouths of Stampede Creek (to the south) and Little Moose Creek. The location is about 0.4 mile east-southeast of the center of section 25, T. 13 S., R. 15 W., Fairbanks Meridian, approximately at the position of the placer claims (Heiner and Porter, 1972, KX 66-122; Hawley and Associates, 1978).

Commodities:

Main: Au

Other: Sb(?)

Ore minerals: Gold, stibnite(?)

Gangue minerals:

Geologic description:
The area drained by locally named Lucky Creek is underlain mostly by Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-1). The creek is 2 miles long, and the placer claim location is about where it flattens out before entering the floodplain of the Clearwater Fork. Nothing is known of the character of the placer deposit; it reportedly contains stibnite as well as placer gold. The Upper Ridge (MM141) and Ridge Top (MM018) antimony mines are in the drainage area of Lucky Creek; erosion of those deposits would have introduced stibnite into the creek.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
Placer gold claims were staked in Lucky Creek in 1968; they were still active in 1972 (Heiner and Porter, 1972).

Production notes:

Reserves:

Additional comments:

References:

Heiner and Porter, 1972; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Heiner and Porter, 1972; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/07/01

Site name(s): Ridge Top

Site type: Mine

ARDF no.: MM018

Latitude: 63.7521 **Quadrangle:** MM D-1

Longitude: 150.4093

Location description and accuracy:
The Ridge Top mine (Hawley and Associates, 1978, mineral deposit C) is at an elevation of about 3150 feet. The mine is on the crest of the divide between Little Moose Creek and locally named Lucky Creek (MM017). The location is accurate within 500 feet.

Commodities:

Main: Sb

Other:

Ore minerals: Stibnite

Gangue minerals: Quartz

Geologic description:
The Ridge Top mine is in quartz-feldspar schist and gneiss in the hanging wall of a layer of quartzite. The quartzite is a unit of the upper Precambrian Birch Creek Schist (Hawley and Associates, 1978, fig. 4.1-A(2); Bundtzen, 1981). The deposit at the Ridge Top mine is geologically similar to the one at the Upper Ridge mine (MM141), which consists of partly oxidized, slightly auriferous, stibnite-bearing quartz veins that also cut Birch Creek quartzite.

Alteration:
Oxidation of iron and antimony minerals (?).

Age of mineralization:
Probably Eocene (see records MM091, MM144, and MM141).

Deposit model:
Simple Sb deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Surface cuts.

Production notes:
Production from the Ridge Top mine is probably included with that from the Stampede mine (MM144).

Reserves:

Additional comments:
The Ridge Top mine is on patented mining claims that are part of the Stampede property.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/08/01

Site name(s): Bright Light; Whistler

Site type: Prospects

ARDF no.: MM019

Latitude: 63.5342 **Quadrangle:** MM C-3

Longitude: 151.0096

Location description and accuracy:
The Bright Light and Whistler prospects are at an elevation of about 2900 feet on the north flank of Alpha Ridge southeast of Reindeer Hill . For this record, the site is at the common end line of the two claims, in the NW1/4 NE1/4 section 15, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within 300 feet. The claims are numbers 1 and 2 of Hawley and Associates (1978), and 17 and 18 of Thornsberry, McKee, and Salisbury (1984). A short, caved adit is at an elevation of about 2850 feet.

Commodities:

Main: Ag, Pb

Other: Au, Sb, Zn

Ore minerals: Arsenopyrite, galena, limonite, pyrite, sphalerite

Gangue minerals: Ankerite, quartz

Geologic description:
The Bright Light and Whistler claims were probably active in the late 1920s (Moffit, 1933). A limonitic, quartz-ankerite vein contains small cubes of pyrite, and small amounts of arsenopyrite and sphalerite. Fragments of dump material contain several percent of galena. Based on trends of shallow trenches, caved adits, and topograpy, the Bright Light-Whistler vein strikes NE and dips NW at a moderately steep angle. A sample of relatively high-grade dump material contained 12 percent lead, 1950 ppm zinc, 480 ppm silver, and 1.2 ppm gold. Other samples were lower grade. One contained 1700 ppm antimony (Hawley and Associates, 1978, nos. 59-61, table 4.1-A(1); Thornsberry, McKee, and Salisbury, 1984, v. 2, locations 17-18).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The vein was explored by trenches and a short adit; the workings are largely sloughed.

Production notes:

Reserves:

Additional comments:
The claims are in Denali National Park and Preserve. They have been purchased by the park.

References:
Moffit, 1933; Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Unnamed (between Reindeer Hill and Alpha Ridge)

Site type: Prospects

ARDF no.: MM020

Latitude: 63.5332 **Quadrangle:** MM C-3

Longitude: 151.0247

Location description and accuracy:
This site represents two possibly related prospects on the northwest slope of Alpha Ridge nearly due south of Reindeer Hill. The southern prospect is in a minor drainage at an elevation of about 2820 feet; the northern prospect is about 750 feet north-northeast of the southern prospect, at an elevation of about 2790 feet. The site corresponds to location 16 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Cu, Pb, Zn

Other: Mo

Ore minerals: Galena, hematite, malachite, pyrite, tetrahedrite(?)

Gangue minerals: Graphite

Geologic description:
This prospect is in metafelsite and graphitic garnet-chlorite-quartz schist and quartzite of the Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, v. 2, location 16). The rocks are coated with hematite and malachite. Small amounts of pyrite, galena, and possibly tetrahedrite occur in sloughed pits. Samples collected from pits in the graphitic schist contained 0.048 to 0.175 percent copper, a trace of lead, and about 400 ppm zinc. Molybdenum values were as much as 105 ppm. Gold and silver were not determined. The existence of buried sulfide deposits nearby is suggested by ferricrete occurrences.

Alteration:
Local oxidation of iron and copper minerals.

Age of mineralization:
Possibly as old as Precambrian, the protolith age of Birch Creek Schist, or as young as Eocene, the emplacement age of nearby plutons (see MM091).

Deposit model:
Disseminated sulfide in metarhyolite and graphitic schist.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
Several small pits, largely sloughed.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Alpha

Site type: Mine

ARDF no.: MM021

Latitude: 63.5229 **Quadrangle:** MM C-3

Longitude: 151.0107

Location description and accuracy:

The Alpha mine (Cobb, 1980 [OFR 80-363]) is on the south flank of Alpha Ridge above Eldorado Creek. It is about 4000 feet due west of Iron Dome. The mine workings are at an elevation of about 3000 feet and are in the SW1/4SE1/4 sec. 15, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within 500 feet. The mine is location 9 of Bundtzen, Smith, and Tosdal (1976) and Bundtzen (1981), 14 and 15 of Thornsberry, McKee, and Salisbury (1984), D of Hawley and Associates (1978), and 3 of Cobb (1972 [MF 366]) and MacKevett and Holloway (1977).

Commodities:

Main: Ag

Other: Au, Cu, Pb, Sb, Zn

Ore minerals: Arsenopyrite, boulangerite, chalcopyrite, galena, jamesonite, limonite, pyrite, sphalerite, stibnite, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:

The fault-controlled Alpha vein system strikes NE and dips steeply. It cuts tan-weathering quartz-mica schist of Birch Creek type (Bundtzen, 1981). The fault can be traced southwest along strike for about 1000 feet. It appears to continue about 1500 feet east-northeast. The fault may be the continuation of a fault which offsets a calcareous schist unit about 500 feet (Hawley and Associates, 1978, fig. 4.1-A(1)).

The fault zone is as much as 25 feet wide and individual veins are up to 10 or more feet thick. In about 1922, a shallow shaft exposed an eight- or nine-foot-thick zone containing three quartz veins, each about a foot thick. A representative sample of hand-cobbed material assayed 266.3 ounces of silver per ton (Davis, 1923, p. 131). The workings were largely caved when Wells visited the property in 1931; he reported that a foot-thick galena-rich vein assayed 0.01 ounce of gold per ton, 346 ounces of silver per ton and 5.46 percent lead (Wells, 1933, p. 375-376).

The mineralogy is typical of quartz-siderite polymetallic veins in the Kantishna Hills area (MM091). The veins mainly comprise arsenopyrite, pyrite, galena, jamesonite, stibnite, and sphalerite, along with lesser amounts of boulangerite and tetrahedrite, in a siderite-rich quartz gangue. Extensive near-surface limonite appears to be derived from siderite as well as from the sulfide minerals. The veins are probably Eocene, roughly contemporaneous with the eruption of the Teklanika Volcanics in the Mt. McKinley area (Gilbert, Ferrill, and Turner, 1976).

Alteration:

Silicification; iron-oxide alteration.

Age of mineralization:

The veins are probably Eocene, about contemporaneous with eruption of the Teklanika volcanics of the Mt. McKinley area (Gilbert, Ferrill, and Turner, 1976), (also see record MM091).

Deposit model:

Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
The Alpha mine was developed before 1923 by a 120-foot-long drift adit and a 20-foot shaft (Davis, 1923). About 10 tons of selected, high-grade ore was shipped in 1921; ore was also shipped in 1923. Although the ore was rich, the mine was not profitable, owing to high shipping costs (Brooks, 1925). The mine was inactive when visited by Wells in 1931 (Wells, 1933). Sometime later, a bulldozer trail was cut to the mine and there was some bulldozer trenching. Claims were never patented; in 1983, they were held as the Virginia City 1 and 2 by James Fuksa.

Samples collected in the 1970s and 1980s tend to confirm the high-grade nature of the vein. A sample collected by Bundtzen (1981, table 9) assayed about 83 ounces of silver per ton, about 18 percent lead and nearly 3 percent zinc. Samples collected by McKee (in Thornsberry, McKee, and Salisbury, 1984, v. 2, location 14) assayed as much as 48 ounces of silver per ton and 15 percent or more combined lead and zinc. Antimony content locally exceeded 9 percent. Samples collected by Bundtzen contained up to 75 ppm tungsten, and one contained 20 ppm uranium. Soil samples collected as much as 1000 feet southwest of the mine workings were significantly enriched in lead, zinc, and silver (Hawley and Associates, 1978, samples nos. 47-49, table 4.1-1(A)).

Production notes:
Probably a total of about 25 tons, including 10 tons of ore shipped in 1921 that assayed more than 200 ounces of silver per ton.

Reserves:

Additional comments:
The Alpha mine is in Denali National Park and Preserve.

References:
Davis, 1923; Brooks, 1925; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Gilbert, Ferrill, and Turner, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/11/00

Site name(s): Unnamed (southwest flank of Alpha Ridge)

Site type: Occurrence

ARDF no.: MM022

Latitude: 63.5176 **Quadrangle:** MM C-3

Longitude: 151.0309

Location description and accuracy:

This occurrence represents an area of mineralization on the southeast flank of Alpha Ridge. The location is the approximate midpoint of the area, which trends east-northeast for about 2000 feet and is up to 500 feet wide. The location is at the center of the north half of the section line between sections 21 and 22, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate.

Commodities:

Main: Cu

Other: Ag, Pb, Zn

Ore minerals: Chalcopyrite, galena(?), limonite, malachite

Gangue minerals: Quartz, sericite

Geologic description:

This occurrence consists of disseminated chalcopyrite, pyrite, and possibly galena in a felsic unit of the Precambrian Birch Creek Schist (Hawley and Associates, 1978; Bundtzen, 1981). The schist is locally coated with malachite. Anomalous metal values in soil samples indicate that the outcrop area of the occurrence is at least 2000 feet long and about 500 feet wide. The occurrence is about on strike with the Alpha vein (MM021) but probably not related to it.

The occurrence was mapped and sampled by Hawley and Associates (1978), who collected eight samples (table 4.1-1(A), nos. 40-46, including subsamples) of the schist and of soil derived from it. Rock sample 41 contained 345 ppm copper, 1650 ppm lead, 635 ppm zinc and 11 ppm silver; rock sample 43B contained 1200 ppm copper. Soils contained 180- 545 ppm copper, and all but one contained detectable silver; the maximum silver value in soil was 3.8 ppm. The deposit probably formed by remobilization of primary metallifereous minerals in the felsic hostrock.

Alteration:

Local oxidation of copper mineral(s).

Age of mineralization:

Probably Precambrian, the age of the felsic protolith of the Birch Creek Schist. Remobilization of primary metals in the schist probably occurred in Eocene time, during the main stage of Kantishna district mineralization (see record MM091).

Deposit model:

Probable remobilization of distal volcanogenic base metals in felsic hostrocks.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The occurrence has been mapped in reconnaissance; there are no known workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve. It is a type of mineral deposit that probably did not attract the attention of early prospectors.

References:
Hawley and Associates, 1978; Bundtzen, 1981.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 12/27/00

Site name(s): Unnamed (southwest of Alpha Ridge)

Site type: Prospect

ARDF no.: MM023

Latitude: 63.5160 **Quadrangle:** MM C-3

Longitude: 151.0463

Location description and accuracy:
This prospect is at an elevation of about 3100 feet on the north flank of the ridge between Brooker Mountain and Alpha Ridge in the Kantishna Hills. It is about 500 feet north of the center of section 21, T. 16 S., R. 18 W., Fairbanks Meridian. The prospect is number 3 of Bundtzen, Smith and Tosdal (1978), Bundtzen (1981), and Thornsberry, McKee, and Salisbury (1984). The descriptions in the two Bundtzen references, however, do not appear to match the prospect. Number 20 of Hawley and Associates (1978) is a minor occurrence about 0.2 mile south of the prospect.

Commodities:

Main: Pb, Sb

Other: Ag, As, Au, Zn

Ore minerals: Galena, pyrargyrite(?), pyrite, stibnite

Gangue minerals: Ankerite, quartz, tourmaline

Geologic description:
The country rocks in the area of the prospect are felsitic and quartzitic facies of the Birch Creek Schist (Bundtzen, 1981). The prospect consists of fragments of vein material in sloughed trenches. No veins are exposed in the trenches, which trend about N 40 E, possibly the strike of the vein. The fragments consist of galena, stibnite, and possibly minor pyrargyrite in a quartz-ankerite-tourmaline gangue. T.K. Hinderman collected two samples at the site: one of them assayed 275 ppm silver, 1.1 ppm gold, 0.245 percent arsenic, 0.905 percent zinc, 9.15 percent antimony and 10.5 percent lead (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 3). Hawley and Associates (1978) reported a quartz-pyrite vein about 0.2 mile south of the prospect.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
Two shallow trenches were sloughed by 1983.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/11/00

Site name(s): Eldorado No. 3

Site type: Prospect

ARDF no.: MM024

Latitude: 63.5133 **Quadrangle:** MM C-3

Longitude: 151.0063

Location description and accuracy:
The Eldorado prospect is at an elevation of about 1800 feet, on the north wall of the canyon of Eldorado Creek. It is about 0.3 mile east of the center of section 22, T.16S., R.18W., Fairbanks Meridian. The location is accurate. The prospect is number 37 of Hawley and Associates (1978), 13 of Thornsberry, McKee, and Salisbury (1984), and 13 of Bundtzen (1981).

Commodities:

Main: Sb

Other: Ag

Ore minerals: Kermesite, pyrite, stibiconite, stibnite

Gangue minerals: Carbonate minerals, quartz

Geologic description:
This prospect consists of a poorly exposed quartz-carbonate vein about 2 feet thick that strikes approximately northeast and cuts muscovitic marble of uncertain affiliation. The vein contains pyrite and stibnite; kermesite and stibiconite occur as secondary coatings on weathered vein material. The marble is silicified and brecciated. A 2-foot sample across the vein contained 3.2 percent antimony; a selected sample assayed 14.1 percent antimony and 0.81 ounce of silver per ton (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, number 13).

Alteration:
Oxidation of antimony minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Simple stibnite deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein is poorly exposed. It was discovered and staked by prospector-miner Jim Fuksa.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Unnamed (ridge northeast of Brooker Mountain)

Site type: Prospect

ARDF no.: MM025

Latitude: 63.5115 **Quadrangle:** MM C-3

Longitude: 151.0403

Location description and accuracy:
This prospect is at an elevation of about 3100 feet on the southeast- trending ridge about midway between Brooker Mountain and Alpha Ridge. It is in the SE1/4 section 21, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within 500 feet. The prospect corresponds to number 4 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Sb

Other: As, Au, Cu, Pb, Zn

Ore minerals: Arsenopyrite(?), galena, pyrite, scorodite(?), sphalerite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rock at this prospect is feldspar-quartz-mica schist of the Birch Creek Schist (Bundtzen, 1981). Although the mineral deposit is not exposed, the distribution of float in relation to old pits and topography indicates that the deposit is a vein which strikes about EW and dips at a moderate or shallow angle to the south (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 4). A selected sample of sulfide-rich material in a pit assayed 144 ounces of silver per ton, 18 percent arsenic, and 45 percent antimony. It also contained 0.365 percent copper, 8.4 percent lead, and 3.75 percent zinc (Thornsberry, McKee, and Salisbury, 1984, v. 2). Some of the material contains about 50 percent stibnite. The high arsenic value indicates that arsenopyrite or its oxidation product scorodite is present.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The vein has been explored by several shallow pits of unknown date.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/18/00

Site name(s): Eagles Nest (Eagle's Den)

Site type: Prospect

ARDF no.: MM026

Latitude: 63.5091 **Quadrangle:** MM C-3

Longitude: 151.0036

Location description and accuracy:
The Eagles Nest prospect (Cobb, 1980 [OFR 80-363]) is at an elevation of about 2400 feet, on the northwest flank of Busia Mountain south of Eldorado Creek. It is in the SE1/4 SE1/4 section 22, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate. The prospect is location 6 of Bundtzen, Smith, and Tosdal (1976), C of Hawley and Associates (1978), 19 of MacKevett and Holloway (1977), and 11 (Eagle's Den) of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Sb

Other: Ag

Ore minerals: Stibnite

Gangue minerals: Quartz

Geologic description:
The Eagles Nest quartz-stibnite vein strikes about N60W and dips 55 NE. It is partly covered, but two outcrops and intervening float suggest that the vein is at least 400 feet long; locally it is at least 20 feet thick. The country rock is quartz-feldspar-mica schist of the Birch Creek Schist (Bundtzen, 1981).
At an elevation of about 2500 feet, the vein is at least 20 feet thick. It contains stibnite masses as much as a foot thick in a 3-foot-wide footwall zone of massive to brecciated quartz. The vein also crops out about 400 feet to the northeast, at an elevation of about 2300 feet. Selected, high-grade samples assayed as much as 44 percent antimony, up to 2.76 ounces of silver per ton, and 0.1-0.2 ppm of mercury (Hawley and Associates, 1978). The vein is similar to those at the Stampede (MM144) and Slate Creek mines (MM153).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Simple stibnite deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein was discovered by Jim Fuksa sometime before 1976; it has been explored by shallow, hand-dug and blasted open cuts.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Unnamed (northeast of Brooker Mountain)

Site type: Prospect

ARDF no.: MM027

Latitude: 63.5090 **Quadrangle:** MM C-3

Longitude: 151.0323

Location description and accuracy:
This prospect is at an elevation of about 2680 feet on a southeast-trending ridge about midway between Brooker Mountain and Alpha Ridge. It is approximately on the boundary between sections 21 and 22, T. 16 S., R. 18 W., Fairbanks Meridian. The location is probably accurate within 300 feet. The prospect is number 5 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Cu, Pb, Sb, Zn

Other:

Ore minerals: Cerussite(?), galena(?), limonite, malachite, smithsonite(?), sphalerite(?), tetrahedrite

Gangue minerals:

Geologic description:
This prospect is in a high-angle(?) fault in the the hanging wall of a probable low-angle fault that places Birch Creek Schist above Spruce Creek rocks in the upper Eldorado Creek area (Thornsberry, McKee, and Salisbury, 1984, pl. K-6). The high-angle fault strikes NNE. The deposit is in quartz-mica and feldspar-quartz-mica schist of the Birch Creek Schist (Bundtzen, 1981).

The deposit consists of oxidized, polymetallic veins. Gossan in shallow, caved pits locally is coated with malachite. Sulfide-bearing gossan in one pit contains tetrahedrite. The presence of galena or its oxidation product cerussite, and of sphalerite or an oxidation product such as smithsonite, is inferred from analyses of the tetrahedrite-bearing sample, which assayed 5.16 ounces of silver per ton, 1.25 percent copper, 4.45 percent lead, 33 percent zinc, and 2.45 percent antimony. Another sample of gossan assayed 7.2 ounces of silver per ton and 2.95 percent zinc (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence number 5).

Alteration:
Oxidation of sulfide minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:

The prospect was explored by four hand-dug pits of unknown date.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/18/01

Site name(s): Eldorado Creek

Site type: Mine

ARDF no.: MM028

Latitude: 63.5081 **Quadrangle:** MM C-3

Longitude: 151.0118

Location description and accuracy:
Eldorado Creek, a northeast-flowing tributary of Moose Creek, (Cobb, 1980 [OFR 80-363]) flows north and northeast on the south flank of the Kantishna Hills. It is auriferous at least from the mouth of Slate Creek (MM152) to the confluence of Eldorado and Moose creeks. For this record, the mine site is about at the midpoint of unpatented mining claims on Eldorado Creek (Hawley and Associates, 1978). Eldorado Creek is number 43 of Cobb (1972 [MF 366]) and 49 of MacKevett and Holloway (1977).

Commodities:

Main: Au

Other: Sb

Ore minerals: Gold, stibnite

Gangue minerals:

Geologic description:
Eldorado Creek contains a thin layer of gravel either on schist bedrock, or, near Moose Creek, on silt false bedrock. The gravel is thawed and is about 4 feet thick (Capps, 1919; Levell, 1984 [v. 2]). The gold in the creek is bright, well worn and finer than that in Friday (MM113) and Eureka (MM122) creeks; Eureka Creek enters Moose Creek opposite the mouth of Eldorado Creek. The fineness of gold on Eldorado Creek reported by Capps (1919) was about 780. Eldorado Creek contains a possible resource of about 300,000 cubic yards of auriferous gravel, probably grading an average of less than 0.02 ounce of gold per cubic yard.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Eldorado Creek was first worked before 1916; early mining was mostly subeconomic and the creek was abandoned for many years. The lower part of Eldorado Creek just above Moose Creek was worked in 1975, possibly in alluvial fan material on silt false bedrock (Bundtzen, Smith, and Tosdal, 1976, p. 13-14).

Some of this material was rich. In 1983, the creek was explored by reconnaissance sluicing methods; values ranged from less than 0.005 ounce of gold per cubic yard to 0.0706 ounce of gold per cubic yard. Most samples graded less than 0.02 ounce of gold per cubic yard.

Production notes:

Total production is probably on the order of 1000 ounces of gold.

Reserves:

Auriferous gravel about 4 feet thick underlies about 46 acres of Eldorado Creek. The calculated resource contains about 300,000 cubic yards of gravel (Levell , 1984 [v. 2]). The possible gold resource remaining in the creek ranges from about 2,000 to 20,000 ounces, depending on the actual grade of the deposit. Assuming an average grade of about 0.02 ounce of gold per cubic yard, there are about 6000 ounces of gold remaining in the creek.

Additional comments:

Eldorado Creek is in Denali National Park and Preserve.

References:

Capps, 1919; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/11/01

Site name(s): Arizona

Site type: Prospect

ARDF no.: MM029

Latitude: 63.5056 **Quadrangle:** MM C-3

Longitude: 151.0040

Location description and accuracy:
The Arizona prospect is in a minor northwest tributary to Eldorado Creek that enters Eldorado about 3000 feet below the mouth of Reinhart Creek. It is at an elevation of about 2400 feet in the NE1/4NE1/4 sec. 27, T. 16 S., R. 18 W., Fairbanks Meridian. The accuracy of the location is uncertain but is probably within 1000 feet. The prospect is number 5 of Bundtzen (1981) and 10 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au(?)

Other: Ag

Ore minerals: Gold(?), limonite

Gangue minerals: Quartz

Geologic description:
The Arizona prospect is in Birch Creek-type chlorite-muscovite-quartz schist (Bundtzen, Smith and Tosdal, 1976; Bundtzen, 1981). It is on the north flank of the quartz porphyry pluton that hosts the Bonnell mine (MM030). The prospect was probably staked for gold. Assays show only about 0.3 ounce of silver per ton, a trace of gold, and no significant base metals (Bundtzen, 1981, p. 212).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold(?)-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: None

Site Status: Inactive

Workings/exploration:
Unknown, possibly pits or trenches.

Production notes:

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve. In 1983, Thornsberry, McKee, and Salisbury (1984, v. 2, location 10) thought that the Arizona no. 2 claim might be overlain by one of the Bonnell claims of Jim Fuksa.

References:

Bundtzen, Smith, and Tosdal, 1976; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/12/01

Site name(s): Bonnell (Neversweat)

Site type: Mine

ARDF no.: MM030

Latitude: 63.5026 **Quadrangle:** MM C-3

Longitude: 151.0158

Location description and accuracy:

The Bonnell or Neversweat mine (Cobb, 1980 [OFR 80-363]) is on the east side of Eldorado Creek opposite the mouth of Reinhart Creek. The mine is at an elevation of about 2200 feet, on a west-trending ridge below hilltop elevation 2725. The location is accurate.

The mine is location 4 of Bundtzen, Smith, and Tosdal (1976), B of Hawley and Associates (1978), 4 of Bundtzen (1981), 7 of Thornsberry, McKee, and Salisbury (1984), and 2 of Cobb (1972 [MF 366]) and MacKevett and Holloway (1977). The site includes several nearby similar mineral occurrences, including numbers 6-9 of Thornsberry, McKee, and Salisbury (1984). The Bonnell mine and nearby prospects occupy a large part of the N1/2 section 27, T. 16 S., R. 18 W., Fairbanks Meridian.

Commodities:

Main: Ag, Pb, Zn

Other: Au, Cu, Sb, Zn

Ore minerals: Anglesite, arsenopyrite, boulangerite, chalcopyrite, galena, jamesonite, scheelite, sphalerite, stibnite, tetrahedrite

Gangue minerals: Calcite, potassium feldspar, quartz

Geologic description:

The Bonnell mine is at or near the intrusive contact between a quartz porphyry pluton and graphitic, quartz-mica schist (Bundtzen, 1981). The east-west, elongate outcrop area of the pluton is about a mile long and a maximum of about 1300 feet wide. It is bisected by Eldorado Creek. An east-west component to the mainly ENE-aligned topography suggests that the pluton may extend beneath Busia Mountain and perhaps part of Brooker Mountain. The pluton has been dated at 48.3 +/- 1.4 Ma (Bundtzen and Turner, 1979); it intrudes Birch Creek Schist of probable Precambrian age (Bundtzen, 1981, p. 37).

The main deposits are polymetallic quartz-calcite-potassium feldspar veins at the Neversweat or Bonnell workings east of Eldorado Creek. The veins are in the quartz porphyry and in the contact zone between the porphyry and the quartz-mica schist. They pinch and swell and are as much as 4 feet thick . The veins contain chiefly arsenopyrite and galena, along with some chalcopyrite, stibnite, tetrahedrite, boulangerite, jamesonite, and, locally, scheelite. Anglesite occurs in oxidized ore. Soil samples collected along the outcrop of the pluton are generally anomalous in antimony and some are strongly anomalous in silver, lead, and zinc; the entire quartz porphyry body appears to be at least weakly mineralized.

Samples of the richest ore assay of as much as 74 ounces of silver per ton and 0.48 ounce of gold per ton, but most samples assay 10 to 35 ounces of silver per ton and less than 0.05 ounce of gold per ton. Antimony content is generally in the 1-5 percent range, and combined lead and zinc values approach 30 percent in some of the veins (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 7 and occurrences 6, 8, and 9).

Alteration:

Silicification and introduction of potassium feldspar. Oxidation of lead minerals.

Age of mineralization:

The deposit is probably Eocene, based on the approximate 48 Ma age of the quartz porphyry hostrock (Bundtzen and Turner, 1979) (also see record MM091).

Deposit model:
Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The Bonnell or Neversweat deposit was discovered and first explored by John Busia, who reported galena-rich float that contained about 74 ounces of silver per ton and almost one-half ounce of gold per ton. An adit driven about 40 feet above creek level in search of the high-grade ore encountered only weakly mineralized schist (Wells, 1933, p. 376). More extensive underground work was done in about 1955 and some lead-silver ore may have been shipped (Bundtzen, 1981, p. 198). At least two additional adits were driven by Bonnell, a subsequent owner of the prospect. One adit was about 60 feet above the original prospect; and a third adit was about 30 feet higher. The upper adit was being extended in 1963 by Bonnell (Morrison, 1964, p. 97). Bundtzen (1981, pl. 3) shows that four main adits were driven on the property. The original, and longest, adit by Busia, a second adit called the Blacksmith level, a third-level adit, and an upper adit. The workings were mapped by Hawley and Associates (1978) and by T. K. Hinderman and McKee (Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 7). The mine apparently has been inactive since the work done by Bonnell in the 1960s.

Production notes:
Some lead- and silver-rich ore may have been shipped in 1955.

Reserves:

Additional comments:
The mine is in Denali National Park and Preserve.

References:
Wells, 1933; Morrison, 1964; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Bundtzen and Turner, 1979; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/14/01

Site name(s): Brooker Mountain

Site type: Prospect

ARDF no.: MM031

Latitude: 63.5021 **Quadrangle:** MM C-3

Longitude: 151.0514

Location description and accuracy:
This prospect is at an elevation of about 3450 feet on the northeast flank of Brooker Mountain above Reinhart Creek . It is about 800 feet north-northwest of the center of section 23, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within about 500 feet. The prospect is number 2 of Bundtzen, Smith and Tosdal (1976), Bundtzen (1981), and Thornsberry, McKee and Salisbury (1984), and number 21 of Hawley and Associates (1978).

Commodities:

Main: Sb

Other: Ag, Au, Bi, Pb, Zn

Ore minerals: Cerussite(?), galena(?), limonite, stibiconite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rock at this prospect is chlorite-quartz-muscovite schist of the Birch Creek Schist (Bundtzen, 1981, p. 206). A polymetallic quartz vein is poorly exposed but appears to be nearly vertical and to strike about N 60 E. The vein is pyritic and locally oxidized to limonite. The quartz locally contains as much as several percent of stibnite. A limonitic quartz vein assayed 1.18 percent lead, 12.1 ounces of silver per ton, 0.63 percent antimony and 0.26 percent bismuth (Bundtzen, 1981, p. 198, 211) . T. K. Hinderman collected a gossan sample that contained 3 percent lead, 4900 ppm silver, 1.6 ppm gold, and 1.55 percent antimony (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 2). The presence of galena or possibly its oxidation product cerussite is inferred from the lead content of samples of vein material and gossan.

Alteration:
Iron-oxide alteration. Possible oxidation of lead mineral.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The prospect was explored by a shallow, 65-foot-long bulldozer trench and a small pit. Workings are

sloughed and timber at the site for a cabin had rotted by 1983.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/11/00

Site name(s): Red Dirt

Site type: Occurrence

ARDF no.: MM032

Latitude: 63.7323 **Quadrangle:** MM C-2

Longitude: 150.5082

Location description and accuracy:
The Red Dirt occurrence (Thornsberry, McKee, and Salisbury, 1984) is a mineralized area mainly in the diagonal northwest half of section 5, T. 14 S., R. 15 W., Fairbanks Meridian. The location is for the approximate center of the area and is accurate.

Commodities:

Main: As, Au, Zn

Other: Ag, Cu, Pb

Ore minerals: Pyrite, pyrrhotite(?)

Gangue minerals:

Geologic description:
The Red Dirt occurrence is at least partly controlled by the Red Dirt fault, which strikes NE and is nearly vertical. Rocks on the southeast side of the fault are calcareous mica schists of the Birch Creek Schist. Rocks on the northwest side are complexly folded and faulted graphitic and quartzitic schists, also of the Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, v. 1, fig. K-30). Several large ferricrete 'kill' zones roughly parallel the Red Dirt fault. (Vegetation is sparse to absent in the kill zones).

The graphitic schist, which is infolded with garnet-quartz-mica schist and quartzite, is a possible host of stratabound mineralization. It contains as much as 3 percent pyrite and pyrrhotite(?), and sample assays show small amounts of copper, lead, zinc, and silver. A reddish soil zone about 800 feet long parallels the Red Dirt fault; it contains as much as 0.43 ppm gold and 120 ppm arsenic.

Zinc appears to have been mobilized by acidic surface waters. Stream- sediment samples collected immediately below the ferricrete zones contain less than 75 ppm zinc; samples collected about a mile downstream contain as much as 400 ppm zinc. The pH of waters below the ferricrete zones is about 3.5; downstream waters are less acidic.

In 1983, the U.S. Bureau of Mines conducted EM and magnetic surveys (Thornsberry, McKee, and Salisbury, 1984). There is a magnetic anomaly that could be due to pyrrhotite. The EM survey shows relatively conductive zones that could be due either to massive sulfides or to graphite.

Alteration:
Iron-oxide(?) alteration.

Age of mineralization:
The Red Dirt occurrence might be a metamorphosed massive sulfide deposit in a protolith of late Precambrian age.

Deposit model:
The geologic setting is permissive for sedimentary-exhalative deposits.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings. In 1983, the U.S. Bureau of Mines conducted detailed mapping, soil surveys, and ground geophysical studies of the occurrence (Thornsberry, McKee, and Salisbury, 1984).

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/05/01

Site name(s): Canyon Creek

Site type: Occurrence

ARDF no.: MM033

Latitude: 63.6840 **Quadrangle:** MM C-2

Longitude: 150.6143

Location description and accuracy:

This occurrence is at an elevation of about 3300 feet, on an unnamed fork of Canyon Creek. The location is where the creek crosses the boundary between sections 22 and 23, T. 14 S., R. 16 W., Fairbanks Meridian. The location is accurate. The site corresponds to occurrence 98 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Pb, Zn

Other:

Ore minerals: Limonite, pyrite, yellow 'sulfate' minerals

Gangue minerals:

Geologic description:

The Canyon Creek occurrence is in a graphitic schist unit of the upper Precambrian Birch Creek Schist (Bundtzen, 1981). The unit is about 340 feet thick, and is intercalated with garnet-mica-feldspar-quartz schist (Thornsberry, McKee, and Salisbury, 1984, v.1, p. 158-161). The graphitic schist is commonly weathered to an orange-red color; protected areas are covered with a yellow sulfate(?) mineral efflorescence; and stream channels draining the unit are coated with iron oxide precipitate. Pyrite is disseminated in the graphitic unit, but valuable sulfide minerals have not been found.

The former presence of zinc in near-surface bedrock horizons is suggested by zinc geochemistry. Zinc content is less than 195 ppm in stream sediment collected immediately below the graphitic schist, but increases to as much as 540 ppm downstream. Stream pH is 3.5 immediately below the schist but becomes neutral downstream. Locally, lead is also anomalous; a stream-sediment sample collected from a tributary creek about 1 mile east of the occurrence contained 295 ppm lead (and 260 ppm zinc).

The graphitic unit was surveyed by EM and magnetic methods. The result of the EM survey is consistent with a response to a massive sulfide deposit; the result of the magnetic survey suggests that graphite is not the sole conductor (Thornsberry, McKee, and Salisbury, 1984).

Speculatively, the Canyon Creek occurrence conceals a buried stratabound sed-ex deposit of late Precambrian age.

Alteration:

Conspicuous oxidation and (or) leaching of iron and zinc minerals.

Age of mineralization:

Possibly syngenetic sed-ex deposit of late Precambrian age.

Deposit model:

Sedimentary-exhalative in graphitic schist.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings. Geochemical and geophysical surveys were carried out in 1983 during a U. S. Bureau of Mines investigation (Thornsberry, McKee, and Salisbury, 1984).

Production notes:

Reserves:

Additional comments:
The Canyon Creek occurrence is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/05/01

Site name(s): Unnamed (ridge between Moonlight Creek and Canyon Creek)

Site type: Occurrence

ARDF no.: MM034

Latitude: 63.6596 **Quadrangle:** MM C-2

Longitude: 150.5291

Location description and accuracy:
This occurrence is at an elevation of about 3650 feet, on an unnamed ridge between the upper reaches of Canyon Creek and Moonlight Creek. It is about 500 feet northeast of the center of section 11, T. 14 S., R. 15 W., Fairbanks Meridian. The location is probably accurate within about 1000 feet. The occurrence corresponds to location 101 of Thornsberry, McKee, and Salisbury (1984, fig. K-8).

Commodities:

Main: Au

Other: Ag, Sb

Ore minerals: Pyrite, stibnite

Gangue minerals:

Geologic description:
This occurrence is in an altered, probably lower Tertiary, gabbro(?) dike. The dike contains pyrite and a small amount of stibnite. A sample collected by Bundtzen assayed 0.01 ounce of gold per ton, 0.10 ounce of silver per ton, and 0.016 percent antimony (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 101).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings.

Production notes:

Reserves:

Additional comments:

The site is in Denali National Park and Preserve.

References:

Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/10/01

Site name(s): Lower Caribou Creek; Lee bench

Site type: Mines

ARDF no.: MM035

Latitude: 63.6576 **Quadrangle:** MM C-2

Longitude: 150.9360

Location description and accuracy:

Lower Caribou Creek (Cobb, 1980 [OFR 80-363]) is the part of Caribou Creek below the Kantishna Hills. The lower Caribou Creek placer deposit is about 3 miles long. It extends from the NW1/4 of section 7, T. 15 S., R. 17 W., Fairbank Meridian, to the midpoint of sections 31 and 36 on the R. 17 W.-18 W. township line. The location marks the north limit of placer tailings shown on the 1954 (rev. 1978) edition of the Mt. McKinley C-2 quadrangle topographic map. It approximately coincides with number 47 of Cobb (1972 [MF 366]), placer resource block C-2 of Thornsberry, McKee, and Salisbury (1984, fig. K-3), and the mined area shown by Hawley and Associates (1978).

Commodities:

Main: Au

Other: Ag

Ore minerals: Gold

Gangue minerals: Garnet, magnetite

Geologic description:

Lower Caribou Creek has a gradient of about 150 feet per mile. It flows through a broad alluvial valley cut into bedrock of the Birch Creek Schist (Levell, 1984, v. 1 and 2; Bundtzen, 1981). The broad terrace on the east side of lower Caribou Creek is called the Lee bench. The lower Caribou Creek placer deposit consists of 4 to 7 feet of subrounded to rounded gravel on top of weathered, clayey, bedrock. The lowest 1 to 2 feet of gravel is weakly cemented. The gold was mainly in the gravel, but about 1/2 foot of bedrock was auriferous and was mined with the gravel. Most of the gold was fine and flaky, a little was nuggety, and its fineness was about 680. The gold was weakly to moderately stained with iron and manganese oxides. Garnet and magnetite were abundant in the concentrate. Grade, calculated from production, was about 0.027 ounce (0.019 fine ounce) of gold per cubic yard (Levell, 1984, v. 2, operation 6).

The nature of the Lee bench placer is uncertain, as most of it has not been tested. The deposit mainly is on schist bedrock, and consists of 4 to 10 feet of gravel overlain by 2 to 3 feet of frozen muck (Levell, 1984, v. 2). At an exposure about 1/2 mile downstream from the schist-floored deposit, 10 to 15 feet of gravel lies on false bedrock of quartz-rich, Tertiary(?) sand. Spoils from nearby pits include blue clay that possily is possibly Tertiary lake sediment. The average grade of the Lee bench deposit, calculated from ground mined and gold recovered in 1975, is 0.026 ounce (0.019 fine ounce) of gold per cubic yard.

Alteration:

Age of mineralization:

Holocene and late Pleistocene; some deposits may be as old as late Tertiary.

Deposit model:

Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

More than a mile of lower Caribou Creek was mined prior to 1951-52, probably mainly by dragline in about 1940. At least one operation worked the lower Lee bench in 1975 (Levell, 1984, v. 2; Bundtzen, Tosdal, and Smith, 1976). The alluvial deposit in and near the modern valley was mined in 1983 and probably 1984.

Production notes:

Total gold production is uncertain. An operator in 1975 recovered about 70.5 ounces. An efficient 1983 operation had recovered more than 1000 ounces before the end of August, and was in production when visited by Levell (Levell, 1984, v. 2). Based on the grade of mined material, and on the extent of the mining, the lower Caribou placer deposit has probably produced at least 5000 ounces of gold.

Reserves:

Resource block C-2 (Levell, 1984) contains about 840,000 cubic yards of alluvium on claimed ground (1983) in or adjacent to modern lower Caribou Creek. The gold resource at the calculated grade of 0.019 fine ounce of gold per cubic yard is 15,960 ounces. There is a much larger, but less quantified, resource on the Lee bench. The estimated volume of claimed (1983) gravel in the bench deposits is 4,300,000 cubic yards. Using the grade calculated from 1975 production from the bench (0.019 fine ounce of gold per cubic yard), the resource is about 81,700 ounces of gold.

Additional comments:

Caribou Creek is in Denali National Park and Preserve.

References:

Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 1 and 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 1 and 2)

Reporter(s): C.C. Hawley

Last report date: 04/19/01

Site name(s): Unnamed (north of Kankone Peak)

Site type: Occurrence

ARDF no.: MM036

Latitude: 63.6302 **Quadrangle:** MM C-2

Longitude: 150.5994

Location description and accuracy:

This occurrence is at an elevation of about 4300 feet, about 2500 feet due north of Kankone Peak. It is in the SW1/4 NW1/4 section 11, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate within 300 feet.

The occurrence corresponds to number 62 of Bundtzen, Smith, and Tosdal (1976), 290 of Hawley and Associates (1978), and 69 of Bundtzen (1981). Its location is the same as occurrence 100 of Thornsberry, McKee, and Salisbury (1984), but their description of the geology does not agree with that of the earlier workers.

Commodities:

Main: Ag

Other: Pb

Ore minerals: Galena, pyrite, sphalerite(?)

Gangue minerals: Quartz

Geologic description:

The country rocks in the area of this occurrence are quartzite and mica-quartz schist of the upper Precambrian Birch Creek Schist. The schistosity strikes NE and dips SE (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The occurrence consists of mineralized quartz veins in a shear zone. The shear zone is 15 to 30 feet wide; it trends NE, and can be traced more than 300 feet. The quartz contains pyrite, small amounts of galena, and, probably, sphalerite or an oxidized zinc mineral. Samples of the veins assay up to a half-ounce of silver per ton, 0.47 percent lead, 0.47 percent zinc, 300 ppm copper, 230 ppm antimony, and 44 ppm molybdenum. Gold was not detected. (Hawley and Associates, 1978; Bundtzen, 1981).

Alteration:

Silicification.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Weakly mineralized silicified shear zone.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

Exposures along the shear zone are mostly rubble crop. There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Bundtzen, Smith, and Tosdal, 1976; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/05/01

Site name(s): Unnamed (ridge northwest of Kankone Peak)

Site type: Occurrence

ARDF no.: MM037

Latitude: 63.6272 **Quadrangle:** MM C-2

Longitude: 150.6147

Location description and accuracy:
This occurrence is at an elevation of about 4050 feet on a northwest- trending ridge crest, about 1/2 mile northwest of Kankone Peak. The location is accurate within 500 feet. The occurrence corresponds to mineral deposit 281 of Hawley and Associates (1978), and occurrence 97 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag

Other: Pb, Zn

Ore minerals: Galena(?), goethite, jarosite, pyrite(?), sphalerite(?)

Gangue minerals: Quartz

Geologic description:
The country rocks at this occurrence are quartzite and mica-quartz schist of the Birch Creek Schist. The schistosity strikes NE and dips moderately SE (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).
The occurrence is an iron-stained shear zone that trends about N. 55 E. and can be traced for about 1200 feet. The zone contains minor amounts of quartz; it is strongly oxidized and leached, but the former presence of pyrite is suggested by the limonite minerals goethite and jarosite. One sample contained 6800 ppm lead, and 6000 ppm zinc (Hawley and Associates, 1978, fig. 4.1-A(1), sample number 281), suggesting that small amounts of galena and sphalerite, or their oxidized equivalents, are present. The sample also contained 31 ppm silver. Thornsberry, McKee, and Salisbury (1984, v. 2) reported anomalous amounts of silver, lead, and zinc from weathered surface material at the site.

Alteration:
Oxidation and leaching of sulfide(?)-bearing shear zone.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 02/0501

Site name(s): Unnamed (on Kankone Peak)

Site type: Occurrence

ARDF no.: MM038

Latitude: 63.6246 **Quadrangle:** MM C-2

Longitude: 150.6056

Location description and accuracy:

This occurrence is at an elevation of about 4450 feet about 1000 feet northwest of the top of Kankone Peak. It is about at the center of the S1/2 SW1/4 section 11, T. 15. S., R. 16 W., Fairbanks Meridian. The location is accurate within 300 feet.

The occurrence corresponds to number 61 of Bundtzen, Smith, and Tosdal (1976), 23 of MacKevett and Holloway (1977), 291 of Hawley and Associates (1978), and 68 of Bundtzen (1981), and is referred to in Cobb (1980 [OFR80-363]). It is at the same location as occurrence 99 of Thornsberry, McKee, and Salisbury (1984, fig. K-8), but their description of the geology does not agree with that of Bundtzen, Smith, and Tosdal, and of Hawley and Associates.

Commodities:

Main: Cu

Other: Ag

Ore minerals: Azurite, chalcopyrite, galena(?), malachite, pyrite, sphalerite(?)

Gangue minerals:

Geologic description:

Stratabound, disseminated and semimassive sulfides occur in layers of greenstone schist of the upper Precambrian Birch Creek Schist. The greenstone schist strikes NE and dips moderately to the SE, off the Kantishna antiform (MM091) (Bundtzen, Smith, and Tosdal, 1976; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The sulfide-bearing zone is parallel to the schistosity of the host greenstone, and is 4 to 6 feet thick. It contains pyrite, chalcopyrite, azurite, and malachite. Samples assayed up to 1.02 percent copper and 1.19 ounces of silver per ton (Hawley and Associates, 1978, fig. and table 4.1-A(1)). The stratabound zone is cut by fracture-controlled, sulfide-bearing veinlets. A sample of these veinlets assayed 0.91 ounce of silver per ton, and 6000 to 6900 ppm each of lead and zinc, suggesting that the veinlets contain galena and sphalerite (Bundtzen, 1981).

Alteration:

Oxidation of copper minerals.

Age of mineralization:

Possibly late Precambrian, the protolith age of the Birch Creek Schist. The deposit could be younger, but is pre-metamorphic. The stratabound deposit is cut by sulfide veinlets assumed to be Eocene (see record MM091).

Deposit model:

Stratabound mineral deposit in greenschist. Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The occurrence was discovered in the mid-1970s (Bundtzen, Smith, and Tosdal, 1976). There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/05/01

Site name(s): Unnamed (near VABM Moon)

Site type: Occurrence

ARDF no.: MM039

Latitude: 63.6195 **Quadrangle:** MM C-2

Longitude: 150.5620

Location description and accuracy:
This occurrence is at an elevation of about 4600 feet, about 250 feet northwest of VABM Moon, on an isolated ridge southeast of Kankone Peak. It is in the NW1/4NE1/4 section 13, T. 15. S., R. 16 W., Fairbanks Meridian. The location is accurate within 500 feet. The occurrence corresponds to mineral deposit number 293 of Hawley and Associates (1978).

Commodities:

Main: Ag, Cu

Other:

Ore minerals: Chalcopyrite, malachite

Gangue minerals:

Geologic description:
This occurrence consists of weakly malachite-stained Birch Creek Schist that contains a small amount of chalcopyrite. An analysis of the schist shows 1250 ppm copper and 3.4 ppm silver (Hawley and Associates, 1978).

Alteration:
Oxidation of copper mineral.

Age of mineralization:

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:

Hawley and Associates, 1978.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 02/05/01

Site name(s): Unnamed (on hill 4372)

Site type: Prospect

ARDF no.: MM040

Latitude: 63.6109 **Quadrangle:** MM C-2

Longitude: 150.6416

Location description and accuracy:
This prospect is about 500 feet west of the top of hill 4372 in the SW 1/4 SW1/4 section 15, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate for a galena-bearing quartz vein, but there may be at least two other mineral showings near this site. Subject to this qualification, the prospect corresponds to number 60 of Bundtzen, Smith, and Tosdal (1976), 282 of Hawley and Associates (1978), 67 of Bundtzen (1981), and 95 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au, Pb, Zn

Other: As, Cu, Sb

Ore minerals: Galena, pyrite, sphalerite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of this prospect consist of Birch Creek quartzite and mica schist faulted against Spruce Creek metafelsite (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). Bundtzen, Smith, and Tosdal (1976) described a two-foot-thick, stibnite-galena-sphalerite-quartz vein at this locality. A sample assayed 0.1 ounce of gold per ton, 48.5 ounces of silver per ton, 0.21 percent copper, 2.1 percent lead, 0.5 percent antimony, and 2.15 percent arsenic. In 1983, Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 95) mapped a 2- to 3-foot-thick, steeply dipping quartz vein that strikes N75W. The vein assayed 0.23 ounce of gold per ton, 51.3 ounces of silver per ton, 0.33 percent copper, 21.5 percent lead, 14.0 percent zinc, 0.39 percent antimony, and 2.85 percent arsenic.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The area was mapped and sampled by Bundtzen, Smith, and Tosdal (1976), Hawley and Associates (1978), and Thornsberry, McKee, and Salisbury (1984). Bundtzen's and Hawley's parties found no evi-

dence of previous prospecting at this site. Thornsberry's party found several small pits; it is possible that that their location is a few hundred feet from the locality visited in the earlier investigations.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/05/01

Site name(s): Flat Creek

Site type: Occurrence

ARDF no.: MM041

Latitude: 63.6075 **Quadrangle:** MM C-2

Longitude: 150.9996

Location description and accuracy:
Flat Creek, one of the larger creeks in the Kantishna Hills placer area, rises on the northwest flank of Wickersham Dome. The location is in the NW1/4 of section 23, T. 15 S., R. 18 W., Fairbanks Meridian. Flat Creek lies between Glacier Creek (MM048) to the east and Moose Creek (MM132) to the west. It joins Glacier Creek about 8 miles below Wickersham Dome.

Commodities:

Main: Au

Other: Ag

Ore minerals: Gold

Gangue minerals:

Geologic description:
Flat Creek rises on the northwest flank of Wickersham Dome in a canyon cut in rocks of the Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, figs. K-2 and K-3). The creek leaves the hills at an elevation of about 2000 feet, then flows north and northwesterly on an outwash(?) plain for about 2 miles. Bedrock on lower Flat Creek is unknown, but lower Glacier Creek, about 1 1/2 miles to the east, flows across Tertiary and Quaternary sediments and weakly indurated, Tertiary sedimentary rocks.

Flat Creek has not been mined. One sluice sample, collected on alluvial bars in the SW1/4 section 25, was gold-bearing, and the creek has alluvial, bench, and terrace deposits that could contain gold. Levell (1984, v. 2) estimated about 2.6 million cubic yards of material of moderate potential along Flat Creek. Flat Creek lies between Moose Creek (MM132) and Glacier Creek (MM048), which are significant gold placer creeks. Flat Creek, however, rises in Birch Creek Schist, a unit not as favorable for gold lode deposits as the Spruce Creek sequence rocks extensively drained by Glacier and Moose Creeks (Levell, 1984, v. 1). There are only a few lode deposits in the drainage area of Flat Creek, which accounts for its lower placer gold potential than that of Glacier and Moose Creeks.

Alteration:

Age of mineralization:
Quaternary.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

Flat Creek probably was prospected for gold in about 1905-06, when the first placer discoveries were made and there was a stampede to the new district. There is no significant evidence of past mining in the creek. In 1983, two localities were sampled. One of the samples was lost, but a sluice concentrate sample contained 0.0036 ounce of gold per cubic yard (Levell, 1984: v. 2).

Production notes:

Reserves:

A volume of about 2,600,000 cubic yards of bench deposits, stream alluvium, and terrace gravels exists in Flat Creek (Levell, 1984, v. 2). This volume has moderate potential for economic placer gold deposits. One sample of stream alluvium contained 0.0036 ounce of gold per cubic yard. No churn drill holes were dug during Levell's evaluation.

Additional comments:

References:

Levell, 1984 (v. 1 and 2); Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/209/01

Site name(s): Upper Caribou Creek

Site type: Mines

ARDF no.: MM042

Latitude: 63.6072 **Quadrangle:** MM C-2

Longitude: 150.8260

Location description and accuracy:

Caribou Creek rises below Kankone Peak (Cobb, 1980 [OFR 80-363], 1973 [B 1374]). Major tributaries, all from the south, are Crevice (MM046), Last Chance (MM050), and Snowshoe creeks. They enter an upper segment of Caribou Creek that flows west-southwest and west for about six miles, then turns northerly for about three miles. As defined in this record, the upper Caribou placer deposit begins about in the middle of section 16, T. 15 S., R. 16 W., and ends in the north part of section 7, T. 15 S., R. 18 W., Fairbanks Meridian. The location is about at the midpoint of this segment of the creek, near where Snowshoe Creek enters from the south. It is about the same as number 48 of Cobb (1972 [MF 366]). Upper Caribou Creek, as defined in this record, also corresponds to block C-3 of Levell (1984 [v. 2]).

Commodities:

Main: Ag, Au

Other: Sb, W

Ore minerals: Gold, scheelite, stibnite, wolframite(?)

Gangue minerals: Garnet, graphite, ilmenite, magnetite

Geologic description:

Caribou Creek below Crevice Creek cuts into Birch Creek Schist bedrock (Bundtzen, 1981); above Crevice Creek, several headward drainages cut into the Spruce Creek sequence.

Caribou Creek rises below Kankone Peak. Initially, it is in a fairly steep canyon, dropping about 500 feet in a mile and a half. It begins to flatten out about in the center of section 16, T. 15 S., R. 16 E. The valley is fairly narrow, but at most places there is at least a 100 foot width of valley- bottom alluvium. In section 17 of R. 15 W, there are prominent south-valley benches. The valley begins to broaden in section 17, R. 16 W., but the north side of the creek continues to crowd the hills for about 3 more miles (Hawley and Associates, 1978; fig. 4.1-A(1)); Thornsberry, McKee, and Salisbury, 1984, fig. K-3).

Gravel thickness gradually increases downstream, from a minimum of about 2 feet to about 12 to 14 feet. The earliest extensive mining was of the relatively thin, 2- to 7-foot-thick gravel section in and near modern Caribou Creek. The thin deposits were probably mined out before 1920 (Capps, 1919). Subsequent operations mined gravel sections mainly on the south side of the modern creek. These sections, which probably produced most of the gold mined in the creek, are as much as 300 feet wide. Locally, the south-side pay is bordered by higher benches. These benches apparently are frozen and have not been mined extensively.

Gold in the upper Caribou deposit was uniformly silver-rich, with an average fineness of about 675. It was primarily bright and flaky, although the gold on bedrock was stained. It was accompanied by pebble- to sand-sized magnetite, ilmenite, and scheelite; near Last Chance Creek, the concentrate contained stibnite. Wolframite was tentatively identified at one locality, and Joesting (1942, 1941-1943) reported graphite. Although most of the gold is in fine flakes, nuggets up to about 5 ounce size are not uncommon. Crystallinity of gold increased upstream (Prindle, 1907; Capps, 1919; Joesting, 1942; Levell, 1984).

Fairly extensive mining in Caribou Creek from 1939 to1948 suggests a fairly constant amount of gold on a bedrock-foot basis. The apparent grade is about 0.02 ounce per bedrock-foot; fluctuations in grade more or less reflect the depth of the deposit. In 1939-40, Caribou Creek gravel 10 to12 feet thick was mined downstream from Last Chance Creek; this gravel averaged about 0.013 fine ounce of gold per cubic yard.

In 1941-42, the operation moved upstream of Crevice Creek, into gravel only 6 to7 feet thick. This material contained about 0.020 to 0.022 fine ounce of gold per cubic yard (calculations by C. C. Hawley from production records, 1939-1948). Some grades calculated in 1984 (Levell, 1984, v. 2) were significantly higher--nearly 0.03 fine ounce per cubic yard. These grades can be multiplied by about 1.5 to convert them to as-mined placer gold, based on an average gold fineness of about 675 for Caribou Creek. The difference between the grades computed from 1930-40s and 1980 records appears to reflect gold contained in the upper bedrock part of the pay section. The 1980s operations used excavators that could dig bedrock to a depth of about 3 or 4 feet, compared to a foot or less of bedrock dug by the tractors and draglines of the earlier operations.

Gold from the Caribou Creek placer is the most silver-rich (average silver fineness 311) in the Kantishna Hills area (MM084). Only Stampede (MM142) and Little Moose (MM140) creeks, in the eastern outlying part of the Kantishna district, contain placer gold richer in silver. The difference in silver content suggests a difference in the source of the gold. The source of the gold in upper Caribou Creek appears to be argentiferous gold lodes in the Spruce and Kankone Peak areas. Creeks containing higher-fineness gold drain the southern part of the area, featuring such auriferous lodes as the one at the Banjo mine (MM097).

Alteration:

Age of mineralization:
Pleistocene or Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; medium

Site Status: Inactive

Workings/exploration:
Except for an operation near Crevice Creek in 1905-6 (Prindle, 1907, 1911), the earliest extensive mining in Caribou Creek seems to have been on the gravel in and near the modern creek. A 1200-foot-long section of upper Caribou Creek between Last Chance and Crevice creeks mined in 1916 ranged from 10 to 70 feet wide. The gravel section was generally 2 to 3 1/2 feet thick, but was as much as 7 feet thick in some bars. Gold occurred throughout the section, but was concentrated on and just above bedrock. Gold in the gravel was bright and flaky; gold on bedrock was somewhat stained. Some nuggets up to about 5 ounces were recovered, and the fineness of the gold was about 655. Pebble-size magnetite, ilmenite, and scheelite, accompanied by large garnets accumulated with the gold in the sluice boxes (Capps, 1919, p. 92), and Prindle (1907) reported stibnite in the concentrates near Crevice Creek.

Exploration in the early 1920s included gravels on the south side of the modern creek. Grades reported in 1921-1922 on upper Caribou Creek near Snowshoe Creek reportedly were about 0.01 to 0.03 ounce of gold per cubic yard. A fairly large hydraulic cut made in 1922 in this area apparently recovered less gold than that and the operation failed (Davis, 1923; Buzzell, 1988). Testing with churn drills in about 1924 and 1925 indicated ground with significantly less value (Charles G. Bigelow for Hammon Consolidated Dredging, written commun., 1925). Value on a bedrock- foot basis was reported as about 11 cents; this value is equivalent to about 0.012 ounce of gold per cubic yard in typical Caribou gravel about 7 feet thick. Testing of this ground with caissons in 1937 and 1938 suggested that the small- diameter churn drilling had underestimated the grade, and that it actually was about 0.02 ounce of gold per cubic yard. Similar values were obtained during medium-scale mining in 1939-1942 (Smith, 1941 and 1942; Bundtzen, Smith, and Tosdal, 1976; Bundtzen, 1978). In 1939 and 1940, a dragline mine operated below Last Chance Creek on gravel about 10 to 12 feet thick; computed grade of this ground in 1940 was 0.013 ounce of gold per cubic yard. In 1941-42, the operation moved upstream, above Crevice Creek, where the gravel was only about 6 to 8 feet thick. The respective average grades in those years were 0.0198 and 0.022 ounce of gold per cubic

yard. These values are for fine gold; using an assumed fineness of about 660, the corresponding grades for placer gold respectively are about 0.030 and 0.033 ounces per cubic yard.

Successful mining on the creek was by innovative methods. Caribou Mines (1939-1942) used a mobile Washington Iron Washing Plant fed by a dragline. Tractors were also used in the pit. That operation processed about 1,000,000 bedrock feet of placer material in each of three seasons before World War II, probably about the same amount in 1946, and lesser amounts in 1947-48. The operation was innovative for its time. Several of the 1975 and later operations used a mining technique developed by Sam and Jerome Koppenberg of KLK, Inc. A mobile washing plant was fed by a tracked, 2-cubic-yard excavator (back shovel). After stripping and pushback of overburden, the excavator cut a slot the length of the pit. This material was not processed, but spread over the surface to be mined. Mining commenced from a second parallel slot; water was discharged through tailings and recirculated. Slots were backfilled during mining, then overburden returned when the operation was completed. Water returned to the creek was not noticeably turbid. Kragness-Hayhurst used the same methods but substituted a jig for sluice processing in their operation on Caribou Creek.

Production notes:

Small placer mines on upper Caribou Creek produced some gold from shovel-in operations before 1916. In 1916, these operations probably recovered about 300-500 ounces of gold from 1200 feet of the creek (Capps, 1919). Upper Caribou had small, subeconomic gold production in 1922 and 1923 from an ill-fated, large-scale hydraulic mine. W. E. Dunkle began exploration of Caribou Creek in 1937. He prospected by sinking caissons to bedrock and processing the material. Substantial production began in 1939 and continued until 1948, interrupted in 1943-45 by World War II. The 1939-42 operation was carried out by Caribou Mines, a partnership of Glen Carrington of the Carrington Company, W. E. Dunkle, L. C. Thomson of Montreal, Quebec, and W. B. Kluckhohn of Seattle. Dunkle sold his interest in the operation to Carringon after the war. Caribou Mines operated a Washingon Iron Works washing plant fed by about a one and a half cubic-yard dragline.

Reported production, in fine ounces, from upper Caribou Creek from 1939 to 1948 was: 1939, 1657 ounces; 1940, 2935 ounces; 1941, 2373 ounces; 1942, 3203 ounces; 1946, 2327 ounces; 1947, 920 ounces; and 1948, 1300 ounces (Company records and Annual Production and Development of Metal Mines forms of the U. S. Bureau of Mines, National Archives, Anchorage) The total production of gold was 14,715 fine ounces,
corresponding to about 21,800 ounces of placer gold. Approximately 6,800 ounces of silver were recovered. Operations in 1946-1948 were not profitable, although 1946 could have been, except for an early freeze-up that halted production. The rise in gold price in the early 1970s caused renewed interest in Caribou Creek. Placer gold production in this period probably was several thousand ounces. The total production of placer gold from the creek is probably between 25,000 and 30,000 ounces, corresponding to about 20,000 fine ounces.

Reserves:

Levell (1984) calculated gold-bearing placer resources for upper Caribou Creek. He measured 1,980,000 cubic yards of high-potential alluvial gravel with estimated grades of 0.012 to 0.032 ounce of gold per cubic yard. The range in possible gold content is 23,760 to 63,360 ounces. The bench gravels comprise about 1,200,000 cubic yards. They have not been extensively mined or explored, and Levell assigned them only moderate potential. Their grade is uncertain. Assuming a grade of of 0.018 ounce per cubic yard, the calculated gold resource in the bench deposits of upper Caribou Creek is about 21,600 ounces.

Additional comments:

Caribou Creek, the most productive placer creek in the Kantishna district, is in Denali National Park and Preserve. It has not been mined since about 1985.

References:

Prindle, 1907; Prindle, 1911; Capps, 1919; Davis, 1923; Smith, 1941; Smith, 1942; Joesting, 1942; Joesting, 1941-43 (MR 195-23); Cobb, 1972 (MF 366); Cobb, 1973 (B 1374); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986; Buzzell, 1988.

Primary reference: Levell, 1984 (v. 2); this record

Reporter(s): C.C. Hawley

Last report date: 04/10/01

Site name(s): Last Chance; Caribou

Site type: Mine

ARDF no.: MM043

Latitude: 63.6061 **Quadrangle:** MM C-2

Longitude: 150.8139

Location description and accuracy:

The Last Chance (sometimes called Caribou) mine is about at the center of the N1/2 NE1/4 of section 22, T. 15 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet. The mine is location 24 of Cobb (1972 [MF 366]), 21 of MacKevett and Holloway (1977), L of Hawley and Associates (1978), 63b of Bundtzen (1981), and 61 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Sb

Other: Ag, Au, Mo, Pb, Zn

Ore minerals: Gold, jamesonite, pyrite, pyrrhotite, sphalerite(?), stibiconite, stibnite

Gangue minerals: Quartz

Geologic description:

The country rock at the Last Chance mine is strongly-deformed, biotite- amphibolite schist of the upper Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit consists of a fault-controlled, mineralized quartz vein that strikes about N 30 E and dips 50-70 NW. The strike of the vein is approximately parallel to the strike of the schist hostrock, but the vein dips NW and the schist dips SE.

The vein is 2 to 6 feet thick. Stibnite is the main ore mineral; it occurs in massive form and in elongate crystals mixed with nearly euhedral quartz crystals (Prindle, 1907; Capps, 1919; Bundtzen, Smith, and Tosdal, 1976). Parts of the vein are composed of nearly massive quartz. The stibnite is accompanied by small amounts of pyrite, pyrrhotite, jamesonite, and probably sphalerite. Some of the stibnite is oxidized to stibiconite. The maximum antimony content in samples of the vein is about 26 percent, but the coarse, massive stibnite probably contains more than 50 percent antimony. More than 70 tons of the high-grade stibnite ore has been mined (Cobb, 1980 [OFR 80-363]; Bundtzen, Smith, and Tosdal, 1976).

The stibnite ore is weakly auriferous. Prindle (1907) reported that samples assayed as much as 0.12 ounce of gold and 4 ounces of silver per ton, and Hawley and Associates (1978) reported assays of as much as 0.14 ounce of gold per ton. Free gold has been reported; it probably occurs in quartz-rich parts of the vein, inasmuch as high-grade antimony ores generally contain little gold. Thornsberry, McKee, and Salisbury (1984, location 61, v. 2) reported about 100 ppm molybdenum in several samples and as much as 600 ppm zinc. The molybdenum mineral is unknown; the zinc probably is in small amounts of sphalerite.

Alteration:

Local oxidation of stibnite.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Simple stibnite deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
The deposit was discovered in 1905 (Prindle, 1907; Brooks, 1916), and developed by open cuts, shallow shafts, and short adits. The shafts were flooded when the prospect was visited by Capps in 1916 (Capps, 1919). The mine operated on a small scale in 1968-1970, 1973-74, and 1984.

Production notes:
Twelve 12 tons of high-grade stibnite ore reportedly was mined in about 1905. The ore was not shipped, because high antimony prices during the Russo-Japanese War fell abruptly at the end of the hostilities (Wells, 1933, p. 353-354). Buntzen, Smith, and Tosdal (1976) reported a total of 74,360 pounds of antimony recovered from 71.5 tons of ore before 1974. Thornsberry, McKee, and Salisbury (1984) reported a total production of about 70 tons of ore. There were 15 to 30 tons of ore stockpiled at the site in 1983.

Reserves:

Additional comments:
Abundant stibnite occurs in the Caribou Creek placer deposit, just below the Last Chance mine. The property is in Denali National Park and Preserve.

References:
Prindle, 1907; Brooks, 1916; Capps, 1919; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, Smith, and Tosdal, 1976; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Unnamed (north side of divide between Caribou and Myrtle Creeks)

Site type: Occurrence

ARDF no.: MM044

Latitude: 63.6058 **Quadrangle:** MM C-2

Longitude: 150.6523

Location description and accuracy:
This occurrence is at an elevation of about 4000 feet on the Caribou Creek side of the unnamed ridge that connects Spruce Peak and Kankone Peak, and forms the divide between Myrtle Creek and upper Caribou Creek. It is about 2400 feet northeast of the center of section 21, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate within about 500 feet. The site corresponds approximately to the location of sample number 272 of Hawley and Associates (1978), and to occurrence 94 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au, Pb

Other: Cu, Sb, Zn

Ore minerals: Arsenopyrite, galena

Gangue minerals: Quartz

Geologic description:
This occurrence is about on the contact between metafelsite and quartz-muscovite schist (Hawley and Associates, 1978, fig. 4.1-A(1). Hawley and Associates correlated these rocks with the upper Precambrian Birch Creek Schist. Bundtzen (1981) and Thornsberry, McKee, and Salisbury, (1984, fig. K-2) subsequently mapped them as lower Paleozoic Spruce Creek sequence. The occurrence consists of a foot-thick, quartz-arsenopyrite-galena vein. The vein assayed 9.9 ppm gold, 340 ppm silver, 8.5 percent lead, 340 ppm copper, 1450 ppm zinc, and 1250 ppm antimony (Hawley and Associates, 1978, fig. 4.1-A(1), number 272). Exposures at and near the site are poor, but the vein could be related to the one at MM045.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The occurrence was found during geologic mapping in 1976 (Hawley and Associates, 1978). There are

no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Unnamed (divide between Myrtle Creek and upper Caribou Creek)

Site type: Occurrence

ARDF no.: MM045

Latitude: 63.6041 **Quadrangle:** MM C-2

Longitude: 150.6516

Location description and accuracy:

This occurrence is at an elevation of about 4150 feet in a saddle on an unnamed ridge between Spruce Peak and Kankone Peak. It is on the divide between Caribou and Myrtle Creeks, in the NE1/4 NE1/4 section 21, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate within 500 feet. The occurrence corresponds approximately to sample location 273 of Hawley and Associates (1978), and to occurrence 93 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au, Pb

Other: As, Cu, Sb, Zn

Ore minerals: Arsenopyrite(?), galena, pyrite

Gangue minerals: Quartz

Geologic description:

The country rock in the area of this occurrence is metafelsite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). The Spruce Creek rocks are in a downfaulted block about 3/4 mile wide that trends about NNE. The block is juxtaposed against Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The occurrence consists of galena- and probably arsenopyrite-bearing quartz float, presumably from a thin, poorly-exposed, vein. A galena-rich sample assayed 0.93 ounce of gold per ton, 112.4 ounces of silver per ton, 33 percent lead, 2.65 percent arsenic, 0.12 percent copper, 0.265 percent zinc, and 0.435 percent antimony. Soil from a saddle near the vein is anomalous in lead, zinc, and silver (Hawley and Associates, 1978, sample number 273).

Alteration:

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: None

Site Status: Inactive

Workings/exploration:

The vein was discovered in 1983 (Thornsberry, McKee, and Salisbury, 1984).

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Crevice Creek

Site type: Mine

ARDF no.: MM046

Latitude: 63.6014 **Quadrangle:** MM C-2

Longitude: 150.7559

Location description and accuracy:
Crevice Creek (Cobb, 1980 [OFR 80-363]) is a two-mile-long, northwest-flowing tributary to Caribou Creek. It rises below Spuce Peak. For this record, the location of the Crevice Creek placer is near the center of section 24, T. 15 S., R. 16 W., Fairbanks Meridian. Crevice Creek is location 54 of Cobb (1972 [MF 366]). It is Alaska Kardex location 66-58 (Heiner and Porter, 1972; Hawley and Associates, 1978), and is resource block CR-1 of Thornsberry, McKee, and Salisbury (1984, fig. K-3).

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:
Crevice Creek is steep, having a gradient of more than 500 feet per mile. It flows in a bedrock valley on Birch Creek Schist. Its steep upper valley is cut into rocks of the Spruce Creek sequence, and a regional fault that strikes northwest controls its upper course (Thornsberry, McKee, and Salisbury, 1984, fig. K-2; Bundtzen, 1981). Several lode mineral occurrences, including MM053 and MM057, are in the headwaters of Crevice Creek (Hawley and Associates, 1978, fig. 4.1-A(1)).

The creek was mined by hand in the early 1900s. Rough, coarse gold was recovered, including a 4 or 5 ounce nugget (Prindle, 1907). About one-third of the creek appears to have been hand mined, and there appears to have been some mining as recently as 1946-47 (Levell, 1984, v. 2, table A-6). Test samples 0.1 cubic yard in size collected in 1983 contained 0.0018 to 0.1249 ounce of gold per cubic yard (Levell, 1984, v. 2). There is a resource of about 100,000 cubic yards of alluvial gravel in the valley that could contain placer gold.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

Placer gold was discovered in Crevice Creek early in the history of the Kantishna district. It was mined fairly extensively by hand in 1906, and some mining could have occurred as recently as 1946 and 1947.

Production notes:

Probable production of 500 to 750 ounces of gold (Levell, 1984, v. 2; Cobb, 1980 [OFR 80-363]).

Reserves:

About 100,000 cubic yards of alluvium that could grade about 0.03 to 0.1 ounce of gold per cubic yard (Levell, 1984, v. 2).

Additional comments:

Crevice Creek is in Denali National Park and Preserve.

References:

Prindle, 1907; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Prindle, 1907; Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/19/01

Site name(s): Unnamed (south of upper Caribou Creek)

Site type: Occurrence

ARDF no.: MM047

Latitude: 63.6014 **Quadrangle:** MM C-2

Longitude: 150.6670

Location description and accuracy:
This occurrence is at an elevation of about 3700 feet on the north flank of a ridge about 1.65 miles north of Spruce Peak. It is about 1100 feet northwest of the center of center of section 21, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate. The occurrence is number 274 of Hawley and Associates (1978), and approximately at the same location as occurrence 92 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Zn

Other: As, Au, Cu, Pb, Sb

Ore minerals: Arsenopyrite(?), galena, limonite, pyrite, sphalerite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rocks at the prospect are metafelsite, marble, and graphitic phyllite of the lower Paleozoic Spruce Creek sequence. The Spruce Creek rocks occur in a narrow, northeast-trending block downfaulted (?) into more widespread Birch Creek rocks (Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury (1984, v. 2).

The mineral deposits include vein and stratiform types. Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 92) described quartz veins up to a foot thick that cut hydrothermally altered metafelsite. The veins contain pyrite, galena, sphalerite, stibnite, and probably arsenopyrite. A sample of one vein assayed 0.12 ounce of gold per ton, 2.94 ounces of silver per ton, 3.95 percent arsenic, 2.15 percent lead, and 8.5 percent zinc (Thornsberry, McKee, and Salisbury, 1984, v. 2).

The stratiform occurrences consist of gossan in graphitic schist. One sample collected about 250 feet southwest of a vein contained 1.7 percent zinc, 3.4 ppm silver, and anomalous amounts of copper and lead (Hawley and Associates, 1978, sample 275).

Alteration:
'Hydrothermal' alteration of metafelsite. Iron-oxide alteration.

Age of mineralization:
The veins are assumed to be Eocene (see record MM091). The stratiform ocurrence may be early Paleozoic, the protolith age of the Spruce Creek sequence.

Deposit model:
Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The occurrence was discovered in about 1975 (Hawley and Associates, 1978). There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Glacier Creek

Site type: Mines

ARDF no.: MM048

Latitude: 63.5976 **Quadrangle:** MM C-2

Longitude: 150.9307

Location description and accuracy:

Glacier Creek (Cobb, 1980 [OFR 80-363]) rises against Glacier Peak. It flows westerly for about two miles, then gradually turns northwesterly. The creek is auriferous for at least six miles; the location marks placer tailings in the SW 1/4 of section 19, T. 15 S., R. 17 W., Fairbanks Meridian. The location is accurate. Glacier Creek is fed by Yellow Creek (MM079) and Twentytwo Gulch (MM066). It is location 53 of Cobb (1972 [MF 366]).

Commodities:

Main: Au

Other: Ag, Pb, Sb

Ore minerals: Gold, galena, pyrite, stibnite

Gangue minerals: Garnet, magnetite

Geologic description:

Glacier Creek above Fifteen Gulch is incised in weathered and altered schist bedrock of the Birch Creek Schist (Bundtzen, 1981; Hawley and Associates, 1978). The schist is cut by occasional quartz veins. Headwater tributaries to Glacier Creek, especially Yellow Creek and Twentytwo Gulch, head into strata of the Spruce Creek sequence. Although many of the lode deposits of the Kantishna Hills are in Spruce Creek bedrock, several lodes in upper Glacier Creek are in Birch Creek Schist (see MM066, MM069, MM074, and MM082).

Below Fifteen Gulch, Glacier Creek flows on weathered schist for about a mile, then on moderately-indurated, clay-rich, Tertiary or lower Quaternary gravel false bedrock. The lower reaches of the creek have extensive fluvioglacial bench terraces, occasionally containing remnant masses of Pleistocene or Holocene alluvial gravel (Prindle, 1907; Capps, 1919; Levell, 1984, v. 2). Locally, as near the point where the creek leaves the Kantishna Hills, ancient bedrock channels diverge to the northwest and are covered by more-recent bench gravels (Capps, 1919, p. 91). In the narrower upstream parts of the creek, alluvial gravels are locally buried by landslide or talus from steep walls or side canyons.

Prindle (1907, 1911) reported that the best ground in Glacier Creek was near where the creek leaves the Kantishn Hills and its gradient flattens. At that point, the gravels are 2 to 5 feet thick on schist bedrock. In 1983, mining from that point for about a mile downstream was of weakly oxidized gravels 4-6 feet thick on oxidized, clay-rich,Tertiary gravel false bedrock; the pay zone was about 200 to 300 feet wide (Levell, 1984, v. 1 and 2). The creek above that point and below the hills was worked by dragline in about 1940. The main accessory minerals in the lower placer gravels are garnet and magnetite; the gold is mainly fine-grained and about 750-760 fine. The ground contained about 0.023 ounce (about 0.017 fine ounce) of placer gold per cubic yard. In 1983, a placer mine operated on schist bedrock in a section of the creek between Twentytwo and Eighteen Gulches. The gold was coarser and rougher than that in the downstream section, mostly of 0.05 to 0.25 ounce size. Galena was abundant in the concentrates, along with smaller amounts of pyrite and stibnite. The computed grade of mined material was 0.038 ounce of gold per cubic yard.

The commercial placers on Glacier Creek are mainly Holocene. The buried bedrock channel deposits are probably Pleistocene.

Alteration:

Age of mineralization:
Pleistocene to Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a). Complex deposit: shallow, upper-valley deposits, broad alluvial channels, and incised bedrock channels.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Auriferous gravels were discovered in Glacier Creek in 1905 and mining commenced immediately (Prindle, 1907; Wells, 1933). When the district was visited by Capps in 1916, there were at least four claims, starting from claim No. 20, about 1 1/2 miles above the point where the creek leaves the hills, to claim no. 12 on the valley flat (Capps, 1919, p. 89-92). In 1921, there were two operations on upstream claims (Davis, 1923, p. 116). According
to annual reports summarized by Cobb (1980 [OFR 80-363]), the creek was mined or prospected on a relatively small scale between 1922 and 1938. A medium-size dragline plant operated at the head of the lower section between about 1939 and 1942 (Bundtzen, Smith, and Tosdal, 1976, p. 16). The creek was mined in the 1970s and early 1980s. There were six operations on the creek in 1983 (Levell, 1984, v. 2), and it was active in 1984. There has been little if any mining since 1985.

Production notes:
The amount of gold recovered is uncertain. Based on the mining reported in 1984 by Levell (1984, v. 2), the minimum production probably was more than 5000 ounces. A total of 10,000 ounces is not unreasonable.

Reserves:
Levell (1984, v. 2) calculated gold resources in Glacier Creek, based on measured volumes of gravel and on grades established by testing or computed from the amount of gold recovered by mining operations in 1983. Levell also classified the resources on the basis of then-claimed and unclaimed ground.

The resources in claimed ground are divided into blocks. Block G-2 is the farthest downstream; it is about 13,000 feet long and starts about 1500 feet below Fifteen Gulch. It contains about 2,340,000 cubic yards of alluvial and bench material with estimated grades that range from 0.0012 to 0.019 ounce of gold per cubic yard. Block G-3 is 1800 feet long and is centered on Fifteen Pup; a total resource of 258,000 cubic yards is estimated to contain between 0.012 and 0.017 ounce of gold per cubic yard. Block G-4 is about 3500 feet long and extends from Fifteen to Eighteen Gulch. Based on a mine active in 1983, it contains about 70,000 cubic yards of pay gravel at a grade of 0.038 ounce of gold per cubic yard. G-5, the uppermost claimed block, is about 5000 feet long and extends from Eighteen to Twentytwo Gulch; it has a measured resource of 45,000 cubic yards at an extrapolated grade of 0.038 ounce of gold per cubic yard. The total high-resource potential ground in blocks G-2 to G-5 is about 2,713,000 cubic yards that contains 25,618 to 46,510 ounces of gold, using the lowest and highest values of each block.

Block G-6 is on unclaimed ground between Twentytwo Gulch and Yellow Creek, a distance of about a mile. Based on testing, this ground could have a resource of about 240,000 cubic yards containing 2640 to 4800 ounces of gold.

Additional comments:
Glacier Creek was probably the second or third most productive creek draining the Kantishna Hills. Its

production is second to that of upper Caribou Creek (MM042), and about the same or perhaps slightly less than that of Eureka Creek (MM122). The creek is in Denali National Park and Preserve.

References:

Prindle, 1907; Prindle, 1911; Capps, 1919; Davis, 1923; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Levell, 1984 (v. 1 and 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 1 and 2)

Reporter(s): C.C. Hawley

Last report date: 04/24/01

Site name(s): Unnamed (ridge northeast of Spruce Peak)

Site type: Occurrence

ARDF no.: MM049

Latitude: 63.5975 **Quadrangle:** MM C-2

Longitude: 150.6661

Location description and accuracy:
This occurrence is at an elevation of about 4100 feet on an unnamed ridge between upper Myrtle Creek and upper Caribou Creek. It is about 1.4 miles north of Spruce Peak, in the NE1/4 SW1/4 section 21, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate within 500 feet. The occurrence corresponds to number 59 of Bundtzen, Smith, and Tosdal (1976), 277 of Hawley and Associates (1978), and 66b of Bundtzen (1981).

Commodities:

Main: Fe

Other: Ag, Au

Ore minerals: Limonite, pyrite

Gangue minerals: Feldspar, quartz

Geologic description:
This occurrence is a stratabound gossan developed on pyritic metafelsite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). The metafelsite forms stratiform lenses in graphitic and chloritic schist. The gossan can be traced southwesterly for about 1500 feet. As much as 50 percent pyrite occurs in half-inch-thick bands in the metafelsite; much of this material is oxidized to limonite. Samples contain less than 1 ppm each of gold and silver, and small amounts of copper, lead, and zinc (Thornsberry, McKee, and Salisbury, 1984, v. 2).

Alteration:
Iron-oxide alteration.

Age of mineralization:
Probably early Paleozoic, the protolith age of the Spruce Creek sequence.

Deposit model:
Stratabound deposit in metafelsite.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
Reconnaissance mapping and sampling. There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Last Chance Creek

Site type: Mine

ARDF no.: MM050

Latitude: 63.5962 **Quadrangle:** MM C-2

Longitude: 150.7984

Location description and accuracy:
Last Chance Creek is a tributary of Caribou Creek, which it joins about one mile below Crevice Creek (MM046). Last Chance Creek heads against Glacier Peak and the unnamed ridge between Glacier and Spruce peaks. The location is about at the midpoint of the placer deposit, in the SW1/4 of section 23, T. 15 S., R. 17 W., Fairbanks Meridian. Placer resource block L-1 of Thornsberry, McKee, and Salisbury (1984, fig. K-3) encompasses all of the placer ground in this creek.

Commodities:

Main: Au

Other: Sb

Ore minerals: Gold, stibnite

Gangue minerals:

Geologic description:
Last Chance Creek flows through a narrow, fairly steep, canyon. The bedrock is Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, fig. K-2; Bundtzen, 1981). Sections of the creek have been mined by hand methods, and about 665 ounces of gold have been recovered. Most of the creek is too steep for significant gravel accumulation; there is a cumulative total of about 100,000 cubic yards of alluvium in several segments of the creek (Levell, 1984, v. 2). Three 0.1-cubic-yard samples collected in 1983 contained a trace to 0.0006 ounce of gold per cubic yard, but the samples did not represent the sections of the creek that have been mined (Levell, 1984, v. 2). Placer concentrates in lower Last Chance Creek and in Caribou Creek at the mouth of Last Chance Creek contain fragments of stibnite eroded from the Last Chance (Caribou) lode (MM043) (Prindle, 1907; Hawley and Associates, 1978).

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
There is evidence of hand-placer mining near the mouth of Last Chance Creek and at one locality up-

stream.

Production notes:
About 665 ounces is attributed to Last Chance Creek (Levell, 1984, v.2).

Reserves:
There is a cumulative resource of about 100,000 cubic yards of alluvial gravel in several segments of the the creek; its gold content is unknown (Levell, 1984, v. 2).

Additional comments:
Last Chance Creek is in Denali National Park and Preserve.

References:
Prindle, 1907; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/19/01

Site name(s): Unnamed (ridge northeast of Spruce Peak)

Site type: Occurrence

ARDF no.: MM051

Latitude: 63.5941 **Quadrangle:** MM C-2

Longitude: 150.6725

Location description and accuracy:
This occurrence is at an elevation of about 4300 feet on an unnamed ridge between upper Myrtle and upper Caribou creeks. It is about 1.1 miles northeast of Spruce Peak, in the SW1/4 SW1/4 section 21, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate within 500 feet. The occurrence corresponds to number 58 of Bundtzen, Smith, and Tosdal (1976), 278 of Hawley and Associates (1978), and 66a of Bundtzen (1981).

Commodities:

Main: Pb

Other: Ag, V(?), Zn

Ore minerals: Limonite, pyrite, vanadinite(?)

Gangue minerals:

Geologic description:
This occurrence is a stratabound gossan about 6 feet wide which can be traced northeasterly for at least 250 feet. It appears to be a continuation of, or parallel to, gossan exposed about 1500 feet to the northeast. The gossan is mainly in metafelsite of the lower Paleozoic Spruce Creek sequence; some also occurs nearby in graphitic schist (Hawley and Associates, 1978; Bundtzen, 1981, and Thornsberry, McKee, and Salisbury, 1984). The gossan marks half-inch-thick, stratiform bands in the metafelsite that contain up to 50 percent pyrite. Bundtzen, Smith, and Tosdal (1976) tentatively identified vanadinite, a secondary lead-vanadium mineral, in the bands. Gossan sampled by Hawley and Associates (1978) contained 1.7 ppm silver, 1050 ppm lead, and 240 ppm zinc.

Alteration:
Oxidation of iron and lead-vanadium(?) minerals.

Age of mineralization:
This stratabound, possibly syngenetic deposit may be lower Paleozoic, the protolith age of the Spruce Creek rocks.

Deposit model:
Stratabound deposit in metafelsite.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings.

Production notes:

Reserves:

Additional comments:
This occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Unnamed (between Last Chance and Crevice Creeks)

Site type: Prospect

ARDF no.: MM052

Latitude: 63.5893 **Quadrangle:** MM C-2

Longitude: 150.7593

Location description and accuracy:
This prospect is on the ridge between Last Chance and Crevice Creeks at an elevation of about 3800 feet. It is about 0.25 mile north of the center of section 25, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate within 300 feet. The prospect corresponds to number 51 of Bundtzen, Smith, and Tosdal (1976), 228 of Hawley and Associates (1978), 64 of Bundtzen (1981), and 72 of Thornsberry, McKee,and Salisbury (1984, v. 2).

Commodities:

Main: Au, Cu

Other: Mo, U

Ore minerals: Limonite, pyrite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of this prospect are quartz-mica schist and quartzite of the upper Paleozoic Birch Creek Schist (Bundtzen, 1981); float at the prospect site is mainly quartz-feldspar schist. The schist generally strikes NNE and dips moderately to the NW (Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit is a 30-foot-thick, quartz-rich vein that trends about N50E. The quartz contains pyrite and features boxwork limonite, possibly after another sulfide. Samples of the vein assayed up to 400 ppm copper, 0.01 ounce of gold per ton, 30 ppm molybdenum, and 12 ppm uranium (Bundtzen, 1981).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold(?)-quartz vein (Cox and Singer, 1986; model 36a?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a?

Production Status: None

Site Status: Inactive

Workings/exploration:
One shallow pit.

Production notes:

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve. A possible extension of this vein on the west side of Moose Creek was uncovered during ground sluicing, but the cut had sloughed by 1921 (Davis, 1923, p. 123).

References:

Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): North Star; Mammoth

Site type: Prospect

ARDF no.: MM053

Latitude: 63.5868 **Quadrangle:** MM C-2

Longitude: 150.7012

Location description and accuracy:

The North Star prospect (Cobb, 1980 [OFR 80-363]) is at the head of Crevice Creek, about 500 feet below the divide northeast of Spruce Peak. It is about 0.25 mile northwest of the center of section 29, T. 15 S., R. 16 W., Fairbanks Meridian. The location is uncertain, but probably accurate within 500 feet.

It seems likely that the North Star prospect of Wells (1933) is the Mammoth claim of Capps (1919). It also seems likely that the North Star is the same as the Slide claim of Moneta-Porcupine (Heiner and Porter, 1972, KX 66-18; Hawley and Associates, 1978), which covers claims originally in force in 1919. The correlation of the Mammoth claim with Lucky Jim (MM056), as suggested by Bundtzen (1981) and Thornsberry, McKee, and Salisbury (1984), seems unlikely. The North Star is included with nearby claims in location 22 of Cobb (1972 [MF 366]), and in location 17 of MacKevett and Holloway (1977).

Commodities:

Main: Ag(?), Pb, Zn

Other:

Ore minerals: Galena, pyrite, sphalerite

Gangue minerals: Quartz

Geologic description:

Strike- and cross-faults in upper Crevice Creek juxtapose graphitic and chloritic schist and phyllite of the Spruce Creek sequence against quartzose schist of the Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit(s) in the prospect area consist of sulfide-bearing quartz vein(s). A 2-foot-thick quartz vein that contains pyrite, galena, and sphalerite occurs in a stream-cut exposure in upper Crevice Creek (Wells, 1933). Wells (p. 375) also reported a nearby 6-foot-thick, galena-rich vein in a pit that had caved. In about 1960, Moneta-Porcupine staked the Slide claim in this area (Heiner and Porter, 1972). No assays have been published.

Alteration:

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: No

Site Status: Inactive

Workings/exploration:

The area is covereed by extensive talus and prospect pits apparently slough rapidly. The Mammoth deposit was located by 1916, but Capps did not visit the site because of a report that the discovery cut had sloughed (Capps, 1919, p. 99). The area was prospected by C. A. Trundy in 1931 (Wells, 1933), and by Moneta-Porcupine in about 1960 (Heiner and Porter, 1972).

Production notes:

Reserves:

Additional comments:

The area is in Denali National Park and Preserve.

References:

Capps, 1919; Wells, 1933; Heiner and Porter, 1972; Cobb, 1972 (MF 366); MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Wells, 1933

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Unnamed (Glacier Creek below Eighteen Gulch)

Site type: Occurrence

ARDF no.: MM054

Latitude: 63.5846 **Quadrangle:** MM C-2

Longitude: 150.9160

Location description and accuracy:
This unnamed occurrence is an elevation of about 1300 feet on the south side of the canyon of Glacier Creek, about 0.25 mile northwest of Eighteen Gulch. The occurrence corresponds to number 46 of Thornsberry, McKee, and Salisbury (1984). The location is probably accurate within 0.3 mile.

Commodities:

Main: Fe

Other: As

Ore minerals: Arsenopyrite(?), goethite, jarosite, limonite, pyrite

Gangue minerals: Quartz

Geologic description:
This occurrence consists of sulfide and alteration minerals in sheared and altered metafelsite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 46). Some vein quartz is present. Exposures are poor, but the mineralized felsite appears to trend northwesterly. Pyrite, the most abundant unoxidized metallic mineral, is disseminated in the metafelsite. Arsenopyrite may also be present, as suggested by a sample that contained 0.285 percent arsenic. Assays showed no precious metals or valuable base metals. The pyrite is extensively oxidized to limonite, chiefly goethite, and to jarosite. Iron oxides also stain the soil near the occurrence (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 46). The nature of the occurrence is uncertain; it appears to be weakly mineralized metafelsite possibly similar to that at occurreences MM018 and MM022.

Alteration:
Iron-oxide alteration.

Age of mineralization:
Pyrite may have been an original volcanogenic(?) component of the lower Paleozoic Spruce Creek felsite (Bundtzen, 1981). The quartz veins may represent later epigenetic mineralization (see record MM091).

Deposit model:
Volcanogenic?

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The site is a poorly exposed natural outcrop.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Unnamed (north side of Spruce Peak and upper Glen Creek)

Site type: Prospects

ARDF no.: MM055

Latitude: 63.5834 **Quadrangle:** MM C-2

Longitude: 150.7046

Location description and accuracy:
This record describes two prospects. One, at the coordinates for this record, is on the northwest flank of Spruce Peak at an elevation of about 4350 feet. This prospect corresponds to occurrence 86 of Thornsberry, McKee, and Salisbury (1984) and is accurate within 500 feet. The other prospect is in upper Glen Creek. It corresponds to occurrence 79 of Thornsberry, McKee, and Salisbury.

Commodities:

Main: Au

Other: Ag, As, Pb, Zn

Ore minerals: Arsenopyrite, galena(?), pyrite, sphalerite

Gangue minerals:

Geologic description:
The two prospects described in this record are geologically similar. Both are in massive metafelsite of the lower Paleozoic Spruce Creek sequence, and feature disseminations and stratiform, semi-massive aggregates, of pyrite (Bundtzen, 1981). At the prospect on the northwest flank of Spruce Peak, the pyrite is accompanied by small amounts of arsenopyrite, sphalerite, and probably galena. The prospect in upper Glen Creek contains only pyrite.

A representative sample of the deposit northwest of Spruce Peak assayed 8.2 ppm gold, 12 ppm silver, 2600 ppm arsenic, 1850 ppm lead, 1500 ppm zinc, and 26 ppm tungsten (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 86). Soils near the prospect contain 0.1 to 0.95 ppm gold and 0.2 to 1.2 ppm silver (Hawley and Associates, 1978, samples 264, 265, fig. 4.1-A(1)).

At the prospect in upper Glen Creek, layers of metafelsite as much as 0.5 foot thick contain up to 20 percent pyrite. Samples assay up to 270 ppm arsenic and 14 ppm antimony, background values of copper, lead, and zinc, and no gold or silver (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 79).

Alteration:

Age of mineralization:
These stratabound deposits might be early Paleozoic, the protolith age of the Spruce Creek sequence.

Deposit model:
Stratabound massive sulfide deposit in metafelsite (Cox and Singer, 1986; model 28a?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
28a?

Production Status: None

Site Status: Inactive

Workings/exploration:
The deposits were explored by small pits.

Production notes:

Reserves:

Additional comments:
The prospects are in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Lucky Jim

Site type: Prospect

ARDF no.: MM056

Latitude: 63.5833 **Quadrangle:** MM C-2

Longitude: 150.6974

Location description and accuracy:

The location of this prospect, which may coincide with that of the Lucky Jim prospect (Cobb, 1980 [OFR 80-363]), is at an elevation of about 4100 feet about 0.2 mile northeast of the top of Spruce Peak. The location is accurate; the correlation with the Lucky Jim prospect is uncertain.

Davis (1923), who first described the Lucky Jim prospect, did not specify its location. A prospect north of Spruce Peak is called Lucky Jim(?) by Bundtzen, Smith, and Tosdal (1976, occurrence 57), as is mineral deposit 263 by Hawley and Associates (1978). Apparently, the same prospect is number 65 of Bundtzen (1981), who called it the Mammoth or Lucky Jim(?). A prospect called Mammoth or Lucky Jim is occurrence 87 of Thornsberry, McKee, and Salisbury (1984). Regardless of the location of the Lucky Jim prospect, the correlation of the Mammoth with the Lucky Jim is unlikely. The Mammoth almost certainly is the same as the North Star prospect (see MM053).

Commodities:

Main: Au

Other: Cu, Pb

Ore minerals: Chalcopyrite, galena, gold, limonite

Gangue minerals: Quartz

Geologic description:

This deposit consists of a poorly exposed quartz vein in metafelsite or greenschist (meta-andesite) of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

At about this location, Davis (1923, p. 132) described a foot-thick, 'rusty' quartz vein that contains galena and chalcopyrite, and pans free gold. At what may be the same site, Bundtzen, Smith, and Tosdal (1976) reported a N40E-trending, poorly-exposed zone containing quartz; and Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 87) mapped a N80E-striking vein that contains traces of gold and silver.

Alteration:

Iron-oxide alteration.

Age of mineralization:

The Lucky Jim vein described by Davis (1923) is probably Eocene (see record MM091).

Deposit model:

Polymetallic veins (Davis, 1923) or low-sulfide Au-quartz veins (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984) (Cox and Singer, 1986; models 22c and 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c or 36a

Production Status: No

Site Status: Inactive

Workings/exploration:
The Lucky Jim vein was discovered during or before 1921 or before.

Production notes:

Reserves:

Additional comments:
The location of the Lucky Jim prospect described by Davis (1923) is uncertain. The area of the prospect is in Denali National Park and Preserve.

References:
Davis, 1923; Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Spruce Creek No. 1; Ridgetop

Site type: Prospect

ARDF no.: MM057

Latitude: 63.5818 **Quadrangle:** MM C-2

Longitude: 150.7112

Location description and accuracy:

The Spruce Creek No. 1, or Ridgetop, prospect (Cobb, 1980 [OFR 80-263]) is at an elevation of about 4250 feet about 1600 feet west of Spruce Peak, on the divide between Crevice and Spruce creeks. The location is probably accurate within 250 feet. The prospect corresponds roughly to soil sample locality 242 of Hawley and Associates (1978), and to locality 62 of Bundtzen (1981). It probably is the same as occurrence 84 of Thornsberry, McKee, and Salisbury (1984), although they locate the prospect north of the divide.

Commodities:

Main: Ag, Au

Other: Mo, Pb, Th, U, Zn

Ore minerals: Galena, limonite, malachite(?), pyrite, sphalerite

Gangue minerals: Quartz

Geologic description:

This deposit is a sulfide-bearing quartz vein in a shear zone in metafelsite of the lower Paleozoic Spruce Creek sequence. A fault that strikes NW cuts the metafelsite near the prospect, but whether the fault and the vein are related is uncertain (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The prospect was first described by Davis (1923, p. 133), who called it the Ridgetop. He described the deposit as a 12-foot-wide lode that was iron- and copper-stained and contained 'a very little galena.' Wells (1933, p. 374-375) apparently called the prospect Spruce Creek No. 1, and described it as a 12-foot-thick pyritic quartz vein. When Well visited in 193l, the prospect pits were sloughed. No assays were given by either Davis or Wells. The prospect was examined by Hawley and Associates in 1976 (1978, samples 242 and 243), who collected two soil samples. Soil at the prospect (no. 242) contained 0.51 ppm gold and 3.2 ppm silver. Reddish residual soil about 400 feet from the prospect (no. 243) contained 1.2 ppm gold, 90 ppm silver, 485 ppm copper, 10500 ppm lead, and 7000 ppm zinc. Bundtzen (1981, locality 62) collected 5 mineralized rock samples that assayed 0.01 to 0.225 ounce of gold per ton, and up to 86 ppm molybdenum, 9.7 ppm uranium, and 14.7 ppm thorium.

Alteration:

Silicification. Oxidation of iron and copper minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Low-sulfide gold-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: No

Site Status: Inactive

Workings/exploration:

The prospect was explored by shallow pits dug before 1922 (Davis, 1923). There has been little additional work since then , but natural rubble crops of quartz vein material are widespread on the divide between Spruce and Crevice Creeks.

Production notes:

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve.

References:

Davis, 1923; Wells, 1933; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Unnamed (east side of Spruce Peak)

Site type: Occurrence

ARDF no.: MM058

Latitude: 63.5814 **Quadrangle:** MM C-2

Longitude: 150.6966

Location description and accuracy:
This occurrence is on the east side of Spruce Peak, probably within 800 feet of the top. The location is uncertain. For this record, it corresponds to occurrence 88 of Thornsberry, McKee, and Salisbury (1984, fig. K-8), which is near the center of the E1/2 SW1/4 section 29, T. 15 S., R. 16 W., Fairbanks Meridian.

Commodities:

Main: Ag, Au

Other: As

Ore minerals: Arsenopyrite(?), goethite, jarosite, limonite, pyrite(?)

Gangue minerals: Calcite, quartz

Geologic description:
At this occurrence, a weakly mineralized reverse(?) fault places metafelsite on the south against highly deformed graphitic schist or phyllite. Both rock types are probably units of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). The fault zone is about 10-15 feet wide. It strikes about N 55 E and dips 65-75 N, and contains quartz -calcite veins. The zone and nearby country rocks are stained with limonitic minerals, including goethite and jarosite. The limonite probably replaces pyrite or arsenopyrite. Samples of the oxidized vein contain up to 1400 ppm arsenic, along with a trace each of gold and silver (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 88).

Alteration:
Silicification of a fault zone. Iron-oxide alteration.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide Au-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings. The oxidized fault zone can be traced in outcrop (rubblecrop?) for several tens of feet.

Production notes:

Reserves:

Additional comments:
This occurrence is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Myrtle Creek

Site type: Prospect

ARDF no.: MM059

Latitude: 63.5814 **Quadrangle:** MM C-2

Longitude: 150.5907

Location description and accuracy:
Myrtle Creek is a tributary of the Clearwater Fork of the Toklat River. Myrtle Creek has two main forks: the west fork rises below Spruce Creek; the east fork rises below Kankone Creek. The placer prospect is in the central part of the creek, about halfway between the main tributary forks. It is in the SE1/4 section 26, T. 15 S., R. 16 W., Fairbanks Meridian.

Commodities:

Main: Au

Other: Ag, Sb

Ore minerals: Gold, stibnite(?)

Gangue minerals:

Geologic description:
The west fork of Myrtle Creek below Spruce Creek has an extensive upper basin of undivided terrace and other gravels; the east fork has some alluvial gravel in its upper basin (Levell, 1984, v. 2). Both east and west forks flow through bedrock canyons cut into the Birch Creek Schist before they join the Clearwater to form a broad alluvial valley.

Myrtle Creek probably was prospected for placer gold in the early years of the Kantishna district, and may have been mined on a small scale. In 1983, thirteen sluice samples from the main creek and its two main tributaries contained at least a trace of gold (Levell, 1984, v. 2). Three of the samples contained more than 0.001 ounce of gold per cubic yard and one contained 0.0121 ounce of gold per cubic yard. The highest grade sample came from the fork that drains Kankone Peak.

Myrtle Creek drains an area of numerous lode mineral deposits. A stream- sediment sample from the tributary fork below Spruce Peak contained 2 ppm silver, and a sediment sample from the main stem of Myrtle Creek between the two main forks contained 65 ppm antimony (Bundtzen, Smith, and Tosdal, 1976).

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
Myrtle Creek has been prospected and possibly placer mined on a small scale.

Production notes:

Reserves:
Levell (1984, v. 2) estimated a total of 240,000 cubic yards of moderate- potential placer ground in Myrtle Creek.

Additional comments:
Myrtle Creek is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Levell, 1984 (v. 2).

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 05/05/01

Site name(s): Unnamed (ridge southeast of Spruce Peak)

Site type: Prospect

ARDF no.: MM060

Latitude: 63.5804 **Quadrangle:** MM C-2

Longitude: 150.7001

Location description and accuracy:
This prospect is about 0.10 mile southeast of Spruce Peak at an elevation of about 4550-4650 feet. It is in the SE1/4 SW1/4 section 29, T. 15 S., R. 16 W., Fairbanks Meridian. The prospect probably corresponds to occurrence 89 of Thornsberry, McKee, and Salisbury (1984, fig. K-8), but the site appears to be misplaced on their map.

Commodities:

Main: Ag, Au

Other: As

Ore minerals: Goethite, jarosite, limonite

Gangue minerals: Quartz

Geologic description:
The country rocks at this prospect are metafelsite and greenschist of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). The deposit consists of iron-stained quartz in a shear zone that strikes NE and dips moderately to the NW. The zone is about 20 to 30 feet wide, and locally is marked by orange and red soil that contains goethite and jarosite. If the quartz once contained sulfide minerals, they have been destroyed by oxidation. The jarosite, however, suggests that they included pyrite. The oxidized material contains traces of gold and silver and about 350 ppm arsenic (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 89).

Alteration:
Silicified shear zone. Iron-oxide alteration.

Age of mineralization:
The quartz vein is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide Au-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: None

Site Status: Inactive

Workings/exploration:
The shear zone was explored by a pit.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/03/01

Site name(s): Lena and Silver Wires

Site type: Prospect

ARDF no.: MM061

Latitude: 63.5799 **Quadrangle:** MM C-2

Longitude: 150.7057

Location description and accuracy:
The contiguous Lena and Silver Wire claims (Cobb, 1980 [OFR 80-363]) are at an elevation of about 4200 feet on the southwest flank of Spruce Peak. They are about in the center of the SW1/4 SW1/4 section 29, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate within 500 feet. It corresponds to number 266 of Hawley and Associates (1978), 22 of Cobb (1972 [MF 366]), 56a of Bundtzen, Smith, and Tosdal (1976), 60 of Bundtzen (1981), and 85 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: Cu, Pb, Zn

Ore minerals: Galena, gold, limonite, malachite, pyrite, silver, sphalerite, tetrahedrite

Gangue minerals: Quartz

Geologic description:
The country rock in the area of the Lena and Silver Wire claims, which probably have a common end line, is metafelsite of the lower Paleozoic Spruce Creek sequence. Graphitic phyllite, also of Spruce Creek affiliation, crops out southeast of the prospects. Both rock units strike NE and dip moderately to the NW, on the north flank of the Kantishna antiform (MM091) (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2, v. 2).
The two claims probably are on a sulfide-bearing quartz vein that strikes about N30E. The vein is 2 to 3 feet thick and contains pyrite, galena, tetrahedrite, sphalerite, malachite, and native silver. Locally, it contains nearly 50 percent galena (Davis, 1923, p. 132). Selected samples from prospect pits assayed 0.27 to 0.48 ounce of gold per ton, 129.6 to 180.3 ounce of silver per ton, 36 to 52.5 percent lead, 1.45 to 8.20 percent zinc, and 0.15 to 0.66 percent copper (Moffit, 1933, p. 333; Thornsberry, McKee, and Salisbury, 1984, v. 2). The native silver, and the high silver and gold assays indicate supergene enrichment of the deposit.

Alteration:
Oxidation of iron and copper minerals; supergene enrichment of silver and possibly gold.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

The veins were discovered and prospected before 1922 (Davis, 1923). At the time of Moffit's visit in 1931, they were owned by C. A. Trudy, commissioner of the Kantishna district (Moffit, 1933). The claims were restaked in 1965 but were inactive in 1983. It appears that very little work was done after the initial prospecting.

Production notes:

Reserves:

Additional comments:

The claims are in Denali National Park and Preserve and have been inactive for decades.

References:

Davis, 1923; Moffit, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923; Moffit, 1933; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 01/31/01

Site name(s): Unnamed (ridge at head of Spruce Creek)

Site type: Occurrence

ARDF no.: MM062

Latitude: 63.5792 **Quadrangle:** MM C-2

Longitude: 150.7248

Location description and accuracy:
This occurrence is at an elevation of about 4200 feet at the head of Spruce Creek. It is about 0.7 mile southwest of Spruce Peak. The location is accurate within 250 feet. The occurrence is approximately the same as that of sample locality 244 of Hawley and Associates (1978).

Commodities:

Main: Ag

Other: Au, Pb, Zn

Ore minerals: Galena, pyrite, sphalerite

Gangue minerals: Quartz

Geologic description:
The country rocks near this occurrence are metafelsite and chloritic phyllite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit is a steeply-dipping quartz-sulfide vein that strikes about N50E and is 2 to 3 feet thick. The vein is largely oxidized, but contains pyrite. A sample of residual soil along the strike of the vein contained 0.47 ppm gold, 120 ppm silver, 675 ppm copper, 14500 ppm lead, and 21000 ppm zinc (Hawley and Associates, 1978, no. 244). The lead and zinc values indicate that the vein contains galena and sphalerite.

Alteration:
Oxidation of sulfide minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein may have been explored by small pits, since sloughed.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Mystery

Site type: Prospect

ARDF no.: MM063

Latitude: 63.5756 **Quadrangle:** MM C-2

Longitude: 150.7217

Location description and accuracy:

The Mystery prospect (Cobb, 1980 [OFR 80-363]) is at an elevation of about 3950 feet on the ridge at the head of Spruce Creek. It is in the NW1/4 NE1/4 section 31, T. 15 S., R. 16 W., Fairbanks Meridian. The location probably is accurate within 1/2 mile.

There are several prospects at the head of Spruce Creek, and the exact site of the Mystery prospect is uncertain. The location for this record is based in part on the Alaska State Kardex file (KX 66-23: Heiner and Porter, 1972; Hawley and Associates, 1978). The Mystery prospect is included with other nearby prospects, including the Lena and Silver Wires (MM061), in location 22 of Cobb (1972 [MF 366]).

Commodities:

Main: Pb, Sb

Other: Cu

Ore minerals: Galena, malachite(?), stibnite

Gangue minerals: Quartz

Geologic description:

The country rocks in the area of the Mystery prospect are graphitic phyllite and marble of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit consists of a 2.5-foot-thick quartz vein that contains galena, stibnite, and a secondary copper mineral, probably malachite (Davis, 1923, p. 132). No other information about the deposit has been published and it has not been found, with certainty, by any of the more recent surveys of the area.

Alteration:

Oxidation of copper mineral.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein(?) (Cox and Singer, 1986; model 22c?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c?

Production Status: None

Site Status: Inactive

Workings/exploration:

Probably explored by shallow pits, since sloughed. The prospect was last active in 1922 (Heiner and Porter, 1972).

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Davis, 1923; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Unnamed (ridge crest southeast of Spruce Peak)

Site type: Occurrences

ARDF no.: MM064

Latitude: 63.5742 **Quadrangle:** MM C-2

Longitude: 150.6819

Location description and accuracy:
This record describes a mineralized area on the ridge southeast of Spruce Creek. The location marks the approximate center of the area, in the SW1/4 NE1/4 section 32, T. 15 S., R. 16 W., Fairbanks Meridian. The location is accurate. It corresponds to occurrence 90 (3 symbols) of Thornsberry, McKee, and Salisbury (1984, fig. K-8).

Commodities:

Main: Ag, Pb

Other: As, Au, Sb

Ore minerals: Arsenopyrite(?) galena(?), goethite, jarosite, limonite, pyrite(?), stibnite(?)

Gangue minerals: Quartz

Geologic description:
The country rocks in the general area of these occurrences include metafelsite of the Spruce Creek sequence, and mica schist and quartzite of the Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The occurrences consist of iron-stained quartz veins, quartz float, and soil, in fault-controlled saddles along the ridge southeast of Spruce Creek. The veins strike NE, about parallel to the strike of the hostrocks and the faults. The veins and fault zones are poorly exposed, but probably range in width from about a foot to tens of feet. All are marked by quartz fragments and by red or orange limonitic soils that contain goethite and jarosite.

In 1983, the U.S. Bureau of Mines sampled four mineralized fault zones along the ridge (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 90). Three of these zones contained 0.0 to 0.12 ppm gold, 2.4 to 9.7 ppm silver, 110 to 710 ppm lead, and 155 to 465 ppm arsenic, and one contained 1 ppm silver, 305 ppm antimony, and 100 ppm zinc. Oxidation of the deposits is pervasive. Judged from their assays and character of the limonite, the quartz veins probably contained pyrite and small amounts of arsenopyrite, galena, and stibnite.

Alteration:
Silicification. Pervasive oxidation of deposits.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide Au-quartz veins (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: None

Site Status: Inactive

Workings/exploration:
Surface mapping and sampling. The deposits were discovered in 1983 and probably have not been further prospected.

Production notes:

Reserves:

Additional comments:
The area is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/04/01

Site name(s): Humboldt

Site type: Mine

ARDF no.: MM065

Latitude: 63.5740 **Quadrangle:** MM C-2

Longitude: 150.7421

Location description and accuracy:
The Humboldt mine (Cobb, 1980 [OFR 80-363]) is at an elevation of about 4100 feet on the east flank of a ridge above the East Fork of Glen Creek . It is in the NE1/4 NE1/4 section 36, T. 15 S., R. 17 W., Fairbanks Meridian. The location is probably accurate within 500 feet. The mine is number 20 of Cobb (1972 [MF 366]), 56 of Bundtzen, Smith and Tosdal (1976), 61 of Bundtzen (1981), and 78 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other: Pb, Sb, Zn

Ore minerals: Arsenopyrite, galena, gold, malachite, pyrite, pyrrhotite, stibnite(?), sphalerite

Gangue minerals: Quartz, siderite

Geologic description:
The Humboldt (also Humbolt) mine is in the Birch Creek Schist, probably a short distance west of a nearly vertical fault that strikes NE and juxtaposes Birch Creek and Spruce Creek rocks. Subunits of the Birch Creek Schist at the mine include quartz-chlorite-biotite schist, micaceous quartzite, garnet schist, and quartz-chlorite-muscovite schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2 and v. 2, occurrence 78). The schistosity strikes N37W and dips 27 SW (Capps, 1919, p. 99).

The deposit consists of a series of quartz veins in a zone 22 to 50 feet wide. A short adit was driven on a nearly vertical vein about 4 feet wide that strikes N55E. The wall rocks adjoining the zone are impregnated with siderite and locally stained with malachite. The veins contain pyrite, pyrrhotite, galena, sphalerite, stibnite(?), minor arsenopyrite, and free gold (Moffit, 1933, p. 333; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 78). A composite representative sample across about 15 feet of the mineralized zone assayed 1.02 ounces of gold per ton, 0.27 ounce of silver per ton, and 0.046 percent arsenic. A sample of limonitic gossan assayed 3.69 ounces of silver per ton, 1.45 percent lead, and 2. 10 percent zinc (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 78).

Alteration:
Carbonate alteration of wallrocks; silicification; oxidation of iron and copper minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low sulfide gold-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The deposit was developed by a tunnel about 50 feet long and by surface cuts. The tunnel was caved by 1916 (Capps, 1919). Probably not much work has been done since then.

Production notes:

Gold reportedly was recovered from a test shipment of several hundred pounds of selected, quartz-rich ore.

Reserves:

Additional comments:

The Humboldt mine is in Denali National Park and Preserve.

References:

Capps, 1919; Moffit, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Capps, 1919; Thornsberry, McKee, and Tosdal, 1984

Reporter(s): C.C. Hawley

Last report date: 05/03/01

Site name(s): Twentytwo Gulch (Twentytwo Pup; Wickersham Creek)

Site type: Mine

ARDF no.: MM066

Latitude: 63.5732 **Quadrangle:** MM C-2

Longitude: 150.8869

Location description and accuracy:
Twentytwo Gulch (Cobb, 1980 [OFR 80-363]) rises between Wickersham Dome and an unnamed dome about one mile east of Wickersham. The gulch has one named tributary, the West Fork. Twentytwo Gulch flows north and enters Glacier Creek about a mile above Eighteen Gulch and a mile below Yellow Pup. The location is about 0.2 mile above the confluence of the gulch with Glacier Creek, and marks the part of Twentytwo Gulch that has been placer mined. Twentytwo Gulch (sometimes called Wickersham Creek) is number 49 of Cobb (1972 [MF 366]), and is included with Glacier Creek in location 54 of MacKevett and Holloway (1977).

Commodities:

Main: Au

Other: Ag, Pb, Sb

Ore minerals: Galena, gold, stibnite

Gangue minerals: Garnet, tourmaline

Geologic description:
Twentytwo Gulch flows through a relatively narrow and fairly steep canyon. The stream gradient is about 500 feet per mile in the main part of the creek and it steepens in the upper reaches. The upper canyon cuts into rocks of the Spruce Creek sequence; the lower part cuts into Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984). The creek was rich enough to work by hand and yielded considerable placer gold (Wells, 1933, p. 371). Lode deposits in the walls of the creek, such as those at the Florence prospect (MM082) and Bosart mine (MM074), could have furnished some of the gold, along with the galena and stibnite reported in the placer concentrates.

Gravel at the junction of Twentytwo Gulch and Glacier Creek was placer mined in 1983. The mine processed gravel from both creeksin a deposit 3 to 6 feet thick. The gold was rudely to coarsely crystalline, and sometimes dendritic; nuggets in the 1/4 to 1/2 ounce range were common. The concentrates contained galena, stibnite, garnet, and tourmaline (Wells, 1933; Levell, v. 2, p. 50-51).

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

Twentytwo Gulch (then called Wickersham Creek) was mined by hand as early as 1920, and then intermittently through the 1930s (Brooks, 1922; Davis, 1923; Cobb (1980 [OFR 80-363]). Mechanical mining began on a small scale in about 1950. During 1983, a small mechanical operation processed gravel both from lower Twentytwo Gulch and adjacent Glacier Creek (Levell, 1984, v. 2).

Production notes:

About 1000 ounces of gold was recovered from Twentytwo Gulch (Cobb, 1980 [OFR 80-363]). In 1983, an operation at the mouth of the creek produced at least 200 ounces, some of probably was recovered from Glacier Creek.

Reserves:

Relatively rich placer gravel probably remains in previously mined sections and in side pay along Twentytwo Gulch. Because the canyon is narrow, the deposits are not large. Levell (1984, v. 2, p. 50-51) believed that the gulch contains a 'very high grade placer resource,' one that could support a small- to medium-scale operation.

Additional comments:

Twentytwo Gulch is in Denali National Park and Preserve.

References:

Brooks, 1922; Davis, 1923; Wells, 1933; Cobb, 1972 (MF 366); MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Wells, 1933; Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/22/01

Site name(s): Rainy Creek Ridge No. 2

Site type: Occurrence

ARDF no.: MM067

Latitude: 63.5713 **Quadrangle:** MM C-2

Longitude: 150.7148

Location description and accuracy:

The Rainy Creek Ridge No. 2 prospect is at an elevation of about 3750 feet on the ridge between the East Fork of Glen Creek and Spruce Creek It is in the NE1/4 SE1/4 of section 31, T. !5 S., R. 16 W., Fairbanks Meridian. The location corresponds to number 83 of Thornsberry, McKee, and Salisbury (1984), which includes the Rainy Creek Ridge Nos. 1 and 2 claims, to number 55 of Bundtzen, Smith, and Tosdal (1976), and to number 250 of Hawley and Associates (1978). The location is accurate within 500 feet. It is not certain whether it actually marks the Rainy Ridge Creek No. 2 claim, but it appears likely to.

Commodities:

Main: Ag, Au

Other: As

Ore minerals: Arsenopyrite, pyrite, scorodite

Gangue minerals: Kaolinite, quartz

Geologic description:

The country rocks at this occurrence are steeply-dipping metafelsite and chloritic phyllite of the Spruce Creek sequence; the rocks strike ENE (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The occurrence is a 15-foot-wide, nearly vertical, silicified shear zone that strikes N60-75E; it contains massive arsenopyrite along with less-abundant pyrite. Quartz is the main gangue mineral, accompanied by some kaolinite.

Samples of the mineralized shear zone assayed as much as 0.01 ounce of gold per ton, 0.23 ounce of silver per ton, 11.0 percent arsenic, 0.31 percent lead, 0.25 percent antimony, 0.011 percent copper, and 0.04 percent zinc (Bundtzen, 1981, location 59b) . Some of the arsenopyrite is oxidized to scorodite.

Alteration:

Silicification, argillization. Oxidation of arsenic mineral.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Arsenopyrite-quartz lode containing minor gold, silver, and base metals.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

The claim is unpatented and there are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/03/01

Site name(s): Unnamed (east flank of Glacier Peak)

Site type: Occurrence

ARDF no.: MM068

Latitude: 63.5706 **Quadrangle:** MM C-2

Longitude: 150.7802

Location description and accuracy:
This occurrence is at an elevation of about 4000 feet on the east flank of Glacier Peak about 1/2 mile northeast of hilltop 4310. It is about 0.4 mile due east of section 35, T. 15 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet. The occurrence corresponds to number 49 of Bundtzen, Smith, and Tosdal (1976), 215 of Hawley and Associates (1978), 57 of Bundtzen (1981), and 71 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag

Other: Au, Pb, Sb

Ore minerals: Boulangerite, galena, pyrite, sphalerite

Gangue minerals: Quartz, siderite

Geologic description:
The country rock in the area of this occurrence is west-dipping micaceous quartz schist of the upper Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984). The occurrence, a poorly-exposed outcrop, consists of a mineralized quartz-siderite vein that strikes NE and is nearly vertical. The vein contains boulangerite, pyrite, and probably sphalerite and galena. Mineralogically, the vein is similar to the one at the nearby Glenn prospect (MM075). A selected sample assayed 9.37 ounces of silver per ton, 3.5 percent lead, 2.6 percent zinc, and 1.19 percent antimony. Soils collected nearby were anomalous (Hawley and Associates, 1978, fig. 4.1-A(1)). Soil sample 215, collected near the occurrence, was anomalous in lead, zinc, silver, and gold; sample 229, collected downslope east of the occurrence, was anomalous in gold.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The deposit was discovered during regional geologic mapping by Bundtzen, Smith, and Tosdal (1976).

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, Smith, and Tosdal, 1976; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Upper Bosart

Site type: Prospect

ARDF no.: MM069

Latitude: 63.5697 **Quadrangle:** MM C-2

Longitude: 150.9071

Location description and accuracy:
The Upper Bosart prospect is at an elevation of about 3100 feet on north spur of Wickersham Dome. It is in the NE1/4 SE1/4 of section 31, T. 15 S., R. 17 W. Fairbanks Meridian. The location is accurate within 300 feet. The site corresponds to number 35 of Bundtzen, Smith, Tosdal (1976), 41 of Bundtzen (1981), 47 of Thornsberry, McKee, and Salisbury (1984), and 112 of Hawley and Associates (1978).

Commodities:

Main: Ag

Other: Cu, Pb, Sb, Zn

Ore minerals: Galena, sphalerite, stibnite(?), tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:
The country rocks at the Upper Bosart prospect are quartz-feldspar schist and micaceous quartz schist of the upper Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 47). The deposit consists of a mineralized quartz-siderite(?) vein that is poorly exposed in shallow trenches. The vein strikes about N 40 E, dips steeply, and ranges from about 1 to 4 feet thick. Selected sulfide-rich samples assayed up to 0.88 percent copper, 32.8 percent lead, 20.4 percent zinc, 1.36 percent antimony, and 26.4 ounces of silver per ton. A representative sample assayed about 1.5 ounces of silver per ton, 2.75 percent lead, and 1.15 percent zinc (Thornsberry, McKee, and Salisbury, 1984; Hawley and Associates, 1978). The assay values suggest that the sulfide minerals include galena, sphalerite, tetrahedrite, and possibly stibnite. The deposit is similar to those at the Florence (MM082) and Bosart (MM074) prospects.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The prospect was explored by shallow trenches, only some of which reached bedrock. The date of this

work is not known, but the nearby Bosart vein (MM074) was first prospected before 1931 (Wells, 1933).

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Wells, 1933; Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Unnamed (upper East Fork of Glen Creek)

Site type: Prospect

ARDF no.: MM070

Latitude: 63.5690 **Quadrangle:** MM C-2

Longitude: 150.7332

Location description and accuracy:
This prospect is on the west side of the upper East Fork of Glen Creek at an elevation of about 3200 feet. It is about in the center of the N1/2 SW1/4 section 31, T. 15 S., R. 16 W., Fairbanks Meridian. The location is probably accurate within 500 feet. The prospect is occurrence 80 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: As, Pb

Ore minerals: Arsenopyrite, galena(?), pyrite

Gangue minerals: Quartz

Geologic description:
The country rock in the area of this prospect is metafelsite of the Spruce Creek sequence. The metafelsite is cut by a dike or small plug of Tertiary dacite that has been sheared and brecciated. The shear zone strikes NE and is almost vertical (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 80). The deposit consists of mineralized brecciated dacite. The breccia is cemented by quartz containing as much as 35 percent pyrite, small amounts of arsenopyrite, and possibly some galena. The sulfides also replace the dacite. The deposit is nearly vertical. Selected samples contain as much as 4.2 ppm gold, 5.1 ppm silver, 0.031 percent lead, and 0.84 percent arsenic. The deposit has been explored by a short adit.

Alteration:
Silicification; replacement of hostrock by sulfides.

Age of mineralization:
The mineralization postdates the Eocene emplacement of the dacite. The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Pyritic shear zone.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
An adit was driven probably before 1920.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen and Turner, 1979; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Glen Ridge No. 1; Skookona

Site type: Prospects

ARDF no.: MM071

Latitude: 63.5689 **Quadrangle:** MM C-2

Longitude: 150.7615

Location description and accuracy:

This site represents several prospects on the crest of an unnamed ridge 0.7 mile east-northeast of Glacier Peak. The prospects are known as the Glen Ridge No. 1 (Cobb, 1980 [OFR 80-363]) or Skookona (Wells, 1933). They occupy a sizeable area in the NE1/4 SW1/4 section 36, T. 15., R. 17 W., Fairbanks Meridian. The location is accurate.

The prospects correspond to location 19 of Cobb (1972 [MF 366]), and are included with other nearby prospects in location 15 of MacKevett and Holloway (1977). They are included in location 48 of Bundtzen, Smith, and Tosdal (1976), comprise mineral deposit 230 of Hawley and Associates (1978), and correspond to number 53 of Bundtzen (1981), and number 74 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: As, Mo, Pb, Sb, W

Ore minerals: Arsenopyrite, azurite, galena, gold, limonite, pyrite, scheelite

Gangue minerals: Quartz, tourmaline

Geologic description:

The country rock in the area of the Glen Ridge prospects is mainly metafelsite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1978). The site is near a fault that strikes NNW and slightly offsets the metafelsite. The area also contains Birch Creek Schist, which appears to be juxtaposed against Spruce Creek metafelsite along a NE-trending fault (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2, and occurrence 74, v. 2).

Two types of deposits occur at the prospects. One consists of argentiferous and auriferous, pyrite- and galena-bearing, quartz veins that occupy a shear zone that strikes NNW. Poorly exposed lenticular veins, as much as 40 feet thick and 150 feet long, occur in the shear zone. These veins were described by Capps (1919, p. 100; Moffit, 1933, p. 333-34, and Wells, 1933, p. 373) as rusty or iron-stained quartz that contains pyrite, galena, and, rarely, free gold.

The other type consists of mineralized quartz-tourmaline veins that contain arsenopyrite, pyrite, scheelite, galena, and sphalerite. The veins occupy a steeply-dipping shear zone that strikes N45E (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 74). Some of these veins contain moderately high values of silver and gold. Bundtzen, Smith, and Tosdal (1976) collected a sample of an arsenopyrite-rich vein that assayed 0.28 ounce of gold per ton and 16.3 ounces of silver per ton. Samples of tourmaline-bearing veins assayed a trace to 0.23 ounce of gold per ton, 8.07 to 13 ounces of silver per ton, 5.05 to 7.45 percent arsenic, about 1 percent lead, and up to 150 ppm tungsten, 71 ppm molybdenum, and 405 ppm antimony (Thornsberry, McKee, and Salisbury, 1984, v. 2, nos. 14123 and 14124).

Alteration:

Extensive silicification along NNW faults; introduction of silica and tourmaline on NE shear zones. Oxidation of copper and iron minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic veins and low-sulfide Au-quartz (tourmaline) veins (Cox and Singer, 1986; models 22c and 36a(?)).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c, 36a?

Production Status: No

Site Status: Inactive

Workings/exploration:
Some of the area was prospected at least as early as 1916, when the veins were discovered (Capps, 1919). Development work included a series of pits. The property has been inactive since 1985.

Production notes:

Reserves:

Additional comments:
The prospects are in Denali National Park and Preserve.

References:
Capps, 1919; Moffit, 1933; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 01/29/01

Site name(s): Rainy Creek Ridge No. 1

Site type: Prospect

ARDF no.: MM072

Latitude: 63.5688 **Quadrangle:** MM C-2

Longitude: 150.7139

Location description and accuracy:

The Rainy Creek Ridge No. 1 prospect is at an elevation of about 3550 feet in a saddle on the ridge between the East Fork of Glen Creek and Spruce Creek. It is in the SE1/4 SE1/4 section 31, T. 15 S., R. 16 W., Fairbanks Meridian. The site corresponds to the location of rock sample 254 of Hawley and Associates (1978), and possibly to location 54 of Bundtzen, Smith, and Tosdal (1976) and 59a of Bundtzen (1981). It is about 0.25 mile south of Thornsberry, McKee, and Salisbury's (1984) occurrence 83, which includes the Rainy Creek Ridge No. 1 and No. 2 claims. The location is accurate within 500 feet of Hawley and Associates' (1978) sample site, but it is uncertain whether it actually coincides with the Rainy Ridge No. 1 claim.

Commodities:

Main: Ag, Au

Other: As, Pb, Sb, Zn

Ore minerals: Arsenopyrite, galena, pyrite, sphalerite, stibnite

Gangue minerals: Quartz, carbonate

Geologic description:

This deposit appears to be on the trace of a nearly vertical fault(?) contact between Birch Creek Schist and Spruce Creek rocks. The contact crosses the ridge between upper Glen and Spruce Creeks; locally, it is intruded by Tertiary mafic dikes (Hawley and Associates, 1978, fig. 4.1-A(1); Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The deposit consists of a mineralized quartz-carbonate vein in silicified schist. The vein is 4 to 15 feet thick, and strikes N75-85E. It contains arsenopyrite and pyrite, along with minor amounts of stibnite and galena, and possibly a trace of sphalerite. It can be traced discontinuously along strike for about 2500 feet. The maximum grade of a representative chip sample was 0.01 ounce of gold per ton, 1.79 ounces of silver per ton, 2.53 percent arsenic, 0.42 percent antimony, 0.38 percent lead, and 0.043 percent zinc (Bundtzen, 1981, occurrence 59a).

Alteration:

Silicification.

Age of mineralization:

The vein is along or subparallel to a fault(?) contact that contains mafic dikes of Eocene age. The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Low-sulfide gold-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: None

Site Status: Inactive

Workings/exploration:
The claim is unpatented and there are no workings.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/03/01

Site name(s): McGonogill; McGonagall

Site type: Prospects

ARDF no.: MM073

Latitude: 63.5680 **Quadrangle:** MM C-2

Longitude: 150.8031

Location description and accuracy:

This site represents two prospects. The upper McGonogill prospect (Cobb, 1980 [OFR 80-363]) is at an elevation of about 3400 feet at the head of the north fork of upper Glacier Creek, a fork locally called McGonogill Gulch. The prospect is about on the north border of the SW1/4 SW1/4 section 35, T. 15 S., R. 17 W., Fairbanks Meridian. The lower McGonogill (sometimes spelled McGonagall) prospect is about a half-mile to the west, at an elevation of about 2700 feet (Davis, 1923). It is in the SE1/4 section 34, T. 15 S., R. 17 W. The location is for the upper prospect and is accurate within 300 feet.

The upper McGonogill prospect corresponds to number 13 of Cobb (1972 [MF 366]), 44 of Bundtzen, Smith, and Tosdal (1976), 51 of Bundtzen (1981), 64 of Thornsberry, McKee, and Salisbury (1984), and 218 of Hawley and Associates (1978). The lower prospect has not been cited in published reports since about 1970.

Commodities:

Main: Ag, Au

Other: Cu, Hg, Pb, Sb, Zn

Ore minerals: Arsenopyrite, boulangerite, chalcopyrite, galena, gold, limonite, pyrite, scorodite, sphalerite, stibiconite, stibnite, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:

The country rocks in the area of the McGonogill prospects are schists correlated with the upper Precambrian Birch Creek Schist (Bundtzen, 1981). Wells (1933, p. 372) reported that an adit at the upper prospect was driven in graphitic schist. Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 64) reported that the country rock is mainly micaceous quartzite that strikes NNW and dips SW at a low angle.

The upper McGonogill deposit is a mineralized shear zone as much as 8 feet thick. It contains polymetallic quartz-sulfide veins, strikes about N 58 E, and dips 34 SW (Wells, 1933, p. 372). The quartz contains disseminated and veinlet pyrite and arsenopyrite, and smaller amounts of galena, stibnite, chalcopyrite, boulangerite, and sphalerite. The sulfides locally are oxidized to limonite, scorodite, and stibiconite (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2). The deposit was explored by a 40-foot adit. Davis (1923) reported that the vein exposed at the face of the adit assayed about 0.6 ounce of gold per ton and 63 ounces of silver per ton. Typical ore is much lower in grade. Bundtzen (1981) reported that quartz vein material containing abundant arsenopyrite and rarer boulangerite and galena assayed as much as 2. 2 percent lead and 8.51 percent arsenic, but only about 0.1 ounce of gold per ton and 1 ounce of silver per ton. Other veins in the area include one that crops out northeast of the workings. It assayed 3.5 percent lead, 1.5 percent zinc, 0.13 ounce of gold per ton, 3 ounces of silver per ton, 2800 ppm antimony, and 89 ppm mercury (Hawley and Associates, 1978, sample 218).

At the lower McGonogill prospect, a quartz vein containing free gold is offset by a shear zone impregnated with tetrahedrite, stibnite, and chalcopyrite (Davis, 1923, p. 131-132). Samples of the mineralized shear zone assayed as much as 52 ounces of silver per ton.

Alteration:

Silcification and sulfidization of shear zones. Oxidation of iron, arsenic, and antimony minerals.

Age of mineralization:
The deposits are assumed to be Eocene (see record MM091). At the lower McGonogill prospect, a polymetallic, mineralized shear zone postdates a low-sulfide gold-quartz vein.

Deposit model:
Polymetallic veins and low-sulfide Au-quartz veins (Cox and Singer, 1986; models 22c and 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c, 36a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
The McGonogill deposits were discovered and prospected before 1916 (Capps, 1919, p. 100). By about 1930, the upper deposit was explored by a 40-foot tunnel (Davis, 1923; Wells, 1933). Apparently not much work was done after that.

Production notes:
About 1 ton of gold-bearing quartz was shipped for testing purposes from the lower McGonogill prospect.

Reserves:

Additional comments:
The upper and lower McGonogill prospects are in Denali National Park and Preserve.

References:
Capps, 1919; Davis, 1923; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis; 1923; Wells, 1933; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Bosart

Site type: Mine

ARDF no.: MM074

Latitude: 63.5671 **Quadrangle:** MM C-2

Longitude: 150.8980

Location description and accuracy:

The Bosart mine (Cobb, 1980 [OFR 80-363]) is at an elevation of about 2700 feet on the west wall of the west fork of Twentytwo Gulch. It is in the SW1/4 SW1/4 of section 32, T. 15 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet. The mine site corresponds to number 14 of Cobb (1972 [MF 366]), 36 of Bundtzen, Smith, and Tosdal (1976), 42 of Bundtzen (1981), 116 of Hawley and Associates (1978), and 48 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag

Other: Au, Cu, Pb, Sb, Zn

Ore minerals: Arsenopyrite, cerussite(?), chalcopyrite, galena, polybasite, pyrite, sphalerite, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:

The country rocks at the Bosart mine are interlayered quartz-feldspar schist and micaceous quartz schist of the Precambrian Birch Creek Schist. Greenschist is also present locally and garnet amphibolite underlies a prominent ridge about 75 feet west of the mine workings (Bundtzen, 1981, pl. 3; Thornsberry, McKee, and Salisbury, 1984, v.2, occurrence 48).

The deposit is a thin, sulfide-rich vein that strikes N. 50 E., and dips 70-80 NW. The vein contains arsenopyrite, pyrite, chalcopyrite, galena, sphalerite, tetrahedrite, and polybasite (Wells, 1933, p. 370-371; Bundtzen, 1981). The polybasite occurs mainly in high-grade, silver-lead ore. Some of the galena may be oxidized to cerussite.

The sulfide-rich ore contains silver assaying from a few ounces to about 40 ounces per ton; some veins assayed more than 230 ounces of silver per ton. Twenty tons of hand-picked ore shipped in 1980 averaged 0.328 ounce of gold and 78.22 ounces of silver per ton; some ore contained more than 1000 ounces of silver per ton.

The Bosart vein projects towards the Florence vein (MM082), which is about 0.75 mile to the southwest.

Alteration:

Possible oxidation of lead mineral.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The vein was developed by Otto Bosart before 1931(Wells, 1933). It was prospected in the 1960s and 1970s by Arley Taylor and Jim Dale. In 1980, a small quantity of ore was mined and shipped. Mill ore was left in place.

Production notes:

The mine produced at least 20 tons of high-grade ore in 1980. This ore contained as much as 6.56 ounces of gold and 1564.4 ounces of silver per ton. About 75 tons of mill-grade ore was left in the walls of the high-grade vein, and a Harz-type jig plant was on the property in 1983. Probably no mining occurred after 1983 (Thornsberry, McKee, and Salisbury, 1984, v. 2).

Reserves:

About 75 tons of low-to medium-grade gold-silver ore was not mined; exploration probably would develop more reserves at the property.

Additional comments:

The Bosart mine is in Denal National Park and Preserve.

References:

Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 01/12/01

Site name(s): Glenn; Glen; Swisher

Site type: Prospect

ARDF no.: MM075

Latitude: 63.5658 **Quadrangle:** MM C-2

Longitude: 150.7850

Location description and accuracy:

The Glenn (sometimes called Glen or Swisher) prospect (Cobb, 1980 [OFR 80-363]) is at altitude of about 4200 feet on the south side of Glacier Peak, within 1000 feet of hilltop 4310. It is near the middle of the S1/2 SE1/4 of section 35, T. 15 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet.

The prospect is location 17 of Cobb (1972 [MF 366]), and is included in location 13 of MacKevett and Holloway (1977). It corresponds to number 47 of Bundtzen, Smith, and Tosdal (1976), 216 of Hawley and Associates (1978), 52 of Bundtzen (1981), and 70 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: Pb, Sb, Zn

Ore minerals: Arsenopyrite, boulangerite, galena, goethite, jamesonite, jarosite, pyrite, scorodite, sphalerite, stibiconite, stibnite, tetrahedrite(?)

Gangue minerals: Potassium feldspar, quartz

Geologic description:

The country rock at the Glenn prospect is micaceous quartz schist of the upper Precambrian Birch Creek Schist, near the rest of the Kantishna antiform (MM091) (Bundtzen, 1981). The schist strikes north and dips 20-40 W. The prospect is about 500 feet north of a fault that strikes WNW and juxtaposes Spruce Creek lithologies (to the south) against Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The deposit is a sulfide-bearing quartz vein that locally contains potassium feldspar. The vein is 4 to 10 feet thick, strikes N80W and is nearly vertical. The ore minerals include arsenopyrite, galena, boulangerite, jamesonite, stibnite, sphalerite, and, tentatively, tetrahedrite; free gold occurs locally (Capps, 1919, p. 100; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984). The sulfides are partly oxidized to scorodite, stibiconite, goethite, and jarosite.

The vein was explored by two adits. A sample from the upper dump assayed 8.54 ounces of silver per ton, 0.03 ounce of gold per ton, 0.086 percent copper, 3.4 percent lead, 0.480 percent zinc, 2.05 percent antimony, and 2.05 percent arsenic. Ore from the lower dump assayed 23.08 ounces of silver per ton, 0.05 ounce of gold per ton, 0.093 percent copper, 6.55 percent lead, 1.00 percent zinc, and less than 1 percent each of arsenic and antimony.

Alteration:

Silicicification and introduction of potassium feldspar. Oxidation of iron, arsenic, and antimony minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The Glenn prospect was explored between 1906 and 1909 by a group led by Tom Lloyd, an early local landowner. The exploration consisted chiefly of two adits. The portal of the lower tunnel is at an elevation of about 4050 feet; the upper portal is at about 4250 feet (Wells, 1933, p. 373). The tunnels were caved when Capps (1919) visited the property in 1916. By 1931, the property was controlled by Lee Swisher, but no more underground work was done (Wells, 1933). Bundtzen, Smith, and Tosdal (1976), Hawley and Associates (1978), and Thornsberry, McKee, and Salisbury (1984) mapped the site or collected rock and soil samples.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Capps, 1919; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Wells, 1933; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Unnamed (east of East Fork of Glen Creek)

Site type: Occurrence

ARDF no.: MM076

Latitude: 63.5654 **Quadrangle:** MM C-2

Longitude: 150.7143

Location description and accuracy:
This occurrence is at an elevation of about 3300 feet above the East Fork of Glen Creek. It is in the SW1/4 SW1/4 SE1/4 section 31, T. 15 S., R. 16 W, Fairbanks Meridian. The location is approximate. It corresponds to number 82 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Zn

Other: As, Cu, Pb

Ore minerals: Arsenopyrite(?), chalcopyrite, galena, pyrite, sphalerite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of this occurrence include chloritic phyllite, metafelsite, and marble of the lower Paleozoic Spruce Creek sequence. Rock units and schistosity strike ENE and dip south, off the crest of the Kantishna antiform (MM091) (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The occurrence consists of semimassive sulfides in cobbles and small boulders in scree. The sulfides occur in tan, vitreous quartzite that possibly is metachert. The sulfides form parallel bands of pyrite, sphalerite, galena, and minor chalcopyrite. The scree fragments are up to 0.5 foot across and contain as much as 20 percent sulfide. Samples assayed up to 0.47 ounce of silver per ton, 1.2 percent zinc, 0.38 percent lead, 0.05 percent copper, and 1.25 percent arsenic. Gold was not determined (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 82).

Alteration:

Age of mineralization:

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

The occurrence is in Denali National Park and Preserve.

References:

Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/03/01

Site name(s): Unnamed (East Fork of Glen Creek)

Site type: Prospect

ARDF no.: MM077

Latitude: 63.5653 **Quadrangle:** MM C-2

Longitude: 150.7235

Location description and accuracy:
This prospect is at an elevation of about 2900 feet in the East Fork of Glen Creek, about 0.85 mile upstream of its confluence with the West Fork of Glen Creek. The location is probably accurate within 500 feet. The prospect corresponds to number 53 of Bundtzen, Smith, and Tosdal (1976), 255 of Hawley and Associates (1978), 58 of Bundtzen (1981), and 81 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag(?), Au(?)

Other: As, Pb

Ore minerals: Arsenopyrite, galena

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of this prospect consist of marble and chloritic phyllite of the lower Paleozoic Spruce Creek sequence. A few hundred feet south of the prospect, Spruce Creek rocks are juxtaposed against Birch Creek Schist by a fault that strikes ENE. Tertiary mafic dikes appear to be emplaced along this fault (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit consists of a quartz vein that contains arsenopyrite and galena. An adit, now caved, explored the vein in about 1912. No assays are available, but the exploration suggests that the vein was prospected for silver or gold (Bundtzen, Smith, and Tosdal, 1976; Bundtzen, 1981).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold-quartz vein or polymetallic vein (Cox and Singer, 1986; models 36a or 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a or 22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The vein was explored by an adit in about 1912 (Bundtzen, 1981).

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/03/01

Site name(s): Lloyd

Site type: Prospect

ARDF no.: MM078

Latitude: 63.5640 **Quadrangle:** MM C-2

Longitude: 150.7306

Location description and accuracy:

The Lloyd prospect (Cobb, 1980 [OFR 80-363]) is in the canyon of the East Fork of Glen Creek, about 1500 feet due north of the confluence of the East and West forks of Glen Creek. The location is accurate within 500 feet.

The prospect corresponds to number 21 of Cobb (1972 [MF 366]), 52 of Bundtzen, Smith, and Tosdal (1976), 56 of Bundtzen (1981), 239 of Hawley and Associates (1978), and 77 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Cu, Zn

Other: Ag, Pb

Ore minerals: Azurite, chalcopyrite, galena, magnetite, malachite, pyrite, smithsonite, sphalerite

Gangue minerals: Quartz

Geologic description:

The country rocks in the area of the Lloyd prospect are metachert (quartzite?) and garnet-quartz-muscovite schist of the upper Precambrian Birch Creek Schist (Bundtzen, 1981). The strata dip gently north and form asymmetric recumbent folds that plunge about S80W at a low angle (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 77).

The deposit consists of stratiform sulfide minerals concentrated in bands up to about 1/2 inch thick in a metachert layer as much as 3 feet thick. The sulfide-rich layers appear to thicken in fold crests. Sphalerite is the most abundant metallic mineral. It is accompanied by pyrite and lesser amounts of chalcopyrite, galena, and magnetite (Bundtzen, 1981). Outcrops are coated with azurite, malachite, and smithsonite. A 5-foot channel sample of a section thicked by folding assayed about 0.15 ounce of silver per ton, 2.2 percent zinc, 0.355 percent copper, and 0.07 percent lead. A selected sample of the richest material on the dump assayed 0.85 ounce of silver per ton, 5.6 percent zinc, 1.1 percent copper, and 0.215 percent lead (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 77). Bundtzen (1981) reported that another selected sample assayed 0.01 ounce of gold per ton.

This stratabound deposit predates recumbent folding of the Birch Creek Schist. It appears to be a zinc-rich, syngenetic, volcanogenic deposit of late Precambrian age.

Alteration:

Oxidation of copper and zinc minerals.

Age of mineralization:

Possibly late Precambrian, the protolith age of the Birch Creek Schist.

Deposit model:

Stratabound base-metal sulfide deposit, possibly of exhalative origin.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The Lloyd prospect explored by a 24-foot-long tunnel before 1916 (Capps, 1919). Very little work has been done since then.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Capps, 1919; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/03/01

Site name(s): Yellow Creek

Site type: Mine

ARDF no.: MM079

Latitude: 63.5634 **Quadrangle:** MM C-2

Longitude: 150.8335

Location description and accuracy:

Yellow Creek is a 0.75-mile-long, north-flowing tributary to Glacier Creek. The location is about at the midpoint of Yellow Creek, in the NW1/4 of section 3, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate.

Resource block Y-1 covers Yellow Creek and the lower part of an unnamed headwater tributary (Levell, 1984 [v. 2]; Thornsberry, McKee, and Salisbury, 1984, fig. K-3).

Commodities:

Main: Au

Other: Ag, Pb, Sb

Ore minerals: Galena, gold, hematite, magnetite, pyrite, stibnite

Gangue minerals: Quartz

Geologic description:

Yellow Creek is a steep, narrow tributary to Glacier Creek. It is fed by west-flowing Ruby Creek and by an unnamed, east-flowing creek; both tributary creeks are steep. Yellow Creek occupies a linear, fault-controlled, northwest-trending valley. Upper Yellow Creek, Ruby Creek and the unnamed east-flowing tributary are incised into bedrock of the Spruce Creek sequence. Lower Yellow Creek cuts Birch Creek bedrock (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

Placer deposits in Yellow Creek consist of poorly sorted, angular to subangular colluvium, angular bouldery gravel, and the uppermost schist bedrock. A 1983 operation in mid-Yellow Creek recovered gold from angular gravel about 7 to 10 feet thick in a paystreak 40 to 50 feet wide. The gold was coarse and crystalline, and commonly adhered to quartz; its fineness was about 700. Crystalline gold from an operation at the head of Yellow Creek sold for about $1000 per ounce (Levell, 1984, v. 2, no. 1). The concentrates contain abundant galena, and lesser amounts of magnetite, pyrite, stibnite, and hematite. The grade of the deposit in mid-Yellow Creek was about 0.03 ounce of gold per cubic yard. The grade of the deposit at the head of the creek that contained the crystalline gold was slightly less than 0.01 ounce of gold per cubic yard (Levell, 1984, v. 2).

Yellow Creek drains mineralized Spruce Creek rocks that are the source of the gold, sulfide, and oxide minerals in the placer deposit. The angular and locally crystalline nature of the gold indicate a proximal source.

Alteration:

Age of mineralization:

Holocene.

Deposit model:

Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

Gold was discovered in Yellow Creek in 1906 (Prindle, 1907); a paystreak reportedly was mined out by 1916 (Capps, 1919). The creek was mined with mechanical equipment in 1983; early production was probably by hand methods. There probably has been no mining since 1985.

Production notes:

Based on production in 1983, total recovery probably exceeded 1000 ounces of gold.

Reserves:

There is a resource of 30,000 to 35,000 cubic yards of coarse, angular, alluvial gravel in Yellow Creek (Thornsberry, McKee, and Salisbury, 1984, fig. K-3, block Y-1). The gravel contains about 270 to 900 ounces of gold, based on samples grading 0.009 to 0.03 ounce of gold per cubic yard.

Additional comments:

The creek is in Denali National Park and Preserve.

References:

Prindle, 1907; Capps, 1919; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Wieler Antimony

Site type: Prospect

ARDF no.: MM080

Latitude: 63.5616 **Quadrangle:** MM C-2

Longitude: 150.7346

Location description and accuracy:
The Wieler Antimony prospect is at an elevation of about 2850 feet on the south side of the West Fork of Glen Creek. It is about 0.2 mile above the junction of the East and West forks of the creek, in the N1/2 of the NE1/4 SE1/4, section 1, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet. The prospect is number 75 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Pb, Sb, Zn

Other: Cu

Ore minerals: Galena, pyrite, sphalerite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of the Wieler Antimony prospect are graphitic and chloritic schists of the upper Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).
The deposit consists of discontinuous, en echelon, quartz pods that contain disseminated to massive pyrite, galena, sphalerite, and stibnite. The pods are alined NE, transverse to a high-angle, WNW- to NNW-striking, fault that controls the course of lower Glen Creek. The pods are exposed in a placer cut for a distance of 50 feet. Selected samples of the mineralized quartz contained 8.55-10.5 percent lead, 3.1-10.5 percent zinc, and 7.35-9.05 percent antimony (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 75).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The Wieler Antimony deposit was discovered during placer mining; the pit that exposed the sulfide-bearing quartz was opened in 1983 (Thornsberry, McKee, and Salisbury, 1984, v. 2). The property has been inactive since about 1985.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Pension

Site type: Prospect

ARDF no.: MM081

Latitude: 63.5606 **Quadrangle:** MM C-2

Longitude: 150.7817

Location description and accuracy:

The Pension prospect (Cobb, 1980 [OFR 80-363]) is at an elevation of about 3350 feet at the head of the East Fork of Glen Creek. It is probably within 300 feet of the center of the NE1/4 of section 2, T. 16 S., R. 17 W., Fairbanks Meridian. The original prospect site appears to be buried under landslide material.

The Pension prospect is included with the Arkansas (MM083) and Glen Ridge No. 1 (MM071) prospects in location 19 of Cobb (1972 [MF 366]) and location 15 of MacKevett and Holloway (1977). The Pension prospect is number 225 of Hawley and Associates (1978), 54 of Bundtzen (1981), and 65 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag

Other: As, Pb

Ore minerals: Arsenopyrite, boulangerite, galena, pyrite, scorodite

Gangue minerals: Quartz

Geologic description:

The country rock in the area of the Pension prospect is mainly metafelsite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). The schistosity strikes ENE and dips NW (Thornsberry, McKee, and Salisbury (1984, fig. K-2). The deposit consists of quartz-sulfide veins. A quartz vein exposed at the claim discovery site is 5 feet thick, of which about half is massive galena. A selected sample of this vein assayed 150 ounces of silver per ton (Davis, 1923, p. 132). Its strike is not reported. Bundtzen (1981, location 54) described a NW-striking quartz vein that contains arsenopyrite, partly oxidized to scorodite, and boulangerite. A representative sample assayed 2.76 percent lead, 1.15 percent antimony, 0.34 percent arsenic, 1.76 ounces of silver per ton, and 0.16 ounce of gold per ton. The site was covered by landslide debris when examined in 1983 by the U.S. Bureau of Mines. They collected iron-stained quartz nearby that assayed 0.40 ounce of gold per ton (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 65).

Alteration:

Oxidation of iron and arsenic minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

The deposit was discovered in 1921, and an adit started 25 feet below the discovery vein outcrop (Davis 1923). The workings had sloughed by 1931 (Wells, 1933, p. 374), and by 1933 the original prospect was apparently covered by landslide material.

Production notes:

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve.

References:

Davis, 1923; Wells, 1933; Cobb, 1972 (MF 366); MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 01/18/01

Site name(s): Florence

Site type: Prospect

ARDF no.: MM082

Latitude: 63.5591 **Quadrangle:** MM C-2

Longitude: 150.9127

Location description and accuracy:

The Florence prospect (Cobb, 1980 [OFR 80-363]) is on the north spur of Wickersham Dome at an elevation of about 3550 feet. It is in the SW1/4 NE1/4 section 6, T. 15 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet.

The prospect corresponds to number 12 of Cobb (1972 [MF 366]), 39 of Bundtzen (1981), 44 of Thornsberry, McKee, and Salisbury (1984), and 110 of Hawley and Associates (1978). This site also includes a possibly related prospect a few hundred feet north of the Florence prospect. It is number 45 of Thornsberry, McKee, and Salisbury (1981), possibly number 40 of Bundtzen (1981), and general location 12 of Cobb (1972 [MF 366]), and may be the Caribou Horn claim of Carl Wikstrom (Heiner and Porter, 1972: KX 66-46).

Commodities:

Main: Ag, Pb

Other: Au, Cu, Sb, Zn

Ore minerals: Anglesite, azurite, cerussite, galena, goethite, malachite, polybasite, pyrite, sphalerite, stibiconite, stibnite, tetrahedrite(?)

Gangue minerals: Quartz, siderite

Geologic description:

The country rock at the Florence prospect is quartz mica schist of the Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 44). Exposures are poor, but the trace of float across the area suggests that the deposit is a sulfide-bearing quartz-siderite vein that strikes about N 40 E. A shaft and trench were caved by 1931, when Wells (1933, p. 370) visited the Florence property. He reported fine-grained galena and tetrahedrite, and that the rocks were stained with malachite. The propect subsequently was explored by bulldozer trenches, which exposed oxidized ore that contained abundant anglesite, azurite, cerussite, goethite, and malachite. Bundtzen (1981) reported sphalerite, stibnite, and polybasite in remnant fragments of fresh ore.

Some of the ore is moderately rich in silver that seems to be associated with galena, but there is essentially no gold. The richest sample assayed 70 ounces of silver per ton and 70 percent lead. Another sample containing only 4.55 percent lead assayed almost 40 ounces of silver per ton. Both samples contained about 1.5 percent copper, suggesting that tetrahedrite or another copper-bearing mineral is present (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2). Samples collected by Hawley and Associates (1978) contained up to 50 percent lead, 1.35 percent copper, 5.2 percent zinc, and 3.1 percent antimony.

A vein possibly related to the Florence vein is exposed several hundred feet north of the Florence prospect (Thornsberry, McKee, and Salisbury, 1984, v. 2, no. 45). It contains pyrite, galena, stibnite, and stibiconite. Maximum assay values for base metals were in the 0.X range.

Alteration:

Oxidation of iron, copper, lead, and antimony minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The prospect was explored by a shallow shaft and trenches, which were caved and sloughed by 1931 (Wells, 1933). More recently, possibly in the 1970s, it was explored by shallow bulldozer trenches and a stripped circular area about 150 feet in diameter.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Wells, 1933; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Arkansas

Site type: Prospect

ARDF no.: MM083

Latitude: 63.5587 **Quadrangle:** MM C-2

Longitude: 150.7746

Location description and accuracy:

The Arkansas prospect (Cobb, 1980 [OFR 80-363]) is at an elevation of about 3450 feet on a minor east-trending ridge at the head of the West Fork of Glen Creek. It is in the SE 1/4 NE 1/4 section 2, T. 16 S., R. 17 W., Fairbanks Meridian. The location is probably accurate within 500 feet. The Arkansas prospect is 1500 feet downstream from the Pension (MM081) prospect (Davis, 1923).

The Arkansas and Pension prospects are included in location 19 of Cobb (1972 [MF 366]). The Arkansas prospect is number 226 of Hawley and Associates (1978), 55 of Bundtzen (1981), and 69 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag

Other: As, Pb, Sb, Zn

Ore minerals: Arsenopyrite, boulangerite, galena, jamesonite, scorodite, sphalerite, stibnite

Gangue minerals: Quartz

Geologic description:

The country rocks at the Arkansas prospect are metafelsite and greenschist (meta-andesite) of the lower Paleozoic Spruce Creek sequence; they are cut by a plug or dike of Tertiary basalt (Bundtzen, 1981). The prospect is in a half-mile-long fault block terminated on the east by a northwest-striking cross fault exposed along the West Fork of Glen Creek (Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The deposit consists of a 14-foot-thick shear zone containing quartz-sulfide veins. Individual veins are as much as 5 feet thick, and are separated by zones of sheared schist. The quartz contains galena, stibnite, and some sphalerite; a grab sample from a 5-foot-thick segment assayed 90 ounces of silver per ton (Davis, 1923). The principal vein is 1 to 4 feet thick, is vertical, and strikes N 70 E (Bundtzen, 1981). It contains arsenopyrite, extensively replaced by scorodite, and galena, boulangerite, jamesonite, and stibnite. A sample collected at the site in 1983 assayed a trace of gold, 2.33 ounces of silver per ton, 3.55 percent lead, 0.50 percent zinc, 1.9 percent antimony, and 5.65 percent arsenic (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 69).

Alteration:

Oxidation of arsenic mineral.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The Arkansas vein was discovered in 1921(Davis, 1923). The prospect was mapped by Bundtzen (1981); an adit at the site was caved.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Davis, 1923; Wells, 1933; Cobb, 1972 (MF 366); Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Kantishna Hills placer deposts

Site type: Mines

ARDF no.: MM084

Latitude: 63.5581 **Quadrangle:** MM C-2

Longitude: 150.8586

Location description and accuracy:

This record summarizes information about the most significant placer gold deposits in the Kantishna Hills area. As defined here, the area is bounded on the east by the midline of R.16 W., Fairbanks Meridian, and on the west by Moose Creek. It approximately coincides with the main placer area of Thornsberry, McKee, and Salisbury (1984, fig. K-3), and includes the most important creeks, as well as many of the secondary ones. For this record, the location is approximately at the center of the area. It is at an elevation of 3835 feet near the crest of a hill, in the NW1/4 of section 4, T. 16 S., R. 17 W., Fairbanks Meridian. Most of the deposits included in this summary are briefly described by Cobb (1972 [MF 366], 1973 [B 374], 1980, [OFR 80-363]) and by Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other: Ag, Mn, Pb, Sb, Sn, W

Ore minerals: Cassiterite, galena, gold, pyrite, rhodonite, scheelite, stibnite, wolframite(?)

Gangue minerals: Garnet, ilmenite, magnetite, quartz

Geologic description:

The most important placer creeks in the Kantishna district drain an area underlain chiefly by rocks of the Spruce Creek sequence (see MM091) (Bundtzen, 1981). Creeks that mostly drain Birch Creek Schist are, in general, smaller producers (Levell, 1984,fig. K-7 [v. 1]).

Placer deposits in the main part of the Kantishna Hills range from small colluvial-elluvial deposits at the heads of the valleys to medium-size alluvial deposits in relatively narrow tributary valleys. In turn, the narrow valley deposits grade into broad alluvial plain placers at the edge of the hills (Cobb, 1973 [B 1474]; Bundtzen, 1981; Levell, 1984 [v. 1]). At the upstream end, the colluvial and elluvial deposits rest on and grade into lode deposits.

Gravels are thin to almost absent in the elluvial deposits; these deposits mainly consist of angular unsorted bedrock material; gold is angular, locally crystalline and in composite nuggets of gold and quartz. Alluvium in the broad alluvial plain deposits, including lower Caribou Creek (MM035), is mostly composed of rounded to subrounded gravel stained and weakly cemented by groundwater precipitates. Gold tends to be fine and moderately well worn. With the exception of a deposit at the junction of the East and West Forks of Glen Creek, where gravel is at least 35 feet thick, most productive gravels are 15 or less feet thick.

There are two main types of placer deposits. One consists of alluvium in relatively narrow tributary valleys and in broad, low-gradient streams. The other consists of lowland alluvium and fluvio-glacial deposits (Levell, 1984 [v. 1]). The deposit in Eureka Creek (MM122) typifies the tributary valley type. The Caribou Creek deposit (MM035) exemplifies a lowland alluvial deposit, and most of the deposits on Moose Creek (MM132) are of fluvio-glacial origin. Most of the remaining placer resources in the Kantishna Hills area are in the low-gradient streams (Hawley and Associates, 1978: Levell, 1984).

The accessory mineral suite varies widely. In the tributary valley deposits, especially at their upper ends, the placers contain abundant mechanically unstable minerals such as pyrite, galena, and stibnite. Magnetite and garnet are probably the most common accessory minerals, and scheelite is widely distributed. Cassiterite occurs in several creeks. Wolframite was tentatively identified in one placer. Galena occurrs in

masses several inches across in Friday, Eureka, and other creeks, and boulders of rhodonite occur in Glen Creek. Ernie Mauer reported scheelite boulders as much as a foot across in upper Caribou Creek (Bundtzen, 1981, p. 165).

Placer gold in the Kantishna Hills area has the lowest mean purity (789 fine) of any district in Alaska; it also the largest coefficient of variation and the lowest reported value of 567 on nearby Little Moose Creek (Bundtzen,1981, p. 163-164). Gold from creeks draining auriferous lode deposits, such as Eureka Creek, is as much as 900 fine. Caribou Creek (MM109), the most productive placer in the area, drains an area of lode deposits near Spruce and Kankone Peaks. The average gold fineness in the upper part of the creek was about 675; on lower Caribou, it ranged from about 680 to 700.

Alteration:

Age of mineralization:

The placer deposits are as old as late Tertiary. The most important deposits are Pleistocene and Holocene.

Deposit model:

Au-PGE placer (Cox and Singer, 1986; model 39a). The deposits range from residual (elluvial) to colluvial in upper tributary valleys to alluvial and fluvio-glacial valley bottom deposits.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a

Production Status: Yes; medium

Site Status: Inactive

Workings/exploration:

Placer gold was discovered in the Kantishna Hills in 1905 and a rush ensued (Prindle, 1907, 1911; Capps, 1919; Bundtzen, 1978). The richest deposits were probably mined by the end of 1907. Medium- to large-scale hydraulic placer mining was attempted in 1922 to 24 but was generally unsuccessful (Davis, 1923). Medium-scale mining with 'dry land dredges' or mobile washing plants commenced in 1939; those operations were successful and continued through 1942. Mining began again in 1946 and continued for a few years, but was less successful than the pre-war years because of the fixed price of gold and higher costs. Small-scale mining continued with sniping of remaining rich deposits, and medium-scale mining resumed in about 1973-75, after the price of gold was allowed to float on the world market. Many of the small, rich deposits were also mined at that time. This mining terminated in about 1985, when an injunction halted mining pending judicial review.

Production notes:

The following creeks in the Kantishna district are ranked in descending order of production of placer gold: Upper Caribou (MM042), more than 20,000 ounces; Eureka (MM122), more than 10,000 ounces; and five creeks that produced at least 5000 ounces each, including Moose (MM132), Friday (MM113), Glacier (MM048), Lower Caribou (MM035), and Glen (MM108). Eldorado (MM028), Spruce (MM104), and Yellow (MM079) creeks each produced at least 1000 ounces of gold, and Last Chance (MM050), Crevice (MM046), and Rainy (MM130) creeks each produced at least 500 ounces of gold. Crooked Creek (MM013) and Little Moose (MM140) Creek, which are outside the Kantishna Hills placer area as herein defined, produced 1000 or more ounces of gold. The cumulative production of placer gold in the Kantishna district is more than 62,000 fine ounces.

Reserves:

Significant gold resources remain in Caribou Creek and its benches; probably in Glacier Creek; and possibly in Moose Creek. The rich upland creeks, including Eureka, Friday, and Glen, have been extensively mined and contain relatively small resources. Flat Creek contains a significant amount of alluvium and is essentially unevaluated (Levell, 1984 [v. 2]). Unlike Caribou and Glacier Creeks, Flat Creek does not drain

a significant area of Spruce Creek sequence rocks (see MM091).

Additional comments:

There appear to be significant placer gold resources in the Kantishna district (Levell, 1984).

References:

Prindle, 1907; Prindle, 1911; Capps, 1919; Davis, 1923; Cobb, 1972 (MF 366); Cobb, 1973 (B 1374); Bundtzen, 1978; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 1 and 2); Cox and Singer, 1986.

Primary reference: Prindle, 1907; Davis, 1923; Levell, 1984 (v. 1 and 2)

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Unnamed (lower Ruby Creek)

Site type: Occurrence

ARDF no.: MM085

Latitude: 63.5577 **Quadrangle:** MM C-2

Longitude: 150.8266

Location description and accuracy:
This occurence is at an elevation of about 2650 feet in lower Ruby Creek, a tributary of Yellow Creek. It is in the SE1/4 NW1/4 section 3, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet. The occurrence represents the location of rock sample 209 of Hawley and Associates (1978), and appears not to have been described previously.

Commodities:

Main: Ag, Pb

Other: Au

Ore minerals: Galena, pyrite

Gangue minerals: Quartz

Geologic description:
A major fault that strikes NNW controls the course of Yellow Creek; strata to the east are apparently downthrown. This occurrence is in quartz schist in marble of the Spruce Creek sequence in the downthrown block. (Bundtzen, 1981; Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The occurrence consists of altered quartzite that contains galena and pyrite. A representative chip sample of mineralized quartz schist contained 1.8 percent lead, 60 ppm silver, and 0.3 ppm gold (Hawley and Associates, 1978, sample no. 209). Stream-sediment samples (nos. 202 and 203) collected upstream of the locality are weakly anomalous in lead, zinc, and silver.

Alteration:
Silicified and sulfidized quartz schist in marble.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic replacement deposit (Cox and Singer, 1986; model 19a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
19a

Production Status: None

Site Status: Inactive

Workings/exploration:
Hawley and Associates (1978) collected rock and stream-sediment samples in 1976. There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Unnamed (ridge between Ruby Gulch and the head of Rainy Creek)

Site type: Prospect

ARDF no.: MM086

Latitude: 63.5577 **Quadrangle:** MM C-2

Longitude: 150.8017

Location description and accuracy:
This prospect is at an elevation of about 3400 feet on the ridge between the heads of Ruby Gulch and Rainy Creek. It is in the north part of the SW1/4 NW1/4 section 2, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 1000 feet. The prospect corresponds to location 50 of Bundtzen (1981), and occurrence 63 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other: Ag, Pb, Sb

Ore minerals: Galena, pyrite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of this prospect are chiefly graphitic quartz schist and chloritic phyllite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2, v. 2, occurrence 63). The deposit consists of pyrite and a small amount of galena in a NE- trending, poorly exposed, quartz vein. Samples of the vein assay up to 0.01 ounce of gold per ton and 0.114 ounce of silver per ton. Lead and antimony are in the 100s of ppm range.

Alteration:
Silicification of graphitic quartz schist.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Weakly auriferous, low-sulfide quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein was prospected by a single pit that may have been covered by subsequent road building (Thornsberry, McKee, and Salisbury, 1984, v. 2).

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 01/16/01

Site name(s): Unnamed (upper West Fork of Glen Creek)

Site type: Prospect

ARDF no.: MM087

Latitude: 63.5570 **Quadrangle:** MM C-2

Longitude: 150.7724

Location description and accuracy:
This prospect is on the west side of the canyon of the upper West Fork of Glen Creek at an elevation of about 3250 feet. It is about 0.5 mile due west of the center of section 1, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet. The prospect corresponds to occurrence 68 of Thornsberry, McKee, and Salisbury (1984) and approximately to the location of soil sample 240 of Hawley and Associates (1978).

Commodities:

Main: Ag, Pb, Sb

Other: Au

Ore minerals: Arsenopyrite, galena, pyrite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rock in the area of this prospect is mainly metafelsite of the Spruce Creek sequence; it strikes ENE and dips SE, along the south flank of the Kantishna antiform (MM091) (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The deposit is a foot-thick quartz vein that strikes north and is nearly vertical. The vein contains several percent of arsenopyrite, pyrite, stibnite, and probably galena. Samples of the vein assayed a trace of gold, 1.6 ounces of silver per ton, 1.45 percent lead, 1.2 percent antimony, and 2.25 percent arsenic (Thornsberry, McKee, and Salisbury, 1984, v. 2). A soil sample collected on apparently mineralized residual soil near the prospect contained 13 ppm silver, 0.71 ppm gold, 600 ppm lead, and 500 ppm zinc (sample 240, Hawley and Associates, 1978, fig. 4.1-A(1)).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold-quartz vein or polymetallic vein (Cox and Singer, 1986; model 36a or 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a or 22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein was explored shallow pits of unknown date.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Unnamed (East Fork of Glen Creek)

Site type: Occurrence

ARDF no.: MM088

Latitude: 63.5565 **Quadrangle:** MM C-2

Longitude: 150.7426

Location description and accuracy:
This is an inferred location for a proximate bedrock source of rhodonite boulders that have long been known to occur in Glen Creek (MM108). The location of the boulders is in the East Fork of Glen Creek about a half-mile above its confluence with the West Fork. It is somewhat upstream of occurrence 76 of Thornsberry, McKee, and Salisbury (1984), cited as a rhodonite boulder locality, but seems to agree more closely with their text description of the locality.

Commodities:

Main: Rhodonite (as a gem mineral, not as an ore of manganese)

Other: Mn

Ore minerals: Pyrolusite, rhodochrosite, rhodonite

Gangue minerals:

Geologic description:
Manganiferous boulders have long been known in Glen Creek. The boulders contain rhodonite and rhodochrosite, and are stained with a black oxide, probably pyrolusite. An early-reported location of the boulders is on socalled Claim No. 9, where black-stained pebbles and small boulders of rhodonite accompanied placer gold and galena (Capps, 1919, p. 84). It is not certain whether this claim is in the East Fork or in Glen Creek below the junction of the two forks. Rhodonite on Glen Creek was also reported by Wells (1933, p. 355-356; p. 372); and Bundtzen, Smith, and Tosdal (1976, p. 9) reported that some of the rhodonite in Glen Creek is of gem quality.
The country rock near the boulder locality consists partly of marble of the Spruce Creek sequence, a possible host for replacement(?) deposits of manganese minerals.

Alteration:
Oxidation of manganese mineral.

Age of mineralization:
The boulder deposit is Holocene.

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The manganiferous boulders may have been discovered in 1916, when they were reported in sluice box concentrate on Claim No. 9 (Capps, 1919). They were also noted in 1931 (Wells, 1933), and in recent min-

ing operations (Bundtzen, Smith, and Tosdal, 1976; Thornsberry, McKee, and Salisbury, 1984).

Production notes:
Small amounts of the rhodonite have probably been sold as gem material.

Reserves:

Additional comments:
The boulder deposits and their presumed bedrock source are in Denali National Park and Preserve.

References:
Capps, 1919; Wells, 1933; Bundtzen, Smith, and Tosdal, 1976; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Capps, 1919; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/03/01

Site name(s): Home Lode

Site type: Prospect

ARDF no.: MM089

Latitude: 63.5559 **Quadrangle:** MM C-2

Longitude: 150.7470

Location description and accuracy:
The Home Lode (Cobb, 1980 [OFR 80-363]) prospect is at an elevation of about 2500 feet on the south side of the valley of Crevice Creek. It is about 0.1 mile southeast of the center of section 24, T. 15 S., R. 17 W., Fairbanks Meridian. The location is approximate; it probably is accurate within 0.2 mile. The prospect is location 23 of Cobb (1972 [MF 366]), 51a of Bundtzen, Smith, and Tosdal (1976), 227 of Hawley and Associates (1978), 63a of Bundtzen (1981), and 73 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Sb

Other:

Ore minerals: Limonite, stibiconite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of the Home Lode prospect are micaceous schist and quartzite of the upper Precambrian Birch Creek Schist (Bundtzen, 1981) The schist strikes NE and dips W (Thornsberry, McKee, and Salisbury, 1984). The deposit consists of a brecciated quartz vein that is cemented by a second generation of quartz containing small amounts of stibnite (Wells, 1933, p. 377). The quartz is stained with iron oxides and with a yellow secondary antimony mineral, probably stibiconite. No assays have been made public.

Alteration:
Oxidation of iron and antimony minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Simple stibnite deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: No

Site Status: Inactive

Workings/exploration:
The Home Lode was discovered and staked by William Julian, a miner who prospected in the Caribou Creek area for many years. When the prospect was visited by Wells (1933) in 1931, the pits were sloughed. The prospect may not have been visited since then.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Wells, 1933

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Unnamed (ridge between West Fork of Glen Creek and Rainy Creek)

Site type: Prospect

ARDF no.: MM090

Latitude: 63.5556 **Quadrangle:** MM C-2

Longitude: 150.7850

Location description and accuracy:
This prospect is at an elevation of about 3850 feet on the crest of the ridge that separates the head of Rainy Creek from the West Fork of Glen Creek. It is in the NW1/4 SE /4 section 2, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet.

Commodities:

Main: Ag

Other: Au, Pb, Sb

Ore minerals: Galena(?), pyrite, stibnite

Gangue minerals: Calcite, quartz, tourmaline

Geologic description:
The country rock in the area of this prospect is primarily metafelsite schist of the lower Paleozoic Spruce Creek sequence; float of Tertiary basalt occurs nearby (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit consists of anastomosing, pyrite- and stibnite-bearing quartz-calcite-tourmaline veins. The veins are in a zone several feet wide that can be traced easterly in a series of pits and an adit, all sloughed or caved. A grab sample assayed 4.55 percent lead, 0.064 ounce of gold per ton, 97.2 ounces of silver per ton, and 1.8 percent antimony. Copper, zinc, and arsenic contents are each in the 0.X percent range. The lead assay indicates the presence either of galena or another lead-bearing mineral.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The deposit was explored by several pits and a short adit, since caved.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park.

References:
Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Kantishna Hills lode deposits

Site type: Mines

ARDF no.: MM091

Latitude: 63.5542 **Quadrangle:** MM C-2

Longitude: 150.8915

Location description and accuracy:

This record is a summary description of numerous lode deposits in the Kantishna Hills, especially those in a belt that trends east-northeast from Alpha Ridge, across Quigley Ridge and the south flank of Wickersham Dome, to Kankone Peak. The belt includes the two largest precious-metal lode mines of the Kantishna Hills--the Little Annie No. 2 (MM115) and the Banjo (MM097). The area also includes several of the richest placer deposits in the Kantishna Hills, summarized in record MM084.

For this record, the site is at the approximate center of the belt of lode deposits. It is at an elevation of about 3200 feet on the ridge about a mile east of Wickersham Dome and about 0.1 mile north of the Banjo mine (called the Red Top mine on the 1954/1978 edition of the USGS Mt. McKinley C-2 topographic map).

The major mines are briefly described in several publications, chiefly those of Cobb (1972 [MF 366], 1980 [OFR 80-363]), MacKevett and Holloway (1977), Bundtzen (1981), and Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: As, Cu, Mn, Pb, Sb, Sn, W, Zn

Ore minerals: Argyrodite, arsenopyrite, azurite, barite, bornite, boulangerite, bournonite, cassiterite, cerrusite, chalcopyrite, covellite, freibergite, galena, gold, jamesonite, kermesite, malachite, marcasite, melanterite, pearcite, polybasite, pyrargyrite, pyrite, pyrrhotite, rhodonite, scheelite, scorodite, stephanite, stibiconite, stibnite, stromyerite, sulfur, tetrahedrite

Gangue minerals: Calcite, dolomite, pharmocosiderite, pyroxmangite, quartz, siderite, tourmaline

Geologic description:

The Kantishna Hills area of lode deposits described in this record conforms closely to the central part of an antiform, an upwarp that can be traced east-northeast from Eldorado Creek to at least Kankone Peak (Wells, 1933). This structure is informally called the Kantishna antiform. Rocks exposed in the antiform's crestal region belong mainly to the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981, p. 50). Regionally, the Spruce Creek rocks structurally overlie the Precambrian Birch Creek Schist, but along the crest of the antiform, they appear to be downfaulted into Birch Creek Schist along high-angle faults (Bundtzen, 1981). Spruce Creek rocks crop out continuously across strike from Eldorado Creek to Canyon Creek. The sequence appears to be 500 to 1000 meters thick and to consist chiefly of gray slate and phyllite, chloritic phyllite and semischist, light-colored metafelsite, quartz-feldspar phyllite, and micaceous marble. Bundtzen (1981, p. 40) divided the sequence into two main units: one consists mainly of metafelsite, quartz-feldspar schist, and chlorite-rich phyllite and semischist; the other is mainly graphitic phyllite and semischist and marble. Bundtzen (1981, p. 40) referred to the Spruce Creek rocks as 'ore-zone rocks' because 'many quartz-carbonate-sulfide veins in the Kantishna mining district . . . are hosted in them.' The Spruce Creek sequence is regionally metamorphosed to greenschist grade, and appears to have undergone only one main period of deformation. Birch Creek rocks have been deformed at least twice and probably were regionally metamorphosed to amphibolite grade before being retrograded to lower greenschist grade.

Rocks corresponding to Spruce Creek lithologies were mapped by Wells (1933), Morrison (1964), and Hawley and Associates (1978), but were included by them in the Birch Creek Schist. Bundtzen (1981) was

the first to distinguish the Spruce Creek sequence in the Kantishna district. The sequence was also mapped separately by Thornsberry, McKee, and Salisbury (1984).

There are mainly two types of lode deposits in the Kantishna Hills area: gold-bearing, relatively low-sulfide, quartz-arsenopyrite-(scheelite) veins; and silver-bearing, sulfide-rich, galena-sphalerite-tetrahedrite-pyrite-chalcopyrite veins. This subdivision, first proposed by Wells (1933), was used by Bundtzen, Smith, and Tosdal (1976), and by Bundtzen (1981) to characterize the deposits. The veins occupy mostly high-angle faults. The area also contains stratabound deposits.

Quartz is the dominant gangue mineral in the gold-bearing veins. Quartz and siderite are the most abundant gangue minerals in the silver-bearing veins. A few sulfide minerals, including arsenopyrite, galena, pyrite, and sphalerite tend to be dominant in most veins, but the area-wide mineral suite is large and complex and less-common minerals locally predominate. Tetrahedrite and its silver-rich analogue freibergite are locally important, as are ruby silver and related minerals such as polybasite and pearceite. Boulangerite and jamesonite ocur widely in the complex silver-rich deposits. Scheelite is common, especially in the gold-rich veins. Cassiterite is rare. Some minerals are known only from float: rhodonite is common in float in Glenn Creek (MM108); its lode source is unknown. There is little evidence of extensive supergene enrichment in the Kantishna Hills, but sulfate-charged ground waters form melanterite and rare native sulfur in veins opened by mining. Thin, surface-oxidized zones are mainly composed of limonite and, depending on primary mineral composition, may contain azurite, malachite, cerrusite, and stibiconite.

The fault-controlled, precious-metal-bearing veins in the district formed after regional metamorphism, probably nearly synchronous with upwarping of the Kantishna antiform. The deposits herein are assumed to be Eocene, inferred from an isotopically-dated mineralized quartz porphyry plug and mineralized bimodal dikes at the Bonnell prospect (MM030).

Alteration:

Surface oxidation of iron, copper, lead, and antimony minerals.

Age of mineralization:

Based on radiometric dating, Bundtzen and Turner (1979, p. 26, 28-30) proposed that the schistose basement rocks in the Kantishna district were metamorphosed in pre-Jurassic time and overprinted by mid-Cretaceous greenschist-grade regional metamorphism. The epigenetic deposits, chiefly mineralized quartz veins and their alteration envelopes, postdate the Cretaceous regional metamorphism and may be roughly synchronous with lower Tertiary plutonism. Four dates, three from dikes and one from a quartz porphyry plug at the Bonnell prospect (MM030) have Eocene (about 50 to 48 Ma) minimum emplacement ages. The quartz porphyry and the dikes are mineralized, indicating that the deposits are no older than Eocene. The deposits herein are assumed to be Eocene, and this age is extrapolated to apply to all epigenetic lode deposits in the Kantishna district. The Eocene age is roughly contemporaneous with eruption of the Teklanika Volcanics in the Mt. McKinley (Denali) Park area (Gilbert, Ferrell, and Turner, 1976).

Deposit model:

Polymetallic silver-rich veins and low-sulfide gold-quartz veins (Cox and Singer, 1986; models 22c, 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c, 36a

Production Status: Yes; medium

Site Status: Inactive

Workings/exploration:

Exploration in the Kantishna district began shortly after the discovery of placer deposits in about 1905 (Prindle, 1906, 1907, 1911). Several rich deposits found before 1916 were actively prospected but had negligible recorded production (Capps, 1919). A short period of mining occurred in the early 1920s after discovery of rich mineral deposits at the Little Annie (MM115), Red Top (MM118) and Alpha (MM021) mines (Davis, 1923, Moffit, 1933, Wells, 1933). A spurt of mining accompanied development of the Banjo mine (MM097) just before WW II. A final stage occurred in the 1970s and early 1980s after the price of

gold was freed and before litigation that terminated most mining in the Kantishna Hills area.

Production notes:

Including 120 tons of low-grade ore mined in 1923, the production of bonanza-grade silver-rich ores from 1920 to 1923 totaled 1,655 tons that contained 257,965 ounces of silver, 449 ounces of gold, and 504,760 pounds of lead (Bundtzen, 1981, table 12). The production from the Banjo mine from 1938 to 1942 totaled 13,603 tons of ore that contained 7113.8 ounces of silver and 6259.9 ounces of gold. This ore also contained considerable lead. Small quantities of high-grade gold and silver ore were produced at the Wieler (Parky) deposit (MM098) after World War II.

Reserves:

Additional comments:

The Kantishna lode area is in Denali National Park and Preserve. Although many of the deposits have been known for decades, their remoteness has precluded extensive exploration. Geologic work by Bundtzen, Smith, and Tosdal (1976), Hawley and Associates (1978), and Thornsberry, McKee, and Salisbury (1984) identified geologic types of deposits not known to early prospectors, including volcanogenic and sedimentary-exhalative deposits, that are largely unexplored.

References:

Prindle, 1906; Prindle, 1907; Prindle, 1911; Capps, 1919; Davis, 1923; Wells, 1933; Moffit, 1933; Morrison, 1964; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Gilbert, Ferrell, and Turner, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Bundtzen and Turner, 1979; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 021/09/01

Site name(s): Chlorine; Saddle; Grizzly No 1

Site type: Prospect

ARDF no.: MM092

Latitude: 63.5533 **Quadrangle:** MM C-2

Longitude: 150.8597

Location description and accuracy:

The Chlorine prospect is on a patented claim at an elevation of about 3600 feet on the south end of hill 3835, about two miles east of Wickersham Dome. It is in the NE1/4 SW1/4 section 4, T. 16 S., R. 17 W., Fairbanks Meridian. The location is at the approximate center of the east endline of the Chlorine claim (Hawley and Associates, 1978). The location is accurate within 500 feet.

There is no public description of the deposit on the Chlorine claim. This record describes a deposit on the Saddle claim, which apparently adjoins the Chlorine claim on the south (Thornsberry, McKee, and Salisbury, 1984, no. 57; Bundtzen, Smith, and Tosdal, 1976, no. 39; Bundtzen, 1981, no. 47).

Commodities:

Main: Au

Other: Ag, As

Ore minerals: Arsenopyrite, pyrite

Gangue minerals: Quartz

Geologic description:

The country rocks in the area of this site are mainly metafelsite and marble of the lower Paleozoic Spruce Creek sequence. The rocks strike east-northeast and are cut by a Tertiary basaltic dike (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

No mineral deposit data have been published on the Chlorine claim. In this record, information about the Saddle prospect is assumed to apply generally to the Chlorine and Grizzly prospects.

The deposit at the Saddle prospect is a sparsely mineralized quartzose shear zone about 8 feet wide exposed for about 100 feet. Pyrite- and arsenopyrite-bearing samples of the zone assayed up to 0.01 ounce of gold per ton, 0.09 ounce of silver per ton, and 5720 ppm arsenic (Thorsberry, McKee, and Salisbury, 1984, occurrence 57).

Alteration:

Silicification of metafelsite.

Age of mineralization:

Uncertain, probably Eocene (see record MM091).

Deposit model:

Low-sulfide Au-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: None

Site Status: Inactive

Workings/exploration:

The Chlorine deposit probably was prospected by discovery pits. Prospecting on the Saddle claim was limited to trenches, some of which did not penetrate the overburden.

Production notes:

Reserves:

Additional comments:

The site is in Denali National Park and Preserve.

References:

Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Unnamed (ridge between Yellow Creek and Rainy Creek)

Site type: Prospect

ARDF no.: MM093

Latitude: 63.5528 **Quadrangle:** MM C-2

Longitude: 150.8104

Location description and accuracy:
This prospect is at an elevation of about 3350 feet in a minor saddle on the ridge between Yellow and Rainy Creeks. It is in the north part of the SE1/4 SE1/4 section 3, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet. The prospect corresponds to number 210 of Hawley and Associates (1978), 43 of Bundtzen, Smith, Tosdal (1976), 49 of Bundtzen (1981), and 62 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other: Mo, Sb

Ore minerals: Arsenopyrite, pyrite

Gangue minerals: Calcite, quartz

Geologic description:
The country rocks in the area of this prospect are complexly faulted, lower Paleozoic Spruce Creek phyllite and semischist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).
The deposit is a sparsely mineralized, fault-controlled, quartz-calcite vein that strikes N 20-40 W and is nearly vertical. The vein is 5 to 6 feet thick and contains pyrite and arsenopyrite. Assays show up to 100 ppm molybdenum and a trace of gold.

Alteration:

Age of mineralization:

Deposit model:
Low-sulfide quartz-calcite vein.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein was prospected by a single pit.

Production notes:

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve.

References:

Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Waterloo

Site type: Prospect

ARDF no.: MM094

Latitude: 63.5526 **Quadrangle:** MM C-2

Longitude: 150.8726

Location description and accuracy:
The Waterloo prospect, on a patented claim, is at an elevation of about 3450 feet on the ridge at the head of the unnamed east fork of Twentytwo Gulch. It is at the approximate center of the north sideline of the claim, which abuts the east endline of the Chloride claim (MM099). The location is near the boundary between the SE1/4 and NE1/4 of the SE1/4 section 5, T. 16 S., R. 17 W., Fairbanks Meridian. It is accurate within 500 feet. The site corresponds to number 37 of Bundtzen, Smith, and Tosdal (1976), 44 of Bundtzen (1981), 34 of Hawley and Associates (1978), and 56 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag

Other: Pb, Zn

Ore minerals: Anglesite, arsenopyrite, galena, pyrite, sphalerite

Gangue minerals: 'Carbonates,' quartz

Geologic description:
The Waterloo claim area is underlain by chloritic phyllite, metafelsite, and graphitic schist of the lower Paleozoic Spruce Peak sequence (Bundtzen, 1981). The area is cut by steep, NE-striking faults (Thornsberry, McKee, and Salisbury, 1984, v. 2).

The deposit consists of mineralized quartz-carbonate veins. Bundtzen (1981) collected a sample containing massive galena, partly oxidized to anglesite, and small amounts of sphalerite. The sample assayed 52 percent lead and 79.1 ounces of silver per ton. In 1983, the U.S. Bureau of Mines examined several shallow pits that exposed rock containing disseminated pyrite, arsenopyrite, and sparse base-metal sulfides (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 56). Hawley and Associates (1978; fig. 4.1-1 (A), nos. 125-128) collected rock samples on and immediately north of the claim. These samples assayed up to 0.35 percent lead, 0. 27 percent zinc, 18 ppm silver, and 1.2 ppm gold, values similar to those obtained in samples collected by the Bureau in 1983 . Hawley and Associates interpret these values to indicate widespread, low-grade mineralization in the area of the claim.

Alteration:
Local oxidation of lead mineral.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The prospect was explored by shallow trenches and pits probably dating to the 1940s or earlier.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Marilee

Site type: Prospect

ARDF no.: MM095

Latitude: 63.5526 **Quadrangle:** MM C-2

Longitude: 150.7808

Location description and accuracy:

The Marilee group of 8 claims is on the ridge between Rainy Creek and the West Fork of Glen Creek. The group, at an average elevation of about 3650 feet, is mainly in the SE1/4 SE1/4 of section 2, T. 16 S., R. 17 W., Fairbanks Meridian. The location is described in Alaska State Kardex file 66-56 (Hawley and Associates, 1978; Heiner and Porter, 1972). It is probably accurate within 500 feet. The site correponds to occurrence 67 of Thornsberry, McKee, and Salisbury (1984), and possibly to unpatented claims reported in this vicinity by Wells (1933).

Commodities:

Main: Au, Pb

Other: Ag, As, Sb

Ore minerals: Galena, pyrite, stibnite(?)

Gangue minerals: Quartz

Geologic description:

The Marilee prospect is along and near a northeast-striking fault contact between the Birch Creek Schist and metafelsite of the Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2, also v. 2, occurrence 67). Wells (1933, p. 373) described mineralized zones subparallel to thin-bedded schist on the ridge between Rainy Creek and the West Fork of Glen Creek.

The deposit consists of at least three quartz veins and two mineralized shear zones. The southeasternmost shear zone is the contact between the Spruce Creek and Birch Creek rocks. The quartz veins contain mainly pyrite, along with less-abundant galena and possibly stibnite. Assays show anomalous amounts of silver, antimony, and arsenic (Wells, 1933; Thornsberry, McKee, and Salisbury, 1984, occurrence 67).

Alteration:

Silicification of metafelsite.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Low-sulfide gold(?)-quartz vein (Cox and Singer, 1986; model 36a?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a?

Production Status: No

Site Status: Inactive

Workings/exploration:

The area was prospected by several pits and trenches, since caved, on the ridge between Rainy Creek and the West Fork of Glen Creek (Wells, 1933, p. 373). Claims were located as the Marilee group by Sinclair Oil & Gas in 1961, but were inactive in the 1970s (Heiner and Porter, 1972; Hawley and Associates, 1978), and in the 1980s, when they were investigated by the U.S. Bureau of Mines (Thornsberry, McKee, and Salisbury, 1984).

Production notes:

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve.

References:

Wells, 1933; Heiner and Porter, 1972; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Wells, 1933; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 01/15/01

Site name(s): Unnamed (lower Moose Creek canyon)

Site type: Occurrence

ARDF no.: MM096

Latitude: 63.5524 **Quadrangle:** MM C-2

Longitude: 151.0056

Location description and accuracy:
This occurrence is exposed on the east canyon wall of the Lower Canyon of Moose Creek at an elevation of about 1800-2000 feet. It is in the SE1/4 SE1/4 of section 3, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate. The occurrence corresponds to rock sample locations 64 and 65 of Hawley and Associates (1978).

Commodities:

Main: Cu, Zn

Other: Pb

Ore minerals: Chalcopyrite, limonite, malachite, pyrite, sphalerite

Gangue minerals:

Geologic description:
This occurrence consists of sulfide minerals and their oxidation products, sparsely disseminated in metafelsite schist of the upper Precambrian Birch Creek Schist. The schist strikes NE and dips NW, and crops out along strike for about 2000 feet in the walls of the Lower Canyon of Moose Creek. There appears to be a fault at the base of the mineralized zone.

The schist contains disseminations of pyrite and lesser amounts of chalcopyrite and sphalerite. It is limonite stained and locally malachite stained. Representative samples contain 300-500 ppm copper, 465-965 ppm zinc, 50-135 ppm lead, and, in one sample, a trace of silver (Hawley and Associates, 1978, figure 4.1-A(1) and table 4,1-A(1)). The occurrence is similar to the one at MM022 on the southwest end of Alpha Ridge (Hawley and Associates, 1978, fig. 4.1-A(1)).

Alteration:
Oxidation of iron and copper minerals.

Age of mineralization:
Possibly late Precambrian, the protolith age of the Birch Creek Schist.

Deposit model:
Possibly syngenetic and volcanogenic; the occurrence is hosted by metamorphosed felsic volcanic rock.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

References:

Hawley and Associates, 1978.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Banjo (Hardrock and Tugboat Annie claims)

Site type: Mine

ARDF no.: MM097

Latitude: 63.5523 **Quadrangle:** MM C-2

Longitude: 150.8904

Location description and accuracy:

The Banjo mine (Cobb, 1980 [OFR 80-363]), on the unpatented Hardrock and Tugboat Annie claims, is on the ridge at the head of Lucky Gulch, a minor south-flowing tributary of Eureka Creek. The Banjo vein cropped out at an elevation of about 3200 feet. The main mine workings are about 0.28 mile south-southwest of the center of section 5, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within about 300 feet.

The Banjo mine site is included in number 13 of Cobb (1972 [MF 366]), numbers 31 and 32 of Bundtzen, Smith and Tosdal (1976), location J of Hawley and Associates (1978), and occurrence 50 of Thornsberry, McKee, and Salisbury (1984). The mine is called the Red Top mine on the 1954 (revised 1978) edition of the Mt. McKinley C-2 quadrangle topographic map; it should be called the Banjo mine of the Red Top Mining Co.

Commodities:

Main: Ag, Au

Other: Cu, Pb, W, Zn

Ore minerals: Arsenopyrite, chalcopyrite, galena, gold, malachite, pyrite, scheelite, scorodite, sphalerite

Gangue minerals: 'Carbonate,' quartz

Geologic description:

The country rocks at the Banjo mine are graphitic schist, quartz-mica schist, and metafelsite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 50).

The Banjo deposit is a 3- to 10-foot-thick quartz-carbonate-sulfide vein that on average strikes N 60 E and dips about 65 SE. It was developed for about 300 feet on the Banjo mine level, approximately at an elevation of 3140 feet, and was stoped from that level to the surface.

On the Banjo level, the vein is cut off to the east by a low-angle fault that strikes NNW and dips SW. The fault projects toward the Jupiter-Mars (MM102) adit,and could be the same fault that cuts off that vein. A mill level driven at an elevation of about 3010 feet appears to intersect the Banjo vein (called the Pas vein on that level), but it contains less gold and more base metals. The mill level apparently also intersects the NNW-striking fault that cuts off the productive vein on the Banjo level (Hawley and Associates, 1978; fig. 4.1-A(1)-4; Bundtzen, 1981, plate 3). The intermediate Quigley level apparently was not driven far enough to intersect either the Banjo vein or the fault (Wells, 1933, p. 370-371).

The productive part of the Banjo vein consists of quartz and carbonate that contains free gold, galena, arsenopyrite, pyrite, sphalerite, and tetrahedrite. The gold is in the quartz and in (or with) the sulfide minerals. Locally, the vein also contains scheelite, malachite, limonite, and scorodite.

The gold-silver ratio in the vein appears to be about 1:1. The average grade of about 13,650 tons of ore was 0.52 ounce of silver per ton and 0.46 ounce of gold per ton. The concentrates contained 13.8 to 19.7 percent lead and about 0.9 to 1.6 percent zinc, and about 20 tons of lead-zinc concentrates were produced from the ore that was mined. The ore also averaged about 0.5 percent scheelite (Bundtzen, 1981).

Alteration:

Local oxidation of iron, copper, and arsenic minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide Au-quartz-(carbonate) vein, possibly grading with depth into a polymetallic vein (Cox and Singer, 1986; models 36a and 22c?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a, 22c?

Production Status: Yes

Site Status: Inactive

Workings/exploration:
The deposit was discovered by tracing rich, gold-bearing quartz float on the east flank of Lucky Gulch. It was probably first developed by the so-called Upper Eureka tunnel (Capps, 1919, p. 101-102). Joe Quigley subsequently drove an adit below the area of float, but encountered only graphitic schist (Wells, 1933, p. 370-371). This level (Quigley) appears to lie between the Banjo level and lower mill level.

The principal Banjo ore body was discovered sometime before1938, and mined from 1939 through 1941. During that time it yielded more than 13,650 tons of ore that contained about 6,260 ounces of gold and 7,114 ounces of silver. A small amount of ore was probably mined in 1942.

Production notes:
The mine was the largest lode gold producer in the Kantishna district; it produced about 6,260 ounces of gold from 1939 through 1941.

Reserves:
There is a small resource, established by drilling and underground workings during the mine operation. This resource is in caved underground workings and aggregates1595 tons of ore averaging 0.49 ounce of gold per ton (Bundtzen, 1981, pl. 3). Additional ore could occur between the Banjo and Mill levels west of the fault that cuts off the ore.

Additional comments:
The Banjo mine was the largest gold lode producer in the Kantishna Hills lode area (MM091). The claims at the mine, which is in Denali National Park and Preserve, were never patented.

References:
Capps, 1919; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 04/22/01

Site name(s): Wieler (Parky; Greiss; Silver King 18)

Site type: Mine

ARDF no.: MM098

Latitude: 63.5522 **Quadrangle:** MM C-2

Longitude: 150.8560

Location description and accuracy:

The Wieler mine is near the head of an unnamed, south-flowing tributary to Eureka Creek. It is at an elevation of about 3210 feet, about 0.3 mile south of the center of section 4, T. 16 S., R. 17 W., Fairbanks Meridian. Mineralization extends at least from 3160 to 3260 feet elevation in the mine area. The location is accurate within 300 feet.

The Wieler mine site (Cobb, 1980 [OFR 80-363]) apparently coincides with the Parky prospect of Seraphim (1962), staked in about 1960. The mine is probably the same as the Greiss prospect on the early Malachite and Azurite claims (Capps, 1919, p. 101). The Wieler mine corresponds to number 40 of Bundtzen, Smith and Tosdal (1976), 45a of Bundtzen (1981), and 58 of Thornsberry, McKee, and Salisbury (1984). This site is probably also the approximate location of a vein reported by Morrison (1964, locations E13 and E14).

Commodities:

Main: Ag, Au

Other: Cu, Pb, Zn

Ore minerals: Arsenopyrite, azurite, chalcopyrite, galena, limonite, malachite, polybasite, pyrite, sphalerite, tetrahedrite

Gangue minerals: Calcite, quartz

Geologic description:

The Wieler mine is in a 6000-foot-long fault block along the Kantishna antiform (see MM091). The country rocks are mainly interlayered marble and locally graphitic chlorite phyllite of the Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2; v. 2, occurrence 85).

The principal deposit at the Wieler mine is an up to 4-foot-thick limonitic quartz vein that strikes N 40 E and dips about 37 NW, approximately parallel to the lithologic layering and schistosity of the Spruce Creek country rocks. Lenticular, sulfide-rich masses in the vein contain abundant galena, sphalerite, polybasite, and tetrahedrite. Where initially exposed, the vein was heavily coated with azurite and malachite. The sulfide-rich part of the vein was only about 35 feet long, but it was exceptionally rich. Channel samples cut at 10-foot intervals along the vein, which ranged from 1.9 to 3 feet thick, assayed as much as 182.3 ounces of silver per ton (Seraphim, 1962, p. 11). One grab sample assayed 902.1 ounces of silver per ton, 0.73 ounce of gold per ton, and 4.1 percent copper. Morrison (1964, p. 100) also reported bonanza-grade ore from this or a nearby locality. The high-grade ore shoot was essentially mined out in 1983. A total of 156 tons of mined ore averaged 2.8 ounces of gold per ton and 65.3 ounces of silver per ton.

Nearby quartz veins also contain chalcopyrite and sphalerite, but are not as rich. Quartz float along the projected northeast strike of the vein can be followed for more than 120 feet. Early prospecting in the area disclosed mineralized graphitic schist that contains euhedral crystals of pyrite. The schist is cut by sheared and crushed quartz, which in turn is cut by calcite veinlets (Capps, 1919).

Alteration:

Oxidation of iron and copper minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
The area north of the head of Eureka Creek was first prospected before 1918 (Capps, 1919). The principal vein was discovered (or rediscovered) in 1960 or 1961 by Mark Rogers of Moneta-Porcupine, and located as the Parky claim (Seraphim, 1962).

Production notes:
About 437 ounces of gold and 10,187 ounces of silver were recovered from 156 tons of ore mined in 1983.

Reserves:

Additional comments:
The mine is in Denali National Park and Preserve.

References:
Capps, 1919; Seraphim, 1962; Morrison, 1964; Bundtzen, Smith, and Tosdal, 1976; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Chloride

Site type: Prospect

ARDF no.: MM099

Latitude: 63.5520 **Quadrangle:** MM C-2

Longitude: 150.8838

Location description and accuracy:

The Chloride prospect is at an elevation of about 3200 to 3500 feet, on the south flank of the ridge east of the head of Lucky Gulch. The Chloride claim abuts the Jupiter-Mars claim (MM102), and is in the center of the SW1/4 SE1/4, section 5, T. 16 S., R. 17 W., Fairbanks Meridian. The site is at the approximate discovery cut and is accurate within about 300 feet.

The Chloride (called the Chlorine) prospect corresponds to location 37 of Bundtzen (1981), and occurrence 55 of Thornsberry, McKee, and Salisbury (1984). Thornsberry, McKee, and Salisbury (1984, loc. 51) show the Chloride prospect on their map of the Jupiter-Mars prospect.

Commodities:

Main: Ag, Au

Other: As, Cu, Pb, Zn

Ore minerals: Arsenopyrite, galena, jamesonite(?), limonite, pyrite, scorodite, sphalerite, stibiconite(?)

Gangue minerals: Calcite, clay, quartz

Geologic description:

The country rock at the Chloride prospect is mainly metafelsite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). Chloritic phyllite crops out at the eastern end of the Chloride claim, and a Tertiary diabase dike crops out north of its eastern end (Thornsberry, McKee, and Salisbury, 1984, v. 2, map of occurrence 51).

The Chloride deposit is a mineralized shear zone containing sulfide-bearing, quartz-calcite-clay veins and stringers. Float, rubble crop, and soil analyses indicate that the zone is as much as 800 feet wide and generally is at least 100 feet wide. The zone strikes N70-75E on the western part of the Chloride claim, and about N80-85E near its east end. The zone, as confirmed in drill holes, is nearly vertical. The ore minerals are mainly arsenopyrite and pyrite. Galena is locally abundant, and sphalerite, apparently dissolved from most of the surface ore, occurs in drill core. Assays show 1 to 5 percent arsenic, up to 20 percent lead, and 3.55 percent zinc. Limonite and scorodite(?) are locally abundant near-surface oxidation products. A zinc halo, marked by zinc assays greater than 0.1 percent, surrounds the deposit. Quartz at the surface commonly is limonite stained, vuggy, and brecciated. Including mineralization on the Jupiter-Mars claim, Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 55) estimated a resource of 103,760 tons or ore grading 0.062 ounce of gold per ton and 5.97 ounces of silver per ton.

In 1983, the U.S. Bureau of Mines drilled two core holes (K-12 and K-14) on the Chloride claim (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrences 51 and 55, and drill logs). Hole K-12 was drilled northerly across the lode from near the midpoint of the south claim sideline. Between 215 feet and 268 feet, the hole intersected mineralized quartz breccia and sheared, silicified metafelsite. The richest part of this intercept is between 224.7 and 226.5 feet, which assayed 0.063 ounce of gold per ton, 7.31 ounces of silver per ton, and 4.15 percent lead. The average assay of about 52 feet of core commencing at 215 feet was 0.017 ounce of gold per ton, 0.656 ounce of silver per ton, 0.11 percent copper, 0.86 percent lead, 0.76 percent zinc, and 1.2 percent arsenic. Core recovery was relatively poor, and the values are probably minimal. Drill hole K-14, collared about 300 feet east-northeast of hole K-12, encountered a similar section. An intercept of 54 feet commencing at 309.2 feet averaged 0.014 ounce of gold per ton, 2.15 percent zinc,

and 1.2 percent arsenic (Thornsberry, McKee, and Salisbury, 1984, v. 2). Silver either was not determined or not reported in hole K-14.

Zinc is nearly ubiquitous. Most check assays of core in hole K-14 from 75 feet to 309.2 feet exceed 0.1 percent zinc, as do check assays of core in hole K-12 from 110 feet to 215 feet. In these intervals, the metafelsite hostrock is argillized and cut by thin veinlets of quartz, calcite, and clay.

Alteration:

Extensive silicification and argillization of the metafelsite hostrock. Oxidation of iron and arsenic minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Low-sulfide Au-quartz vein, possibly grading into a polymetallic vein (Cox and Singer, 1986; models 39a and 22c?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

39a, 22c?

Production Status: None

Site Status: Inactive

Workings/exploration:

William Taylor probably prospected the Chloride deposit in the 1920s, at the same time that he explored the Jupiter-Mars (then the Damon and Pythias) deposit (Wells, 1933). In 1976, Hawley and Associates (1978, fig. 4.1-A(1)-4) conducted a soil survey on the Chloride and Jupiter-Mars claims. In 1983, the U.S. Bureau of Mines drilled two holes on the Chloride claim (Thornsberry, McKee, and Salisbury, 1984, v. 2).

Production notes:

Reserves:

Thornsberry, McKee, and Salisbury (1984, v. 2) computed a partly drill- based resource of 103,760 tons of ore grading 0.062 ounce of gold per ton, 5.97 ounces of silver per ton, and significant lead and zinc. A larger resource can be inferred from the extent of mineralization on the claim. Based on a width of 50 feet, strike length of 1000 feet, depth of 500 feet, and estimated average of surface and subsurface sample assays, there is a resource of about 2,000,000 tons of rock grading about 0.025 ounce of gold per ton and 1 ounce of silver per ton.

The low-grade, gold-silver deposit at the Chloride prospect probably is the best-defined bulk-mineable target in the Kantishna Hills lode area (MM091). The deposit would have been too low-grade and remote to mine when the nearby Banjo deposit was being mined in 1939-41, but it is within the grade and tonnage range of a modern, small, open-pit mine. Drilling, metallurgical study, and other research would be required to define an economic deposit.

Additional comments:

The Chloride prospect is in Denali National Park and Preserve.

References:

Wells, 1933; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Unnamed (southwest flank of Wickersham Dome)

Site type: Prospect

ARDF no.: MM100

Latitude: 63.5518 **Quadrangle:** MM C-2

Longitude: 150.9318

Location description and accuracy:

This prospect is at an elevation of about 3400 feet on the southwest flank of Wickersham Dome, a short distance northeast of the north end of Quigley Ridge. It is in the SW1/4 SW1/4 section 6, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet. The prospect corresponds to number 38 of Bundtzen (1981) and number 82 of Hawley and Associates (1978). It is number 42 of Thornsberry, McKee, and Salisbury (1984), although numbers 43 and 42 appear to be interchanged on their map (fig. K-8).

Commodities:

Main: Ag

Other: As, Mo, Pb

Ore minerals: Arsenopyrite, limonite, pyrite

Gangue minerals: Quartz, siderite

Geologic description:

The country rock at this prospect is mainly feldspathic quartz schist of the Birch Creek Schist. The schist is cut by lower Tertiary basaltic dikes (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984). The deposit consists of a sulfide-bearing quartz-siderite vein that cuts the basalt, and of disseminated pyrite and arsenopyrite in argillic(?)-altered basalt.

The vein is sparsely mineralized. The highest silver content in four samples was 0.22 ounce per ton; lead content was as much as 0.17 percent, arsenic averaged about 300 ppm, and one sample contained 35 ppm molybdenum (Bundtzen, 1981, p. 219).

The vein is Tertiary; it cuts mafic dikes which have been dated as Eocene (Bundtzen and Turner, 1979).

Alteration:

Sulfidization and argillic(?) alteration of basalt. Iron-oxide alteration.

Age of mineralization:

The vein is Tertiary; it cuts mafic dikes which have been dated as Eocene (Bundtzen and Turner, 1979).

Deposit model:

Low-sulfide quartz-carbonate vein.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

The prospect was explored by several pits of unknown date.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve and is inactive.

References:
Hawley and Associates, 1978; Bundtzen and Turner, 1979; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Friday Rim

Site type: Prospect

ARDF no.: MM101

Latitude: 63.5516 **Quadrangle:** MM C-2

Longitude: 150.9769

Location description and accuracy:
The Friday Rim prospect is at an elevation of about 3050 feet on the south flank of the ridge north of Friday Creek . It is in the SE1/4 SE1/4 section 2, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within 500 feet. The prospect corresponds to number 19 of Bundtzen, Smith, and Tosdal (1976) and 30 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag(?)

Other: Pb, Zn

Ore minerals: Pyrite

Gangue minerals: Quartz, siderite

Geologic description:
The Friday Rim prospect area is underlain by quartz-rich Birch Creek schist that dips to the northwest (Hawley and Associates, 1978, fig. 4.1-1(A); Thornsberry, McKee, and Salisbury, 1984, fig. K-2, v. 2). The Birch Creek schist is probably late Precambrian (Bundtzen, 1981). At the prospect, a pit exposes a quartz-siderite vein that contains a little pyrite. Samples of the vein assayed up to 0.05 ounce of gold per ton and small amounts of lead and zinc (Bundtzen, 1981). Near the pit, Hawley and Associates (1978, fig. 4.1-1(A)) sampled reddish soil (no. 82) that contained slightly anomalous amounts of silver, lead, and zinc. Soil (no. 81) collected a few hundred feet away contained 2.8 ppm silver, 505 ppm lead, and 315 ppm zinc.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide quartz-siderite vein.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein was explored by a 4- x 4- x 4-foot pit of unknown date.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Bundtzen, Smith, and Tosdal, 1976; this record

Reporter(s): C.C. Hawley

Last report date: 02/09/01

Site name(s): Jupiter-Mars (Damon and Pythias)

Site type: Prospect

ARDF no.: MM102

Latitude: 63.5510 **Quadrangle:** MM C-2

Longitude: 150.8886

Location description and accuracy:

The Jupiter-Mars (formerly called the Damon and Pythias) prospect is in Lucky Gulch, a south-flowing tributary to Eureka Gulch. It is at an elevation of about 3050 feet, about 0.1 mile east of Lucky Gulch. The site marks the main Jupiter-Mars adit, about 0.46 mile south of the center of section 6, T. 15 S., R. 17 W., Fairbanks Meridian. The location is accurate within about 250 feet. The site corresponds to location 36 of Bundtzen (1981), approximately to the location of patented claim 32 of Hawley and Associates (1978), and occurrence 51 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other: Ag, As, Pb, Sb, Zn

Ore minerals: Arsenopyrite, boulangerite, galena, jamesonite(?), limonite, pyrite, scheelite, scorodite, sphalerite, stibiconite

Gangue minerals: Calcite, clay, quartz

Geologic description:

The country rocks in the area of the Jupiter-Mars prospect are mainly metafelsite and chloritic phyllite of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 51). The deposit is a weakly-mineralized shear zone nearly 200 feet across in metafelsite. The shear zone is nearly vertical, strikes N 60 E, and contains a body at least 10 feet thick of sheared and altered schist, mineralized and locally brecciated quartz-calcite veins, and fault gouge. The north wall of the zone is a gouge-filled fault, adjoined by a well-defined quartz-sulfide vein about 2 feet thick.

Arsenopyrite, partly oxidized to scorodite, is probably the most abundant metallic mineral in the deposit, and pyrite and galena are locally abundant. Boulangerite, scheelite, and sphalerite have been reported, and jamesonite was tentatively identified (Thornsberry, McKee, and Salisbury, 1984, v. 2; Bundtzen, 1981).

Based on several representative samples, the deposit contains a resource of 2339 tons of ore grading 0.11 ounce of gold per ton and 2.8 ounces of silver per ton (Thornsberry, McKee, and Salisbury, 1984). Representative samples contained as much as 2.9 percent lead and 11.7 percent arsenic. Selected samples assayed as much as 0.20 ounce of gold per ton and 14.6 ounces of silver per ton; these samples contained negligible amounts of base metals (Bundtzen, 1981).

In 1983, the U.S. Bureau of Mines drilled one diamond core hole. The hole is about 150 feet west of the portal of the adit and was drilled north-northwest, across the strike of the deposit. The hole encountered mineralization somewhat richer in base metals than most surface samples. A 12.4-foot intercept between 162 and 174.4 feet assayed an average of 0.052 ounce of gold per ton, 6.95 ounces of silver per ton, 8.42 percent lead, 1.2 percent zinc, and 1.85 percent arsenic. Only selected intervals of the drill core were analyzed, but all assays showed more than 0.1 percent zinc. The mineralization extends from about 28 feet to the bottom of the hole at 237 feet. Throughout this interval, the metafelsite is sheared and contains quartz-carbonate veinlets. The extent of shearing and anomalous zinc values are comparable to those at the Chloride lode (MM099), which appears to be the eastern continuation of the Jupiter-Mars deposit.

Alteration:

Extensive silicification and alteration of host metafelsite. Oxidation of iron, arsenic, and antimony minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide Au-quartz (carbonate) vein, possibly grading into a polymetallic vein (Cox and Singer, 1986; models 39a and 22c?).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a, 22c?

Production Status: None

Site Status: Inactive

Workings/exploration:
The deposit was discovered by William Taylor, probably in the 1920s, when it was called the Damon and Pythias. A drift tunnel was driven on the vein before 1931 (Wells, 1933, p. 371). Apparently little work was done between 1931 and 1976. In 1976, Hawley and Associates (1978, fig. 4.1-A(1)-4) mapped the Jupiter-Mars workings, and conducted soil surveys on the Jupiter-Mars, Chloride (MM099), and Banjo properties (MM097). Bundtzen (1981) conducted additional mapping, and, in 1983, the U.S. Bureau of Mines drilled three diamond core holes on the Jupiter-Mars and Chloride claims (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrences 51 and 55).

Production notes:

Reserves:

Additional comments:
The Jupiter-Mars and adjacent Chloride claims are crossed by an east-northeast-trending shear zone that contains low-grade, gold- and silver-bearing mineralization. The claims are in Denali National Park and Preserve and are inactive.

References:
Wells, 1933; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 01/12/01

Site name(s): Unnamed (southwest flank of Wickersham Dome)

Site type: Prospect

ARDF no.: MM103

Latitude: 63.5495 **Quadrangle:** MM C-2

Longitude: 150.9336

Location description and accuracy:
This prospect is at an elevation of about 3100 feet on the southwest flank of Wickersham Dome, a short distance northeast of the north end of Quigley Ridge. It is near the west end of the south boundary of section 6, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet. The prospect corresponds to number 25 of Bundtzen, Smith, and Tosdal (1976) and to number 81 of Hawley and Associates (1978). It also corresponds to number 43 of Thornsberry, McKee, and Salisbury (1984), although numbers 43 and 42 are interchanged on their map (fig. K-8).

Commodities:

Main: Au

Other: Ag, As

Ore minerals: Arsenopyrite, limonite, pyrite

Gangue minerals: Quartz, siderite

Geologic description:
The country rock at the prospect is mainly feldspathic quartz schist of the Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984). The deposit consists of a sulfide-bearing quartz-siderite vein, and of finely disseminated pyrite and arsenopyrite in the adjacent country rocks. Four largely sloughed pits and a 20-foot-long sloughed trench along the vein are alined about N 15-20 E. A grab sample of dump material contained barely detectable gold, 1.6 ppm silver, and 670 ppm arsenic; copper, lead, and zinc were near background levels.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide quartz-siderite vein.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The prospect is explored by 4 small pits and a short trench of unknown date.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Spruce Creek

Site type: Mine

ARDF no.: MM104

Latitude: 63.5492 **Quadrangle:** MM C-2

Longitude: 150.6661

Location description and accuracy:

Spruce Creek (Cobb, 1980 [OFR 80-363]) rises on the south flank of Spruce Peak and flows south-southeast for about two miles. The creek then flows southerly for about 1.5 miles, where it joins Willow Creek (MM107) to form Moose Creek (MM132). The location is where Spruce Creek crosses the boundary between sections 4 and 9, T. 16 S., R. 16 W., Fairbanks Meridian. This location is about a third of a mile above the point where the creek leaves the Kantishna Hills and flows on the broad glacio-fluvial plain on the north side of Moose Creek.

The site is about in the center of resource block S-1 of Thornsberry, McKee, and Salisbury (1984, fig. K-3). It is location 52 of Cobb (1972 [MF 366]) and location 57 of MacKevett and Holloway (1977).

Commodities:

Main: Au

Other: Ag

Ore minerals: Gold

Gangue minerals: Quartz

Geologic description:

About the uppermost 3/4 mile of Spruce Creek cuts bedrock of the Spruce Creek sequence; below that, it cuts Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The part of the creek that trends northwest is controlled by a steep fault that cuts sharply across the Spruce Creek strata and the contact between Spruce Creek and Birch Creek rocks. The headwater region of the creek contains numerous lode deposits. Upper Spruce Creek is steep; it has a gradient of about 350 feet per mile in section 32 (T. 15 S., R. 16 W.), decreasing downstream to about 200 feet per mile. The steep upper creek contains thin deposits of angular, poorly-sorted gravel derived from country rock and quartz veins. The gold in placer deposits in upper Spruce Creek is rough, crystalline, and some has adhering vein quartz (Prindle, 1907).

The lowest mile of Spruce Creek flows over an alluvual fan lying on bouldery glacial outwash or till. Irregular stream channels cut in the fan contain relatively angular gravel that carries a little gold. A small placer operation in 1983, conducted more or less as a test, mined gravel grading 0.005 ounce (0.004 fine ounce) of gold per cubic yard (Levell, 1984, v. 2). Gravel in a test excavation upstream graded about 0.005 ounce of gold per cubic yard in a 9-foot-thick gravel section. A 2-foot-thick part of this section graded about 0.011 ounce of gold per cubic yard.

Successful mining operations farther upstream probably processed richer gravel. Bundtzen, Smith, and Tosdal (1976, p. 14) describe a 1975 operation that processed several tens of thousands of cubic yards of gravel at a site about 2 1/2 miles above the mouth of the creek.

Alteration:

Age of mineralization:

Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Mining in the upper canyon of Spruce Creek was in progress in 1906 (Prindle, 1907). A probably rich, thin and narrow placer deposit was almost completely mined out in one or two seasons. There was one operation on the creek in 1922 (Davis, 1923). The later history of creek is poorly known. There was one substantial operation in 1975 (Bundtzen, Smith, and Tosdal, 1976), and a small, test operation in 1983 (Levell, 1984, v. 2). There has been no substantial mining since about 1985.

Production notes:
Production began in 1906 and continued intermittently through 1983. Cobb (1977 [OFR 77-168B]) proposed that production was less than 1000 ounces, but later thought that, in view of the operation in 1975, the figure was too low (Cobb, 1980 [OFR 80-363]). Production was probably at least 1000 ounces.

Reserves:
Levell (1984) proposed that uppermost Spruce Creek (block S-1) contains a total of 315,000 cubic yards--in both claimed and unclaimed ground--of alluvial gravel carrying a little gold. Assuming a grade range of 0.0001 to 0.0051 ounce of gold per cubic yard, there is a remaining resource of 32 to 1566 ounces of gold. Block S-2, on the lower part of the creek, contains about 285, 000 cubic yards of material. Assuming the same range of grades, its remaining gold resource is 28 to1454 ounces.

Additional comments:
The low grade of alluvium remaining in Spruce Creek reflects relatively complete extraction of a small, high-grade deposit in 1906-07. The operation in 1975 probably recovered much of the remaining high-grade material. The creek is in Denali National Park and Preserve.

References:
Prindle, 1907; Davis, 1923; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Cobb, 1977 (OFR 77-168B); MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Prindle, 1907; Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/27/01

Site name(s): Doherty

Site type: Prospect

ARDF no.: MM105

Latitude: 63.5482 **Quadrangle:** MM C-2

Longitude: 150.9109

Location description and accuracy:
The Doherty prospect is at an elevation of about 2950 feet on the southeast flank of Wickersham Dome above Eureka Creek. It is in the NE1/4 of section 7, T. 16 S., R. 17 W., Fairbanks Meridian. The location is approximately at the discovery pit shown on the plat of the Doherty patented claim; the pit is about 300 feet from the southwest end line of the claim (Hawley and Associates, 1978).

Commodities:

Main: Au(?)

Other:

Ore minerals:

Gangue minerals:

Geologic description:
The Doherty claim is in a NNW-trending fault block near the axis of the Kantishna antiform (see MM091). In general, rocks near the axis of the antiform belong to the Spruce Creek sequence, but in the Doherty block these rocks have been displaced to the south and the country rocks at the claim belong to the Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). Little is known about the deposit. Two prospect pits aligned along the northeast-trending lode line of the claim suggest a vein that strikes NE, but there has been no detailed mapping to substantiate this. The claim is northeast of and partly overlaps the Pittsburgh claim (MM109). The Doherty claim probably was located as a gold prospect.

Alteration:

Age of mineralization:

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The claim was prospected by shallow pits; a discovery must have been present to qualify the claim for patent.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Eureka

Site type: Prospect

ARDF no.: MM106

Latitude: 63.5469 **Quadrangle:** MM C-2

Longitude: 150.8482

Location description and accuracy:
The Eureka prospect reportedly is near the head of Eureka Creek (Bundtzen, Smith and Tosdal, 1976, location 38). Bundtzen's party did not visit the locality, but it probably corresponds approximately to an area of anomalous soil samples collected in upper Eureka Creek by Hawley and Associates (1978, sample nos. 179-183). For this record, the location is in the NW1/4NE1/4 section 9, T. 16 S., R. 17 W., Fairbanks Meridian. It probably is accurate within a half-mile.

Commodities:

Main: Cu

Other: Ag, Au, Pb, Zn

Ore minerals: Azurite, chalcopyrite, galena, malachite, tetrahedrite

Gangue minerals:

Geologic description:
Upper Eureka Creek is underlain by undivided schist and quartzite of the upper Precambrian Birch Creek Schist (Bundtzen, 1981, p. 37; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). Little information about this prospect has been made public. Bundtzen, Smith, and Tosdal (1976, location 38) describe it as an unverified occurrence of chalcopyrite, galena, and tetrahedrite, which has been partly oxidized to azurite and malachite. Soil samples collected by Hawley and Associates (1978, fig. and table no. 4.1-A(1), nos. 179-183) in the reported prospect area contained up to 0.08 ppm gold, 2.6 ppm silver, 150 ppm copper, 900 ppm lead, and 455 ppm zinc.

Alteration:
Oxidation of copper mineral(s).

Age of mineralization:

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
Unknown; probably minor surface cuts.

Production notes:

Reserves:

Additional comments:
This reported occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, Smith, and Tosdal, 1976

Reporter(s): C.C. Hawley

Last report date: 05/08/01

Site name(s): Willow Creek

Site type: Mine

ARDF no.: MM107

Latitude: 63.5468 **Quadrangle:** MM C-2

Longitude: 150.6488

Location description and accuracy:
Willow Creek is one of the headwater tributaries of Moose Creek. It joins Spruce Creek near the center of section 16, T. 16 S., R. 16 W., Fairbanks Meridian, to form Moose Creek. Willow Creek is about 2 1/2 miles long; it heads into the low divide at the head of Myrtle Creek. For this record, the location of the Willow Creek placer mine is about on the unpatented Willow No. 5 Above Discovery claim, in the NE1/4 NE1/4 section 9, T. 16 S., R. 16 W., Fairbanks Meridian. Willow Creek is placer resource block W-1 of Thornsberry, McKee, and Salisbury (1984, fig. K-3).

Commodities:

Main: Au

Other: Ag, Sb

Ore minerals: Gold, stibnite(?)

Gangue minerals:

Geologic description:
The placer-mined part of Willow Creek has a gradient of about 200 feet per mile. The creek heads into a swampy divide at the head of Myrtle Creek, which rises below Spruce Peak. The physiography suggests that Myrtle Creek may have captured upper Willow Creek, and that Willow Creek may once have headed into Spruce Creek rocks. The present course of Willow Creek is in Birch Creek Schist, but if Myrtle Creek captured Willow Creek, an ancestral Willow Creek could have drained rocks of the Spruce Creek sequence (Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, figs. K-2 and K-3).

Claims were staked on Willow Creek early in the 1900s (Heiner and Porter, 1972: KX 66-64). Three placer gold claims were located in 1964 (KX 66-100), and most of the creek was staked in 1966 by Northwest Exploration (KX 66-115). The Willow Creek citation for 1966 (Heiner and Porter, 1972) notes that placer claims were located for antimony; suggesting that stibnite occurs in the alluvial gravels. One lode gold claim was located in lower Willow Creek in 1961 (Heiner and Porter, 1972: KX 66-100). There is a resource of about 500,000 cubic yards of low-grade alluvium in and adjacent to modern Willow Creek (Levell, 1984, v. 2). Levell's sampling of Willow Creek in 1983 showed insignificant gold content.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

Gold apparently was discovered in Willow Creek in the early 1900s, when the creek was placer mined on a limited scale (Heiner and Porter, 1972: KX 66-64). There was renewed claim activity in the 1960s, but the deposit apparently was not rich enough to support much mining.

Production notes:

Probably less than 100 ounces of placer gold since 1905.

Reserves:

There is a low-grade placer gold resource in about 500,000 cubic yards of alluvium in lower Willow Creek (Levell, 1984, v.2).

Additional comments:

The creek is in Denali National Park and Preserve.

References:

Heiner and Porter, 1972; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 01/20/01

Site name(s): Glen Creek; Glenn Creek

Site type: Mine

ARDF no.: MM108

Latitude: 63.5465 **Quadrangle:** MM C-2

Longitude: 150.7095

Location description and accuracy:

Glen Creek (Cobb, 1980 [OFR 80-363]) drains the south flank of the Kantishna Hills between Rainy Creek and Dry Creek to the west and Spruce Creek to the east. The West Fork of Glen Creek rises on Glacier Peak; the East Fork drains an unnamed ridge west of Spruce Peak. The location is at the approximate midpoint of the main productive part of Glen Creek, about a mile below the junction of the East and West Forks. The location is accurate. Glen Creek is location 51 of Cobb (1972 [MF 366]) and location 56 of MacKevett and Holloway (1977). As defined here, Glen Creek includes resource blocks GL-1 and GL-2 of Levell (1984 [v. 2]).

Commodities:

Main: Au

Other: Ag, Mn, Pb, Sb, Sn, W

Ore minerals: Cassiterite, galena, gold, pyrite, rhodonite, scheelite, stibnite

Gangue minerals: Garnet, ilmenite(?), magnetite

Geologic description:

Both West Fork and East Fork of Glen Creek are cut in semischist, phyllite, metafelsite, and related rocks of the lower Paleozoic Spruce Creek sequence (Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). Below the junction of East and West Forks, Glen Creek flows through a canyon cut into Birch Creek Schist. The creek then flows for about a mile over glacial till and outwash sediments, to its confluence with Moose Creek

The gradient of Glen Creek is fairly steep. In the main drainage, from the mouth of the creek to the junction of East and West Forks, it is about 200 feet to the mile. The gradient of West Fork is 400 feet to the mile; East Fork generally has a lower gradient, but is steep in the upper canyon.

Gold was discovered in Glen Creek in 1905 or 1906, and was mined as early as 1906. Initially, gravel in the main canyon was mined. This gravel was up to three feet thick and 30 to 150 feet wide. Gravel at the junction of East and West Forks is locally much thicker than that mined in the main canyon or in East Fork. Capps (1919) reported gravel more than 34 feet thick at the junction, and Levell (1984, v. 2) monitored an operation near the forks where the alluvium was 35 or more feet thick. The gold generally occurred on bedrock or in the lowermost two feet of gravel; some occurred in fractured bedrock. The gold was relatively coarse; maximum nugget size was about three ounces (Prindle, 1907, 1911). In 1916, the creek was mined from, or just above, the forks to a point about 2 miles downstream (Capps, 1919, fig. 6). On claim No. 9, the gravels were 5 to 8 feet thick; they were bouldery and contained large slabs of schist. Nugget gold was discolored; fine gold was bright; fineness ranged from about 725 to 764 (Capps, 1919, p. 84). The gold was rough and some was attached to pebbles of galena and to pebbles and small boulders of rhodonite. Concentrates contained pyrite, magnetite or ilmenite, and garnet, locally accompanied by cassiterite, scheelite, and stibnite. The cassiterite was reported in a sample submitted to the Territorial Department of Mines in 1927 by Arthur W. Lilliedale (Joesting, 1941-43; Wells, 1933, p. 372). Stibnite and scheelite, along with galena, pyrite, magnetite, and rhodonite were reported from an operation at the forks, and from one in East Fork (Levell, 1984, v. 2). All of the valuable accessory minerals, except rhodonite and cassiterite, occur in lode deposits drained by Glen Creek. Rhodonite is especially abundant in the placer gravels near MM058.

Some of it is of gem quality.

The calculated ore grade at two operations in 1983 was about 0.015 fine ounce of gold per cubic yard (Levell, 1984, v. 2). Other tests showed grades as low as 0.0027 ounce of gold per cubic yard in potentially mineable sections. Locally, the ground was much richer, and Glen Creek produced a high proportion of nugget gold that sold at a premium price.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Mining began in Glen Creek as early as 1906, and it was being mined in 1916 (Prindle, 1907; Capps, 1919). There were three operations on the creek in 1922 (Davis, 1923). Cobb (1980 [OFR 80-363]) indicates that the creek was mined or prospected in most years between 1920 and 1939. The creek was mined after World War II. Bundtzen, Smith and Tosdal (1976) reported operations in 1975, and there were two operations in 1983 (Levell, 1984, v. 2). There has been little if any mining since 1985.

Production notes:
Total production from Glen Creek is unknown. Cobb (1980 [OFR 80-363]) estimated it to be 1,000-10,000 fine ounces of gold. Levell (1984, v. 2) reported recovery in 1983 of about 216 ounces from two mining operations during monitored cleanups. Each of these operations probably produced about 1,000 ounces per year. Minimum total production from Glen Creek is probably at least 5,000 fine ounces of gold.

Reserves:
Levell (1984, v. 2) estimated about 480,000 cubic yards of stream alluvium in East and West Forks of Glen Creek and overlying the schist bedrock part of the creek below the forks (resource block GL-1). Test results ranged from 0.0043 ounce of gold per cubic yard in a small sample, to 0.015 ounce of gold per cubic yard in two monitored tests in 1983. The range in calculated gold resource is between 2,064 and 7,200 fine ounces of gold. The upper value in the range seems conservative; Levell (1984) reported that samples from nearby unmonitored cuts indicated considerably higher values.

A larger but less certain resource exists in about 1,900,000 cubic yards of bench gravel in resource block GL-1. Results of small-scale tests showed 0.0027 to 0.0093 ounce of gold per cubic yard. Using these values, the calculated gold resource is 5,130 to 17,670 fine ounces of gold.

Resource block GL-2 consists of the approximately mile-long section of Glen Creek that flows on an alluvial fan and, probably, on glacial outwash. The resource is high-potential stream alluvium; test results ranged from 0.0063 to 0.0228 ounce of gold per cubic yard. This possible gold resource ranges from 1,575 to 5,700 fine ounces of gold.

Additional comments:
Numerous lode deposits in the upper East and West Forks of Glen Creek shed gold, stibnite, galena, pyrite, and scheelite into Holocene placer deposits in the creek. Diligent prospecting would probably locate the source of the cassiterite and rhodonite. Glen Creek is in Denali National Park and Preserve.

References:

Prindle, 1907; Capps, 1919; Davis, 1923; Wells, 1933; Joesting, 1941-43 (MR 195-23); Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/27/01

Site name(s): Pittsburgh

Site type: Prospect

ARDF no.: MM109

Latitude: 63.5465 **Quadrangle:** MM C-2

Longitude: 150.9180

Location description and accuracy:
The Pittsburgh prospect (Cobb, 1980 [OFR 80-363]) is at an elevation of about 2700 feet near the head of a south-facing gulch east of Iron Gulch. It is about 0.3 mile north of the center of section 7, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within about 500 feet. The prospect is included in occurrence 41 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other:

Ore minerals: Gold, pyrite, 'sulfides'

Gangue minerals: Calcite, quartz

Geologic description:
The area of the Pittsburgh prospect is underlain by schistose metafelsite of the Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2; v.2, occurrence 41). The deposit consists mainly of a mineralized quartz-calcite vein that probably is the continuation of the Pennsylvania vein (MM116). According to Davis (1923, p. 129): 'Although there is a gap of about 1000 feet . . . it is quite likely that this vein [Pennsylvania] is the same one that is exposed on the discovery cut of the Pittsburgh claim. The vein matter is quartz containing some pyrite and calcite, and free gold can be panned from samples taken along the outcrop.' When visited by Davis, the discovery cut on the Pittsburgh vein was partly sloughed, but vein material was still visible. He reported a 6- to 7-foot-thick quartz-calcite vein containing sulfides.

Apparently, little work has been on the Pittsburgh claim since its discovery. A rock sample collected close to the west end line of the claim contained 1050 ppm lead and 4 ppm silver (Hawley and Associates, 1978, sample 147). Thornsberry, McKee, and Salisbury (1984, v. 2) found several sloughed pits and fairly abundant quartz float on the claim.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The property was developed by pits and shallow shafts in 1922 or earlier. The claim has been inactive for many years.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Davis, 1923; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 04/28/01

Site name(s): Gold Dollar and Golden Eagle

Site type: Mines

ARDF no.: MM110

Latitude: 63.5462 **Quadrangle:** MM C-2

Longitude: 150.9413

Location description and accuracy:

The Gold Dollar mine and the contiguous Golden Eagle mine (Cobb, 1980 [OFR 80-363]) are at an elevation of about 2700 feet, at the head of a steep, unnamed gulch east of upper Friday Creek. The claims are on the north flank of Quigley Ridge, in the NE1/4 NE1/4, section 12, T. 16 S., R. 18 W., Fairbanks Meridian. The location is at the approximate center of the common east end line of the Gold Dollar claim and the west end line of the Golden Eagle claim (Hawley and Associates, 1978). The location is accurate within 300 feet. The claims are partly overlapped to the south by the Little Annie and Little Annie No. 2 claims (MM115).

The mines are included in location 9 of Cobb (1972 [MF 366]) and location 7 of MacKevett and Holloway (1977). The Gold Dollar is location 23 and the Golden Eagle is location 24 of Bundtzen, Smith, and Tosdal (1976). In Bundtzen (1981), the Golden Eagle is number 25 and the Gold Dollar is 26. The two mines constitute occurrence 36 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: Cu, Pb, Sb, Zn

Ore minerals: Arsenopyrite, bournonite, 'copper carbonates,' galena, gold, limonite, pyrite, sphalerite, stephanite, stromeyerite, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:

The country rock at the Gold Dollar and Golden Eagle mines is mainly metafelsite of the Spruce Creek sequence. The mines are about 100 feet south of a contact between metafelsite and chloritic and graphitic phyllites to the north. This contact strikes slightly north of east (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 36).

The deposit consists of mineralized quartz-siderite veins in a shear zone approximately parallel to an internal Spruce Creek contact between metafelsite and phyllite. The Gold Dollar vein is 3-4 feet thick; it strikes about N 65 E and dips 75 S. The Golden Eagle vein has approximately the same strike, dip, and thickness, and appears to be in the same shear zone as the Gold Dollar vein.

In 1916, Joe Quigley reported high-grade ore consisting mainly of galena and tetrahedrite in a surface cut on the Gold Dollar claim. This ore also contained abundant 'copper carbonates' and some free gold (Capps, 1919, p. 104). The deposit was developed by shallow shafts and a short adit, and a lessee (Tom Aitken?) mined about 600 tons of high-grade silver ore around 1920 (Davis, 1923, p. 128). About 4 tons of ore were mined from a nearby surface cut on the Golden Eagle claim (Davis, 1923, p. 128-129). Minerals exposed in that cut were galena, pyrite, sphalerite, and their oxidation products, presumably including limonite. The ores were studied by then Bureau of Mines mineralogist Paul Hopkins, who identified stephanite, bournonite, and stromeyerite (Moffit, 1933, p. 330). Bundtzen (1981) reported polybasite in the ore. Quartz, siderite, and sheared and altered wall rocks, are the main components of the gangue.

In 1983, the U.S. Bureau of Mines drilled one hole below the Gold Dollar workings. The hole intersected a 10-foot-wide zone of mylonite containing quartz-carbonate veins. A 6-foot section of the zone assayed about 0.9 percent zinc, but no precious metals (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence

36 and drill logs). This fault may cut off the Gold Dollar and Golden Eagle veins. Another hole was attempted on the Golden Eagle claim but lost. Davis (1923, p. 128) stated that in the underground workings of the Golden Eagle mine, the deposit seemed to contain more quartz and less sulfides than the ore mined in the open cuts.

Alteration:
Intense shearing, mylonitization, silicicification, and introduction of carbonate minerals along fault zones. Near-surface oxidation of iron and copper minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
The Gold Dollar vein was discovered in 1916 by Joe Quigley (Capps, 1919). The vein was developed by shallow shifts and a short crosscut adit. Much of the more than 600 tons of high-grade ore credited to the mine was produced from this vein by a lessee in 1920 (Davis, 1923). The Golden Eagle vein was developed by a longer crosscut-drift adit. The adit was driven about 60 feet in a N 70 E shear zone, then crosscut northerly for about 60 feet, where it intersected what appeared to be the Golden Eagle vein. The adit followed the vein for 30 or 40 feet on a N 65 E bearing (Davis, 1923, p. 129). Workings were caved when the district was studied by Wells (1933). Apparently there was no more production until about 1973, when additional ore was mined for about 4 years, processed in a mill at the Red Top mine, and shipped to a smelter in British Columbia (Bundtzen, Smith, and Tosdal, 1976, p. 9). In 1983, the U.S. Bureau of Mines mapped and drilled the deposit (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 36). Of three core holes, only one (K-1) reached its targeted depth.

Production notes:
A total of 638 tons of ore (including concentrate?) was mined in 1920, 1921, and 1973-77 (Bundtzen, Smith, and Tosdal, 1976, p. 25). The ore contained 76,120 ounces of silver, 159.5 ounces of gold, and 273,160 pounds of lead, indicating an apparent average grade of 119 ounces of silver per ton, 0.25 ounce of gold per ton, and 21.4 percent lead. Some of the ore was richer: Wells (1933, p. 366-367) states that smelter returns assayed as much as 152 ounces of silver per ton, and that the ore returned an average of more than $70.00 per ton. The Gold Dollar and Golden Eagle mines rank second to the Little Annie mine (MM115) in production of silver ore, and they produced more lead than the Little Annie.

Reserves:

Additional comments:
The mines are in Denali National Park and Preserve.

References:
Capps, 1919; Davis, 1923; Moffit, 1933; Wells, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Gold King; East Gold King; Blue Bell

Site type: Prospect

ARDF no.: MM111

Latitude: 63.5459 **Quadrangle:** MM C-2

Longitude: 150.9304

Location description and accuracy:

A block of three contiguous patented claims--the Gold King (Cobb, 1980 [OFR 80-363]), East Gold King, and Blue Bell--is at the head of Iron Creek near the top of Quigley Ridge. The average elevation of the claims is about 2800 feet. The location is the common corner of the three claims: East Gold King abuts the east end line of Gold King, and Blue Bell adjoins East Gold King on its north sideline (Hawley and Associates, 1978). The Gold King is included with other nearby claims in location 11 of Cobb (1972 [MF 366]); it is location 28 of Bundtzen, Smith and Tosdal (1976) and of Bundtzen (1981). All three claims are occurrence 40 of Thornsberry, McKee, and Salisbury (1984). The location is accurate within about 300 feet.

Commodities:

Main: Ag, Au

Other: Cu, Pb, Sb, Zn

Ore minerals: Arsenopyrite, galena, gold, sphalerite

Gangue minerals: Quartz

Geologic description:

The country rocks in the area of these claims are mostly metafelsite, graphitic phyllite, and chloritic phyllite of the Spruce Creek sequence, although the Blue Bell claim may be underlain by Birch Creek Schist. A steep fault that strikes NW may displace rock units on the Gold King claim, but mapping is insufficient to determine the exact bedrock relations (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. A-2).

Each of the three claims is reported to contain a vein. On the Gold King claim, a 4- to 6-foot-thick quartz vein strikes N 70 E and dips vertically. It was explored by two adits (Capps, 1919, p. 103). Davis (1923, p. 129) reported that the vein was traced across the Gold King claim by prospect pits that were sloughed at the time of his visit. The distribution and orientation of sloughed trenches on the Blue Bell claim suggest a parallel vein (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 40).

The Gold King vein contains arsenopyrite, galena, and sphalerite. Gold could be panned from the outcrop of the vein (Capps, 1919). A dump sample assayed 0.19 ounce of gold per ton, 7.88 ounces of silver per ton, and 0.12 percent zinc, along with low arsenic and antimony values (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 40). There is no information information about the mineralogy of the East Gold King and Blue Bell veins. Rocks at the west end of the Blue Bell claim are visibly altered and the alteration extends west of the claim line. Soils in this area contain as much as 900 ppm copper (Hawley and Associates, 1978, samples 145-146, fig. 4.1-1(A)).

Alteration:

Bleaching and sulfidization of schist on, and west of, the Blue Blue claim.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The Gold King prospect was explored by two short adits driven before 1919; the East Gold King and Blue Bell claims were explored by pits. In 1983, the U.S. Bureau of Mines drilled one diamond core hole (K-11) on the Gold King. The hole did not intersect significant mineralization, but it appears to have drilled away from the most likely vein structure.

Production notes:

Reserves:

Additional comments:
These patented claims are in Denali National Park and Preserve.

References:
Capps, 1919; Davis, 1923; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Capps, 1919; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/09/01

Site name(s): Merry Widow and Silver King

Site type: Prospect

ARDF no.: MM112

Latitude: 63.5444 **Quadrangle:** MM C-2

Longitude: 150.9011

Location description and accuracy:

The Merry Widow and Silver King claims are at an elevation of about 2200 feet on the north side of the canyon of Eureka Creek. The location is about 0.3 mile below the mouth of Lucky Gulch, and marks the approximate center of the common end line between the claims. The Merry Widow is the downstream claim. The location is accurate within 500 feet. The Merry Widow and Silver King claims are included in location 34 of Bundtzen (1981) and location 52 of Thornsberry, McKee, and Salisbury (1978).

Commodities:

Main: Ag, Cu, Pb

Other: Au, Sb, Zn

Ore minerals: Chalcopyrite, galena, limonite, malachite, pyrite, sphalerite, tetrahedrite

Gangue minerals: Ankerite, quartz

Geologic description:

The country rocks in the area of the Merry Widow and adjacent Silver King claims are metafelsite and chloritic phyllite of the Spruce Creek sequence. The rocks are part of a fault block, possibly separated by an ENE-striking fault from Birch Creek rocks exposed south of Eureka Creek (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The deposit consists of mineralized quartz-ankerite veins. A vein that strikes N 70 E and dips 65 NW is exposed nearly at the common end line of the two claims. At that point, the vein contains chalcopyrite, probably tetrahedrite, and galena. The copper minerals are partly oxidized to malachite. A sample assayed 6.9 percent copper, 9.25 percent lead, 0.24 percent zinc, and a small amount of silver (Hawley and Associates, 1978, fig. 4.1-A(1), sample no. 125). Bundtzen (1981, pl. 3) reported 55.47 ounces of silver per ton in a 10-foot wide sample across a complex vein in mineralized felsite. Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 52) reported a selected sample that assayed 188.7 ounces of silver per ton, 0.047 ounce of gold per ton, 0.905 percent copper, 58.5 percent lead, 13.5 percent zinc, and 1 percent antimony.

Alteration:

Introduction of silica and ankerite in sheared metafelsite. Oxidation of iron and copper minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

William Taylor owned and explored the Merry Widow claim in 1931 in the late 1920s or early 1930s (Wells, 1933). A site near the boundary between Silver King and Merry Widow claims was trenched in the 1970s (Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981). The trench went below the water table and was flooded by 1983 (Thornsberry, McKee, and Salisbury, 1984). In 1983, the U.S. Bureau of Mines drilled a south-directed core hole (K-18) across the projected strike of the deposit. Core recovery was poor. Between 73 and 103 feet, the hole penetrated a zone containing quartz, limonite, pyrite, and sphalerite, and at about 176 feet, it intersected quartzite containing about 3 percent pyrite.

Production notes:

Reserves:

Additional comments:

The Merry Widow and Silver King claims are in Denali National Park and Preserve.

References:

Wells, 1933; Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/15/01

Site name(s): Friday Creek

Site type: Mine

ARDF no.: MM113

Latitude: 63.5431 **Quadrangle:** MM C-2

Longitude: 150.9665

Location description and accuracy:

Friday Creek is only about two miles long, including its steep headward forks (Cobb, 1980 [OFR 80-363]). It rises against the west flank of Wickersham Dome, drains the north flank of Quigley Ridge, and flows westerly into Moose Creek (MM132). The location is at the approximate midpoint of the extensively mined section of the creek. It is at an elevation of about 1900 feet, nearly coincident with the location of Friday Creek by Hawley and Associates (1978), which they base on a summary of Alaska mining claims (Kardex) by Heiner and Porter (1972). Friday Creek is location 45 of Cobb (1972 [MF 366]). The location of various resource blocks on the creek is shown by Thornsberry, McKee, and Salisbury (1984, fig. K-3), and by Levell (1984 [v. 2]).

Commodities:

Main: Au

Other: Ag, Pb, Sb, W

Ore minerals: Galena, gold, pyrite, scheelite, stibnite

Gangue minerals: Garnet, magnetite

Geologic description:

Friday Creek drains an area underlain mainly by metafelsite and chloritic phyllite of the the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). Bedrock lithologies encountered in placer mining include quartzitic schist, carbonaceous schist, greenstone, and marble, and dikes of Eocene(?) granite porphyry (Prindle, 1907, 1911; Bundtzen, 1981).

The creek is fairly steep, about 400 feet per mile, above an inflection point near its junction with Moose Creek. Two main types of placer deposit have been exploited: alluvial placers along and near modern Friday Creek; and complex fan and terrace gravel deposits mined where Friday Creek enters Moose Creek. The alluvial gravels grade into poorly sorted or unsorted colluvial slope wash deposits along the canyon walls. Slide and colluvial deposits from the sides of the valley locally bury the alluvium, but at places auriferous colluvium on bedrock probably grades into auriferous alluvial valley fill.

The alluvial deposits near modern Friday Creek are 3 to 6 feet thick; pay is in the top of bedrock and in the lowest gravel, totaling about 4 feet thick. Locally, the valley-bottom placer is as much as 100 feet wide, but at one place it narrows to only about 12 feet between bedrock walls (Prindle, 1911, p. 178). Gold recovered from the alluvial deposit was rough, locally almost crystalline. Some was attached to quartz or was accompanied by coarse fragments and boulders of galena and small amounts of stibnite (Brooks, 1907; Prindle, 1911; Cobb, 1973 [B 1374]). Ounce to ounce-and-a-half nuggets were common. Later workers reported pyrite, scheelite, magnetite, and garnet in the concentrates (Levell ,1984, v. 2, mine localities 4 and 17). Gold from Friday Creek was reported to be about 720 fine (Capps, 1919, p. 87, 88). Later studies suggest an average fineness of about 760 (Bundtzen, 1981, table 19).

Complex alluvial fan-terrace deposits occur in the lower part of the creek near its junction with Moose Creek. At one site, alluvial fan sediments from Friday Creek overlie a thin layer of terrace gravels that in turn overlie false bedrock developed on glacial debris (Levell, 1984, v. 2, placer monitoring site 4). The average grade of this deposit was about 0.022 ounce (0.016 fine ounce) of gold per cubic yard. The pay section at the mine included both the terrace gravel and fan material.

The deposits are mainly Holocene. The sources of the gold are auriferous lodes on Quigley Ridge, and, near Moose Creek, low-grade Pleistocene drift.

Alteration:

Age of mineralization:
Mainly Holocene.

Deposit model:
Au-PGE placer deposits (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes

Site Status: Inactive

Workings/exploration:
The deposits in Friday Creek were probably discovered in 1905, the major year of placer discovery in the district, and were mined in 1906 (Brooks, 1907; Prindle, 1907). The relatively thin and shallow alluvial deposits were probably exhausted quickly, leaving side pay and probably locally rich colluvial deposits and alluvial fan-terrace deposits to be exploited later. Mining is documented in 1916 and 1922 (Capps, 1919; Davis, 1923); after World War II (Cobb, 1973 [B 1374]); in 1975; and in 1982 and 1983 (Bundtzen, Smith and Tosdal, 1976; Levell, 1984, v. 1 and v. 2).

Production notes:
The amount of gold recovered from Friday Creek is uncertain. Cobb (1980 [OFR 80-363]) estimated total production before 1980 of less than 1000 ounces. This estimate is probably too low. In 1982 and 1983 more than 4000 ounces were recovered, mainly from a fan-terrace deposit; this production included more than 300 ounces recovered from a colluvial-alluvial placer (Levell, 1984). Total production from Friday Creek probably is 5,000 to 10,000 ounces of gold.

Reserves:
No quantified mineable reserves are known, but there are significant resources. There is a small amount of gold left in the alluvium, but the significant resource is in fan-terrace deposits at the mouth of the creek. Mined grades reported from Friday Creek ranged from 0.006 to 0.044 ounce of gold per cubic yard. According to Levell (1984, v. 2), there are about 1,600,000 cubic yards remaining which reasonably could contain between 9,600 and 25,600 fine ounces of gold. This range is determined by the lowest reported grade (0.006 ounce) and the average grade (0.016 ounce) of the deposit when it was mined in 1982 and 1983.

Additional comments:
The shallow alluvial channel deposits first mined on Friday Creek probably were rich, but small, because of the limited size of the pay section. Placers of moderate grade are in larger, complex fan-terrace deposits at the mouth of the creek. The gold in the alluvial-colluvial deposits has not been transported far; it is accompanied by argentiferous galena, stibnite, and scheelite, which occur in lode deposits drained by the Friday Creek. Some of the placer gold was attached to large chunks of galena, which does not travel far in a placer environment.

The deposit is in Denali National Park and Preserve. It is inactive, except for recreational panning by tourists and park guests.

References:
Brooks, 1907; Prindle, 1907; Prindle, 1911; Capps, 1919; Davis, 1923; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Cobb, 1973 (B 1374); Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978;

Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 1 and 2); Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 1 and 2)

Reporter(s): C.C. Hawley

Last report date: 04/21/01

Site name(s): Polly Wonder

Site type: Prospect

ARDF no.: MM114

Latitude: 63.5430 **Quadrangle:** MM C-2

Longitude: 150.9533

Location description and accuracy:

The Polly Wonder prospect (Cobb, 1980 [OFR 80-363]) is on the north flank of Quigley Ridge at an elevation of about 2500 feet. It is about 0.1 mile northwest of the center of section 12, T. 16 S., R. 17 W. Fairbanks Meridian. The location is probably accurate within 300 feet.

The site is near the discovery location of the patented Polly Wonder claim (Hawley and Associates, 1978). The claim is included with the Golden Eagle, Gold Dollar (MM110), and Little Annie (MM115) claims in location 9 of Cobb (1972 [MF 366]) and location 7 of MacKevett and Holloway (1977).

Commodities:

Main: Au

Other: Ag, Pb

Ore minerals: Galena, gold, limonite

Gangue minerals: Quartz

Geologic description:

The country rocks in the area of the Polly Wonder claim are metafelsite schists of the Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit consists of a vein that
strikes about east and dips 65-70 south. The vein is about 7 feet thick and is composed mainly of iron-stained quartz with some galena; free gold can be panned on the outcrop (Davis, 1923, p. 125). A sample across the vein assayed 0.12 ounce of gold per ton and 2.2 ounces of silver per ton (Wells, 1933, p. 364).

Alteration:

Local iron staining.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: None

Site Status: Inactive

Workings/exploration:

In about 1920, the property was owned and prospected by Quigley and Dalton. In about 1960, the Polly Wonder and adjacent claims were mapped and soil sampled by Moneta-Porcupine (Seraphim, 1962).

Production notes:

Reserves:

Additional comments:

The Polly Wonder claim is in Denali National Park and Preserve. It is sometimes included in the Dalton group of claims, which cover the Martha Q (MM121), and the contiguous Star and Friday claims (MM117) (Thornsberry, McKee, and Salisbury (1984, v. 2, location 29).

References:

Davis, 1923; Wells, 1933; Seraphim, 1962; Cobb, 1972 (MF 366); MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 04/22/01

Site name(s): Little Annie and Little Annie No. 2 (Quigley Ridge; Aitken property; Quigley property; Alice; Fransen and Hawkins)

Site type: Mine

ARDF no.: MM115

Latitude: 63.5430 **Quadrangle:** MM C-2

Longitude: 150.9462

Location description and accuracy:

The Little Annie and contiguous Little Annie No. 2 claims (Cobb, 1980 [OFR 80-363]) are at an average elevation of about 2800 feet on the north slope of Quigley Ridge above upper Friday Creek. The location is at the approximate center of the end line between the Little Annie and Little Annie No. 2 claims. This point is within 500 feet of the main workings on each of the two claims. The location is accurate within about 300 feet. The Little Annie mine is marked by mine symbols on the 1954 edition of the Mt. McKinley C-2 quadrangle map.

Cobb (1972, number 9 [MF 366]), and MacKevett and Holloway (1977, number 7) include the Little Annie and Little Annie No. 2 claims with the nearby Gold Dollar and Golden Eagle claims (MM110) and Polly Wonder claim (MM114). The two Little Annie claims are number 27 of Bundtzen (1981) and 35 of Thornsberry, McKee, and Salisbury (1984). The Little Annie mine is letter G of Hawley and Associates (1978).

Commodities:

Main: Ag, Au

Other: Cu, Pb, W, Zn

Ore minerals: Arsenopyrite, azurite, chalcopyrite, galena, gold, jamesonite, malachite, pharmacosiderite, polybasite, pyrite, scheelite, sphalerite, tetrahedrite

Gangue minerals: Calcite, quartz, siderite

Geologic description:

The deposit at the Little Annie mine consists of mineralized quartz-carbonate veins in metafelsite and graphitic phyllite of the Spruce Creek sequence. The deposit is near the crest of the Kantishna antiform (MM091). About 1500 feet north of the mine, a high-angle(?) fault juxtaposes the Spruce Creek country rocks against Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

There are two main veins in the mine. The principal vein strikes about N 60 E and dips 65 SE. It was developed by trenches and by more than 500 feet of underground workings driven below the trenches. Most of the workings are on the northeast half of the Little Annie claim. A second vein, called the sulfide vein, strikes about N 20 E and dips about 70 SE. The sulfide vein is thinner but richer than the principal vein. It is exposed about 350 feet south of the main Little Annie adit. By projection, the principal and sulfide veins should intersect near the boundary between the Little Annie and Little Annie No. 2 claims.

The principal vein was developed by a crosscut-drift adit. The vein was as much as 32 feet thick, and was explored by a series of crosscuts driven into the north wall of the drift (Wells, 1933, pl. 31: Note that the north arrow on this plate is reversed and points south). The vein contains pods of argentiferous galena and a little gold. Excluding one high-grade sample, Wells (1933, p. 366) computed the average assay of the principal vein as 0.10 ounce of gold per ton and 2.10 ounces of silver per ton over a length of 468 feet and an average width of 17 feet. Samples collected from a series of trenches above the vein were somewhat richer, possibly because of local supergene enrichment.

In 1983, the U.S. Bureau of Mines drilled one hole to test the principal vein (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 35, drill logs). The hole (K-3) intersected a 31-foot-thick vein composed

mainly of limonite-stained, sheared, gougy quartz containing a little pyrite and arsenopyrite. The vein averaged only 0.023 ounce of gold per ton, but core recovery was poor, and none was recovered from part of the interval. The richest intersect, from 113.3 to 115.5 feet, assayed 0.094 ounce of gold per ton, 5.86 ounces of silver per ton, and 0.42 percent lead. Another 2.2 foot section of the vein assayed 0.086 ounce of gold per ton. Based on the location of the drill hole relative to mine workings, the hole intersected the principal vein below the drift.

The sulfide vein was up to 3 feet thick. It consisted principally of siderite and calcite containing galena and tetrahedrite. The vein assayed as much as 286 ounces of silver per ton and 0.5 ounce of gold per ton (Brooks and Martin, 1921; Brooks, 1922; Davis, 1923). Essentially all of the ore produced at the Little Annie mine came from this vein.

Wells (1933, p. 365) identified chalcopyrite, tetrahedrite, pyrite, arsenopyrite, and small specks of free gold in polished sections of galena and sphalerite from the principal vein. Buntzen (1981, including plate 3) identified polybasite, scheelite, and a rare iron-arsenic secondary mineral called pharmcosiderite.

Alteration:

Possible near-surface supergene enrichment of precious metals. Oxidation of copper minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

The principal vein is a low-sulfide qold-quartz vein; the sulfide vein is a polymetallic vein (Cox and Singer, 1986; models 36a and 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a, 22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

Mining began in about 1919, when a shallow shaft and short drift were developed on the (then) Alice claim (Brooks and Martin, 1921). Small-scale mining continued until 1921 (Davis, 1923; Bundtzen, Smith, and Tosdal, 1976). Sometime before 1931, the main drift crosscut and other workings were driven on the principal Little Annie vein. This work may have been done by Kennecott in 1929. W. E. Dunkle optioned the mine to Kennecott in 1928, and in 1929 Be Van Pressley and W. A. Richelson of the Kennecott mine staff undertook significant underground development. Kennecott dropped the claims, but they were reoptioned by General A. D. McRae, who was working for Thayer Lindsley of Ventures, Ltd. They dropped the option in about 1934. Consultant Ira B. Joralemon believed that the ore was cut off at depth by a 'great thrust fault that was hidden on the surface by glacial detritus' (Joralemon, 1976, p. 297-311). The silver-rich ore bodies seemed to pinch out at a depth of about 60 feet, but Wells (1933) believed that this was a structural, not supergene, effect. The claims were reoptioned in 1937 by Franson and Hawkins (Smith, 1939), who built a new mill, but little if any ore was mined at that time. In 1983, the U.S. Bureau of Mines drilled three core holes on the property. A vein interseccted in hole K-3 suggests that the principal vein persists at least to shallow depth below the existing mine workings.

Production notes:

Most of the ore mined at Little Annie was produced between 1919 and 1921. About 725 tons mined in that interval contained 117,305 ounces of silver, about 75 ounces of gold, and 148,000 pounds of lead (Bundtzen, Smith, and Tosdal, 1976). Probably this ore was mined by T. P. Aitken on claims optioned from their discoverers, Joe and Fannie Quigley.

Reserves:

Based on sampling reported by Wells (1933), and on U.S. Bureau of Mines drill hole K-3, there is a re-

source of about 200,000 tons of low-grade gold ore remaining in the principal Little Annie vein.

Additional comments:

The mine is in Denali National Park and Preserve and is inactive.

References:

Brooks and Martin, 1921; Brooks, 1922; Davis, 1923; Wells, 1933; Smith, 1939; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; Joralemon, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Wells, 1933

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Pennsylvania; Keystone

Site type: Prospects

ARDF no.: MM116

Latitude: 63.5429 **Quadrangle:** MM C-2

Longitude: 150.9256

Location description and accuracy:

The Pennsylvania and Keystone prospects are on patented, adjacent claims in the canyon of Iron Gulch, a south-flowing tributary to Eureka Creek. The location is at the center of the end line between the two claims. It is about 150 feet west of Iron Gulch, and about 0.24 mile west-northwest of the center of section 7, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 300 feet. The prospects are number 30 of Bundtzen (1981) and 39 of Thornsberry, McKee, and Salisbury (1984), and are included in location 12 of MacKevett and Holloway (1977).

Commodities:

Main: Au

Other: Ag, Cu, Pb, W, Zn

Ore minerals: Arsenopyrite, galena, gold, pyrite, scheelite, sphalerite, tetrahedrite

Gangue minerals: Ankerite(?), calcite, dolomite, quartz

Geologic description:

The area of the Pennsylvania-Keystone claims is underlain mainly by 'quartz-eye' metafelsite of the Spruce Creek sequence (Thornsberry, McKee, and Salisbury, 1984, fig. K-2; v. 2 occurrence 39; Hawley and Associates, 1978, fig. 4.1-(A)1). The claims are close to the axis of the Kantishna antiform (see record MM091).

Two main veins, the Pennsylvania and the Keystone, have been explored on the claims. The Pennsylvania vein crosses the west end line of the Pennsylvania claim about 100 feet north of the center of the claim. The vein strikes N 65 E and dips 85 S. It continues easterly (uphill) for about 500 feet and strikes toward the Pittsburgh vein (MM109), with which it probably correlates (Davis, 1923, p. 129; Thornsberry, McKee, and Salisbury, 1984, v. 2, no. 39). The Keystone vein is about 100 feet south of the Pennsylvania vein at the west end of the Pennsylvania claim. It strikes about N 50 E, and dips 60 S. The Keystone vein continues southwest for about 800 feet on the Keystone claim, and intersects the Pennsylvania vein on the Pennsylvania claim. Its total strike length is at least 1200 feet.

A third vein, which crops out between the Pennsylvania and Keystone veins, appears to intersect both of the them (Davis, 1923, p. 130), and a fourth vein is suggested by quartz float near the north boundary of the claims (Thornsberry, McKee, and Salisbury, 1984, v. 2, no. 39).

The Pennsylvania vein consists mainly of quartz and calcite, and contains pyrite and free gold. The Keystone vein consists mainly of quartz, along with arsenopyrite and pyrite and lesser amounts of galena and sphalerite (Capps, 1919, p. 122-23). Spectacular dendritic gold occurred in a shallow pit on a thin quartz vein that may be part of the Keystone vein (Capps, 1919; Davis, 1923, p. 130; Moffit, 1933, p. 131-132). Other minerals in the veins include chalcopyrite, scorodite, jamesonite(?), tetrahedrite, and scheelite (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984).

Alteration:

Oxidation of arsenopyrite to scorodite.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The veins were explored by numerous open cuts, short adits, and shafts, currently (2001) mostly inaccessable. Considerable development occurred prior to 1922 (Davis, 1923), and a little work was done in subsequent years. In 1983, the U.S. Bureau of Mines drilled three diamond core holes (K-8, -9, and -10). Between 132 and 135 feet, drill hole K-8 intersected vein quartz, chalcedonic quartz and dolomite, and mineralized metafelsite. Core recovery was only fair, and one section was lost. The best intersection was 147 to 150 feet, which assayed 0.294 ounce of gold per ton and 0.276 ounce of silver per ton. From 34.5 to 43.5 feet, drill hole K-9 intersected quartz-dolomite vein material and possible stope fill that assayed 0.10 ounce of gold per ton. Hole K-10 intersected quartz-dolomite-ankerite(?) vein material containing traces of gold and silver. Drill hole K-8 probably intersected the Pennsylvania vein (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 39 and drill logs).

Production notes:
Production is unknown but small quantities of dendritic gold were almost certainly taken from the claims.

Reserves:

Additional comments:
The claims are in Denali National Park and Preserve.

References:
Capps, 1919; Davis, 1923; Moffit, 1933; Cobb, 1972 (MF 366); MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1933; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/27/01

Site name(s): Friday; Star (North Star)

Site type: Mine

ARDF no.: MM117

Latitude: 63.5415 **Quadrangle:** MM C-2

Longitude: 150.9609

Location description and accuracy:

The Friday and Star (North Star of Cobb) patented claims are on the north flank of Quigley Ridge above the midpoint of Friday Creek (Cobb, 1980 [OFR 80-363]; Davis, 1923). For this record, the location is at an elevation of about 2300 feet, on the common end line of the two claims. The location is accurate within about 300 feet.

Thornsberry, McKee, and Salisbury (1984, location 29) include the Friday and Star claims with the Polly Wonder (MM114) and Martha Q (MM121) claims in the Dalton group. The patented claims are numbers 7 and 8 in Hawley and Associates (1978), and probably are lumped with other nearby claims in location 6 of MacKevett and Holloway (1977).

Commodities:

Main: Ag, Au

Other: Pb, Zn

Ore minerals: Galena, limonite, pyrite, sphalerite

Gangue minerals: Calcite, quartz

Geologic description:

The area of the Friday and Star claims is underlain mainly by metafelsite schist of the Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit consists of at least two sets of mineralized quartz-calcite veins. On the southwest part of the Star claim, pits disclose galena- and sphalerite-bearing quartz veins. These pits align with veins that strike NNW on the adjacent Martha Q claim (MM121) (Hawley and Associates, 1978, fig. 4.1-A(1)-3). Davis (1923, p. 125) reported a thin, galena- and sphalerite-bearing quartz vein in this area that assayed as much as 60 ounces of silver per ton. Bundtzen (1981, p. 201) reported that 4 to 15 tons of high-grade silver ore was produced from the Star claim, probably from near the pits that exposed the galena- and sphalerite-bearing quartz vein. Shallow pits on the eastern part of the Star claim and on the Friday claim expose veins that strike ENE, roughly on strike with the Red Top (MM118) vein. Davis (1923) reported rich float on the claims, but that its source had not been found.

Alteration:

Oxidation of iron minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The Friday and Star claims were explored by numerous pits and shallow shafts dating from about 1920. The area was also explored by Moneta-Porcupine in about 1960 (Seraphim, 1962). In 1983, the U.S. Bureau of Mines drilled one diamond core hole on the Star claim, between two pits exposing galena- and sphalerite-bearing veins (Thornsberry, McKee, and Salisbury, 1984, v. 2, location 29). From about 30 to 38 feet, and 105 to 106.5 feet, the hole (K-15) intersected only low-grade material assaying 0.02 ounce or less of gold per ton. From 130 to 138 feet, it intersected mostly iron-stained gouge, quartz, calcite, and small amounts of pyrite. The hole could have been misdirected. If the veins are continuous with those to the north-northwest on the adjacent Martha Q claim (MM121), the hole probably would have missed them.

Production notes:

Four to fifteen tons of high-grade silver ore reportedly were shipped from the Star claim (Bundtzen, 1981, p. 201).

Reserves:

Additional comments:

The claims are in Denali National Park and Preserve.

References:

Davis, 1923; Seraphim, 1962; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 04/24/01

Site name(s): Red Top

Site type: Mine

ARDF no.: MM118

Latitude: 63.5399 **Quadrangle:** MM C-2

Longitude: 150.9745

Location description and accuracy:

The Red Top mine (Cobb, 1980 [OFR 80-363]) is on the westernmost flank of Quigley Ridge above Friday Creek. The main workings are at elevations of about 1850 to 2200 feet. The mine is about 0.4 mile east-northeast of the point where Friday Creek crosses the Kantishna road. The location is accurate within 300 feet. (The mine named Red Top at the head of Lucky Gulch on the Mt. McKinley C-2 quadrangle map actually is the Banjo mine, MM097).

The site corresponds to location 7 of Cobb (1972 [MF 366]), 6 of MacKevett and Holloway (1977), E of Hawley and Associates (1978), 18 of Bundtzen, Smith, and Tosdal (1976), 19 of Bundtzen (1981), and 28 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: Cu, Pb, W, Zn

Ore minerals: Arsenopyrite, galena, gold, jamesonite, limonite, marcasite, melanterite, polybasite, pyrargyrite, pyrite, scheelite, scorodite, sphalerite, sulfur, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:

The country rocks near the Red Top mine are metafelsite, chloritic and graphitic phyllite, and impure marble of the Spruce Creek sequence (Bundtzen, 1981). A fault north of Friday Creek strikes east-northeast and separates the Spruce Creek rocks from Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

Veins and ore zones in the Red Top mine are controlled by complex, intersecting faults. The veins tend to have sharp hanging walls and gradational footwalls. At the portal of the Red Top mine, a 1- to 3-foot-thick vein that strikes E-W to ENE and dips about 55 S, cuts faulted and altered chloritic phyllite. This vein was extremely rich: 3-foot-long samples collected across the vein on 5- to10-foot centers from 10 to 45 feet along the adit (measured from the portal) assayed 0.58-1.96 ounces of gold per ton and 238 to 1717 ounces of silver per ton (Davis, 1923; Wells, 1933). This part of the vein contained polybasite, pyrargyrite, and tetrahedrite or freibergite. Associated sulfide minerals were arsenopyrite, pyrite, galena and sphalerite. About 180 tons of ore mined in about 1922 from this part of the mine averaged 1.1 ounces of gold per ton and 237 ounces of silver per ton (Bundtzen, 1981).

Between 150 feet and 280 feet along the main adit, a 10- to 20-foot thick vein strikes about N 60 E and dips steeply S. Most of this vein is consistently mineralized, but of low- to medium-grade (Davis, 1923, p. 122; Wells, 1933, pl. 30). Part of the vein consists only of limonitic quartz, and part consists of quartz, siderite, galena, arsenopyrite, tetrahedrite, and probably lead sulfosalts.

The relations between the high-grade and low- to moderate-grade veins are uncertain. Bundtzen, Smith, and Tosdal (1976) proposed multiple mineralization along complex, interlaced faults. Most of the high-grade ore contained abundant arsenopyrite; the lower-grade ore mainly was rich in galena (Wells, 1933, p. 362-363).

The Red Top vein is truncated by an E-W fault at about 290 feet in the adit. The vein was not recovered, although vein outcrops on the surface beyond the fault suggest only minor fault displacement, and that the

vein continues uphill to the northeast.

Mine water at Red Top is strongly acidic and corrosive. Melanterite and native sulfur formed on the drift walls in ore-bearing sections of the deposit, and marcasite formed from acidic attack on the primary sulfides.

Alteration:

Silicification. Oxidation of iron minerals. Formation of melanterite, native sulfur, and marcasite due to acidic mine water.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The Red Top deposit was discovered and the mine first developed by J. B. Quigley. Ore was mined from the high-grade portal shoot in 1922, but not shipped until later (Davis, 1923). Production continued until about 1925 (Moffit, 1933). Despite extremely high grade ore, the mine may not have been profitable because of high shipping costs (Brooks, 1925). There was renewed interest in the property before World War II, but it is not known if any more ore was shipped. Joesting (1942), investigating strategic minerals throughout Alaska during World War II, found that table concentrates from Red Top ore were rich in scheelite. There was further interest in the Red Top deposit beginning in about 1970, when some of the workings were reopened and a mill built on the property. This venture apparently was not successful. There was no substantial development after the early period of mining, which ended by 1925.

In 1983, the U.S. Bureau of Mined drilled three diamond core holes on the property. Hole K-19, drilled about 150 northeast of the mine portal, intersected a strongly mineralized section between 148 feet and 176.4 feet. This 28.4-foot section assayed 0.137 ounce of gold per ton and 3.37 ounces of silver per ton. The best 10-foot section of this zone assayed a little more than 0.2 ounce of gold per ton and 8.09 ounces of silver per ton. Base metal contents were negligible, although arsenic assays reached 2.89 percent in the 28.4 foot section. The section apparently correlates with a low- to moderate-grade vein exposed in the mine. The two other holes (K-20 and K-21) did not intersect significant mineralization (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 28).

Production notes:

Production during the main period of mining in the early 1920s was about 187 ounces of gold, 43,600 ounces of silver, and 93,200 pounds of lead from about 183 tons of ore (Bundtzen, Smith, and Tosdal, 1976, p. 25).

Reserves:

Additional comments:

The Red Top mine is in Denali National Park and Preserve.

References:

Davis, 1923; Brooks, 1925; Moffit, 1933; Wells, 1933; Joesting, 1942; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981; Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 04/26/01

Site name(s): Little Maud

Site type: Prospect

ARDF no.: MM119

Latitude: 63.5394 **Quadrangle:** MM C-2

Longitude: 150.9540

Location description and accuracy:

The Little Maud prospect (Cobb, 1980 [OFR 80-363]) is on the southwest crest of Quigley Ridge at an elevation of about 2850 feet. It is about 0.25 mile south-southwest of the center of section 12, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within 300 feet. The prospect corresponds to claim number 14 of Hawley and Associates (1978); it is included with the Francis mine (MM124) in location 31 of Thornsberry, McKee, and Salisbury (1984), and in location 23 of Bundtzen (1981).

Commodities:

Main: Ag, Au, Pb

Other: Cu

Ore minerals: Arsenopyrite, chalcopyrite, galena, gold, limonite, pyrite, sphalerite, tetrahedrite

Gangue minerals: Calcite, quartz

Geologic description:

The country rocks at the Little Maud prospect are metafelsite and graphitic phyllite of the Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984). The deposit consists of mineralized quartz-calcite veins and breccia zones that cut graphitic schist (phyllite) and quartz schist, units that appear to be folded at an angle to the east-northeast trend of the Kantishna antiform (MM091) (Seraphim, 1962; Hawley and Associates (1978, fig. 4.1-1(A)-3). The veins strike NE and dip steeply. Davis (1923, p. 125) reported that an 18-inch-thick quartz-tetrahedrite vein was trenched immediately east of the Francis claim end line. A 13-foot-thick quartz vein, exposed in two trenches just north of the side line between the Little Maud and the Silver Pick (MM120) claims, strikes N55E. The vein contains pods and masses of fine-grained galena cut by veinlets of chalcopyrite. In one trench, the vein had a weighted average assay of 0.107 ounce of gold per ton and 53.3 ounces of silver per ton; in the other, the weighted average assay was 0.115 ounce of gold per ton and 22.6 ounces of silver per ton (Wells, 1933, p. 369). In 1983, The U.S. Bureau of Mines diamond-drilled this vein (Thornsberry, McKee, and Salisbury, 1984). The hole (K-5) cut a 31.5-foot-thick section of oxidized, quartz-calcite breccia containing arsenopyrite and small amounts of pyrite, chalcopyrite, sphalerite,and galena. The full 31.5-foot section assayed 0.022 ounce of gold per ton, 1.16 ounces of silver per ton, and 2.98 percent arsenic. The best 3.8-foot intercept assayed 0.082 ounce of gold per ton, 8.67 ounces of silver per ton, and 1.05 percent arsenic. Lead and zinc contents were in the 0.X percent range.

Alteration:

Oxidation of iron minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined

Site Status: Inactive

Workings/exploration:
The Little Maud claim was prospected in about 1920 (Davis, 1923), and there was some activity in the 1930s (Wells, 1933). The Little Maud-Silver Pick-Francis claim area was extensively studied by Moneta-Porcupine in about 1960 (Seraphim, 1962). The area was also investigated by Hawley and Associates (1978) and Bundtzen (1981), and in 1983, the U.S. Bureau of Mines drilled one core hole (K-5) (Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 31).

Production notes:

Reserves:

Additional comments:
The claim is in Denali National Park and Preserve.

References:
Davis, 1923; Wells, 1933; Seraphim, 1962; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Wells, 1933; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 02/09/01

Site name(s): Silver Pick; Silver Pick No. 2

Site type: Prospect

ARDF no.: MM120

Latitude: 63.5388 **Quadrangle:** MM C-2

Longitude: 150.9525

Location description and accuracy:

The Silver Pick prospect (Cobb, 1980 [OFR 80-363]) is at an elevation of about 2700 feet on the southeast flank of Quigley Ridge, just below the crest of the ridge. The location is about 500 feet northeast of the common endline between the Silver Pick and Silver Pick No. 2 claims. It is probably accurate within 300 feet.

The Silver Pick prospect is included with the Little Maud prospect (MM119) in location 8 of Cobb (1972 [MF 366]), and in location 6 of MacKevett and Holloway (1977). It is included with the Darling unpatented claim in location 23 of Bundtzen (1981); and corresponds to patented claim 18 of Hawley and Associates (1978), and to occurrence 32 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: Cu, Pb, Zn

Ore minerals: Arsenopyrite, galena, gold, melanterite, pyrite, scorodite, sphalerite, tetrahedrite

Gangue minerals: Calcite, quartz, siderite

Geologic description:

The area of the Silver Pick and Silver Pick No. 2 claims is underlain by graphitic phyllite, quartz schist, and quartz-mica phylllite or semischist of the Spruce Creek sequence (Seraphim, 1962; Hawley and Associates, 1978, fig. 4.1-A(1)-3; Bundtzen, 1981).

At least three veins that strike northeast are exposed on the Silver Pick claims. A S30E crosscut tunnel whose portal is on the adjacent Little Maud claim (MM119) intersected the 3 veins, one of which is probably about on the side line between the Little Maud and Silver Pick claims. The strongest vein was intersected at 165 feet in the crosscut; it strikes N 65 E, and dips 67 SE (Capps, 1919, p. 105; Davis , 1923, p. 125-126). The vein is about 13 feet thick. It consists of about a foot of calcite and 12 feet of quartz and siderite containing arsenopyrite, pyrite, sphalerite, galena, and tetrahedrite (Bundtzen, Smith, and Tosdal, 1976, occurence 21). This vein may correlate with a vein exposed at the surface (Seraphim, 1962; Bundtzen, 1981). Another intersected vein consists mainly of quartz containing some galena and sparse free gold. In near-surface exposures, the arsenopyrite is largely oxidized to scorodite, and the iron minerals are altered to melanterite.

One sample of the principal vein assayed about 25 ounces of silver per ton, 3.05 percent lead, and 7.65 percent zinc (Thornsberry, McKee, and Salisbury (1984, v. 2, occurrence 32). Moffit (1933, p. 330) reported assays of as much as 300 ounces of silver per ton in some galena-rich vein material.

Alteration:

Silicification. Near-surface oxidation of arsenic and iron minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The Silver Pick deposit was discovered before 1918 (Capps, 1919) in a crosscut adit driven from the adjacent Little Maud claim (MM119). It was extensively explored in 1960-61 by Moneta-Porcupine (Seraphim, 1962). In 1983, the U.S. Bureau of Mines drilled one core hole (K-7). The hole, drilled northwesterly, intersected a gougy, mineralized zone between 128 and 169 feet, but only about 10 percent of the core in the mineralized interval was recovered, and its grade is unknown (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 32, drill logs).

Production notes:

Reserves:

Additional comments:
The claims are in Denali National Park and Preserve.

References:
Capps, 1919; Davis, 1923; Moffit, 1933; Seraphim, 1962; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923; Seraphim, 1962

Reporter(s): C.C. Hawley

Last report date: 02/10/01

Site name(s): Martha Q

Site type: Mine

ARDF no.: MM121

Latitude: 63.5387 **Quadrangle:** MM C-2

Longitude: 150.9613

Location description and accuracy:
The Martha Q mine (Cobb, 1980 [OFR 80-363]) is on the western- most spur of Quigley Hill at an elevation of about 2700 feet. The location is accurate within about 250 feet. The mine is included in location 8 of Cobb (1972 [MF 366]) and in location 6 of MacKevett and Holloway (1977).

Martha Q is a patented claim. The location of the claim is shown at a scale of 1:12000 in Hawley and Associates (1978), and the location of the mine shaft is about coincident with their deposit number 129.

Commodities:

Main: Ag

Other: Au, Pb

Ore minerals: Galena

Gangue minerals: Quartz

Geologic description:
The area of the Martha Q mine is underlain by low-grade metamorphic rocks of the Spruce Creek sequence (Bundtzen, 1981). The mine is on the west flank of a northwest-trending body of locally conglomeratic quartz schist (Seraphim, 1962; Hawley and Associates, 1978, fig. 4.1-A(1)-3).

The deposit consists of a mineralized quartz vein that strikes NNW, about parallel to the orientation of the quartz schist body. The vein dips steeply NE. It occupies a fault that strikes obliquely to the dominant, northeast- striking veins of the Quigley Hill area. Locally, the vein consists mostly of galena. A selected sample from the mine assayed 0.08 ounce of gold per ton and 284.2 ounces of silver per ton (Davis, 1923, p. 125). Four tons of this high-grade vein material was picked and shipped with ore mined at the Gold Dollar (MM110) in 1921-22.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
A shallow shaft and a few trenches were excavated in 1921-22 (Davis, 1923). In 1983, the property was

owned by Kantisna Mines Inc., and Maurice Butler (Thornsberry, McKee, and Salisbury, 1984, v. 2, location 29).

Production notes:

Four tons of ore shipped in about 1921-22 contained 1136 ounces of silver (Bundtzen, Smith, and Tosdal, 1976, table 1).

Reserves:

Additional comments:

The Martha Q mine is in Denali National Park and Preserve.

References:

Davis, 1923; Seraphim, 1962; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 04/24/01

Site name(s): Eureka Creek

Site type: Mine

ARDF no.: MM122

Latitude: 63.5385 **Quadrangle:** MM C-2

Longitude: 150.9262

Location description and accuracy:

Eureka Creek (Cobb, 1980 [OFR 80-363]) rises on the south flank of Quigley Ridge and Wickersham Dome and flows westerly into Moose Creek immediately north of the Kantishna townsite. The location is for the most heavily mined part of the creek, about one-third of the distance from the head and 1.4 miles above the mouth. Claims extended for the length of the creek, a distance of about 4.5 miles. Eureka Creek is location 46 of Cobb (1972 [MF 366]) and 51 of MacKevett and Holloway (1977). It is included in placer area E-1 of Thornsberry, McKee, and Salisbury (1984, fig. K-3).

Commodities:

Main: Au

Other: Pb, Sb

Ore minerals: Cassiterite, galena, gold, scheelite, stibnite

Gangue minerals: Garnet, magnetite

Geologic description:

Eureka Creek flows mostly across Birch Creek Schist, but for about 1/2 mile below Lucky Gulch It flows over infaulted rocks of the Spruce Creek sequence (Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The valley of Eureka Creek is narrow, and colluvium encroaches on a narrow alluvial section. Eureka Creek cuts high-terrace, bouldery gravels of Moose Creek just above the confluence of the creeks. At one point, the creek cuts through a landslide, and near Lucky Gulch an alluvial fan enters the valley from the north (Thornsberry, McKee, and Salisbury, 1984, figs. K-2 and K-3).

Rich placer deposits were discovered in Eureka Creek in July 1905. In the part of the creek upstream from the high-terrace gravels, the mined section ranged in width from somewhat less than 20 feet to about 100 feet and consisted of allluvial gravel on bedrock. The gravel was about five feet thick and the pay concentrated in sections from 1 to about 5 feet thick. The part of the creek flowing through bouldery gravels of the Moose Creek system contained exotic boulders in addition to the bedrock-derived material from Eureka Creek (Prindle, 1907, 1911; Capps, 1919).

The thin alluvial deposits were rich, and the richest gravels were within 1/2 mile of the mouth of the creek. Prindle (1911, p. 177) proposed that the richness of the lower gravels was due to a slight decrease in the grade of the creek and to the riffle-like action of the large boulders in the Moose Creek wash. Some of this ground was very nuggety; the largest nugget found was about 33 ounces, but two-ounce nuggets were found as much as two miles above Moose Creek. Mining extended farther upstream in later years; notable placer deposits continue upstream to about 1/2 mile above the confluence of Lucky Gulch. The Banjo mine (MM097), the most productive lode gold mine in the Kantishna Hills, is at the head of Lucky Gulch.

Fineness or purity of Eureka Creek gold ranged from 747 to 841 in eleven samples (Bundtzen, 1981, table 19), much finer than that at Caribou Creek (MM042). Gold 777 fine was mined in Eureka Creek in 1983 about 1 mile above the mouth of the creek (Levell, v. 2, p. 38).

The deposits are Pleistocene and Holocene. Stibnite, galena, scheelite, and lesser amounts of cassiterite occur in the Eureka Creek placer concentrate, along with magnetite and garnet. A possible local stibnite source in the lower part of Eureka Creek is the antimony deposit at the Eureka Stibnite mine (MM133).

Alteration:

Age of mineralization:
Pleistocene and Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes

Site Status: Inactive

Workings/exploration:
Eureka Creek was mined by hand in the early days and mechanically after about 1930. Rich deposits were discovered in July 1905 and nearly mined out by August 1906. Production during that era was probably about 7500-8000 fine ounces of gold ($150,000-160,000). Placer operations continued until World War II and commenced again after the war. Records of mining are given in the annual reports on mining in Alaska summarized by Cobb (1980 [OFR 80-363]). Two outfits were mining in 1975 and in 1983 (Bundtzen, Smith, and Tosdal, 1976; Thornsberry, McKee, and Salisbury, 1984).

Production notes:
Total production probably exceeded 10,000 fine ounces of gold, of which about three-fourths was recovered in 1905-06.

Reserves:
Eureka Creek contains potential gold resources estimated from field measurements and drill and pit tests (Levell, 1984, v. 2, table A-5). High- potential resources left in Eureka Creek in then-claimed ground consist of 390,000 cubic yards of stream-bottom and bench gravels. Stream gravels contain 0.0027 to 0.045 ounce of gold per cubic yard; bench gravels contain 0.0027 to 0.024 ounce of gold per cubic yard. Based on the gold grades, the total gold contained in high-potential, claimed alluvial and bench gravels in Eureka Creek ranges from 1,053 to 12,300 ounces. Gold is also in alluvial fan deposits, which are of lower grade and certainty. The amount of gold reasonably contained in such deposits ranges from 936 to 1716 ounces. In addition, there are about 645,000 cubic yards of high- to moderate-potential gravels contained in unclaimed lands along Eureka Creek.

Additional comments:
Eureka Creek was the richest creek mined in the Kantishna district and probably the second in total production. The creek is entirely in Denali National Park and Preserve.

References:
Prindle, 1907; Prindle, 1911; Capps, 1919; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Prindle, 1907; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/08/01

Site name(s): Hillside; Silver King

Site type: Prospect

ARDF no.: MM123

Latitude: 63.5385 **Quadrangle:** MM C-2

Longitude: 150.9780

Location description and accuracy:
The Hillside or Silver King (Cobb, 1980 [OFR 80-363]) prospect is at the northwest foot of Quigley Ridge about 0.15 mile south of the mouth of Friday Gulch. The location is between a shaft at an elevation of about 1800 feet and a cut along Moose Creek at an elevation of about 1550 feet. The location is approximate but probably is accurate within 1000 feet. The Hillside prospect is included with the Red Top mine (MM118) in location 7 of Cobb (1972 [MF 366]) and location 6 of MacKevett and Holloway (1977).

Commodities:

Main: Ag(?), Au(?)

Other: Cu, Pb

Ore minerals: Chalcopyrite(?), galena, tetrahedrite(?)

Gangue minerals: Quartz

Geologic description:
The country rock in the area of the Hillside or Silver King prospect is probably metafelsite of the lower Paleozoic Spruce Creek sequence (Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The Hillside vein was discovered in a 40-foot shaft sunk just west of the west end line of the Red Top claim (MM118), and presumably is an extension of the Red Top vein. The vein is 5 to 6 feet thick and and consists of quartz containing galena, possibly chalcopyrite and tetrahedrite, and probably some silver and gold. A possible extension of this vein on the west side of Moose Creek was uncovered during ground sluicing, but the cut had sloughed by 1921 (Davis, 1923, p. 123). The prospect was in litigation when it was visited by Davis; one claimant called the claim the Hillside; the other called it the Silver King.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The deposit was explored during or before 1922 by a 40-foot shaft and by sluicing and other surface work.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Davis, 1923; Cobb, 1972 (MF 366); MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Francis

Site type: Mine

ARDF no.: MM124

Latitude: 63.5382 **Quadrangle:** MM C-2

Longitude: 150.9589

Location description and accuracy:

The Francis mine (Cobb, 1980 [OFR 80-363]) is on the southwest crest of Quigley Ridge at an elevation of about 2800 feet. The coordinates are for the location of the mine adit, and are accurate within about 300 feet.

The Francis mine is included with the Lucky Strike prospect (MM135) in location 5 of Cobb (1972 [MF 366]) and in number 4 of MacKevett and Holloway (1977). The mine is included in number 23 of Bundtzen (1981) and number 31 of Thornsberry, McKee, and Salisbury (1984). It is patented claim 13 of Hawley and Associates (1978).

Commodities:

Main: Ag, Au

Other: Cu

Ore minerals: Chalcopyrite(?), gold, pyrite

Gangue minerals: Quartz

Geologic description:

The country rock on the Francis claim consists of metafelsite and graphitic phyllite of the Spruce Creek sequence (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2, also v. 2, location 31). The deposit is a 1- to 3.5-foot-thick mineralized quartz vein that strikes N. 55 E., and dips about 65 S. It can be followed in old workings and pits for several hundred feet and projects towards a vein of similar strike and dip on the adjacent Little Maud claim (MM119). The vein is mostly white quartz containing some pyrite and copper sulfide. Samples from the Francis vein collected by Davis (1923) and Wells (1933) were low grade, but Wells noted that some of the quartz contains visible free gold. Davis (1924) noted that the owners of the property reported finding vein material valued at about $35, or about 1.75 ounce of gold, per ton. Bundtzen (1981) reported another vein on the property that strikes about N75E and dips vertically.

Alteration:

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Low-sulfide gold-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The Francis vein was developed by a drift adit about 70-75 feet long that was probably driven before 1920. The Francis claim area was explored by Moneta-Porcupine in 1960-61 (Seraphim, 1962).

Production notes:

Bundtzen (1981) reported that a few tons of ore were produced from the Francis mine. Presumably, this ore was the richer, free-gold bearing, material reported by Davis (1923) and Wells (1933).

Reserves:

Additional comments:

The claim is in Denali National Park and Preserve.

References:

Davis, 1923; Wells, 1933; Seraphim, 1962; Cobb, 1972 (MF 366); MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923; Seraphim, 1962; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 04/22/01

Site name(s): Sulphide

Site type: Occurrence

ARDF no.: MM125

Latitude: 63.5375 **Quadrangle:** MM C-2

Longitude: 150.9311

Location description and accuracy:
The Sulphide occurrence (Cobb, 1980 [OFR 80-363]) is in the canyon of Eureka Creek at an elevation of about 2100 feet. It is on a patented claim, in the SW1/4 SW1/4 section 7, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet. The occurrence is number 22 of Hawley and Associates (1978), 33 of Bundtzen (1981), and 38 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other: Ag, Pb

Ore minerals: Arsenopyrite, gold, pyrite, scorodite

Gangue minerals: Quartz

Geologic description:
A quartz vein at the Sulphide claim cuts Birch Creek schist. Davis (1923) described an 8-foot-thick quartz vein in the discovery cut near the center of the claim that contains pyrite; panned samples of the vein contained gold. Bundtzen (1981) reported that the vein, which he traced for about 150 feet, contains arsenopyrite, boulangerite, and pyrite. The arsenopyrite is partly oxidized to scorodite. Hawley and Associates (1978, nos. 137-38, table 4.1-A(1)) collected rock samples near the prospect that assayed as much as 20 ppm silver and 1.9 ppm gold.

Alteration:
Partial oxidation of arsenopyrite to scorodite.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: No

Site Status: Inactive

Workings/exploration:
Sloughed pits date at least as far back as 1922.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve; it has been inactive for many decades.

References:
Davis, 1923; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 04/23/01

Site name(s): Water Level

Site type: Prospect

ARDF no.: MM126

Latitude: 63.5370 **Quadrangle:** MM C-2

Longitude: 150.9393

Location description and accuracy:
The Water Level prospect, on a patented claim, is at an elevation of almost 2000 feet in the canyon of Eureka Creek, about one mile above its mouth. It is in the SE1/4 SE1/4 section 12, T. 16 S., R. 18 W, Fairbanks Meridian. The location is accurate within 500 feet. The prospect is number 21 of Hawley and Associates (1978), 32 of Bundtzen (1981), and 37 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag

Other: Au, Cu, Pb

Ore minerals: Cerussite, galena, limonite, pyrite(?), tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:
The country rock at the Water Level prospect is south-dipping quartzitic schist of the Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, fig. K-2). The deposit consists of mineralized quartz-siderite veins. Davis (1923, p. 130) described a 3-foot-thick, galena-bearing vein that assayed 30 to 40 ounces of silver per ton. Bundtzen (1981, location 32) described a vein that strikes ENE and dips steeply to the NW. It is 3 to 6 feet thick, strongly sheared and oxidized, and contains galena, pyrite(?), cerussite, and limonite. Float near or at the prospect assaayed up to about 77 ounces of silver per ton (Seraphim, 1962), and Hawley and Associates (1978) collected a soil sample that assayed about 0.1 ounce of gold per ton.

Alteration:
Surface oxidation of iron and lead minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
Most of the work at the prospect appears to have been done before 1922 (Davis, 1923). Moneta-Porcupine prospected at and near the prospect in 1960, and the prospect was examined by Bundtzen (1981). Little work has been done since 1922.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Davis, 1923; Seraphim, 1962; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 04/23/01

Site name(s): White Hawk

Site type: Prospect

ARDF no.: MM127

Latitude: 63.5358 **Quadrangle:** MM C-2

Longitude: 150.9451

Location description and accuracy:
The White Hawk prospect is at an elevation of about 2150 feet on the north wall of the canyon of Eureka Creek, about three-quarters of a mile above its mouth. It is in the SW1/4 SE1/4 section 12. T. 16 S., R. 18 W., Fairbanks Meridian. The location is about at the center of the patented claim, and is accurate within about 300 feet. The prospect is number 15 of Bundtzen, Smith, and Tosdal (1976), 20 of Hawley and Associates (1978), 31 of Bundtzen (1981), and 34 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: Cu, Pb, Sb, Zn

Ore minerals: Azurite, boulangerite, galena, goethite, hematite, malachite, pyrite, pyrrhotite, stibnite, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:
The White Hawk prospect is in felsic(?) schist, close to a fault contact between Birch Creek Schist and felsic rocks of the Spruce Creek sequence (Thornsberry, McKee, and Salisbury, 1984, fig. K-2) The deposit consists of mineralized siderite-quartz veins. A hole (K-13), drilled by the U.S. Bureau of Mines in 1983, encountered pyrrhotite-bearing greenschist of Birch Creek type (Thornsberry, McKee, and Salisbury, 1984, fig. K-2; v.2, occurrence 34).
Early workings exposed siderite-quartz veins containing sphalerite, galena, pyrite, stibnite, tetrahedrite, and boulangerite and possibly other lead-antimony sulfides (Bundtzen, 1981). The sulfides are oxidized to azurite, goethite, hematite, and malachite.
Samples of dump material assayed as much as 24.5 percent lead, 32.5 percent zinc, 11 percent antimony, 11.6 ounces of silver per ton, and a small amount of gold (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 34). The prospect was developed by pits and a shallow shaft, largely sloughed. The claim discovery was on a 3-foot thick tetrahedrite-bearing vein of apparent NE strike. The vein probably continues southwesterly to a shallow shaft, where a similar 3-foot vein is exposed (Davis, 1923, p. 130).

Alteration:
Oxidation of iron and copper minerals.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The vein was discovered and explored by pits and shallow shafts before 1922 (Davis, 1923). Some additional work was done by Seraphim (1962). The shallow workings are sloughed.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Davis, 1923; Seraphim, 1962; Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 04/23/01

Site name(s): Galena

Site type: Mine

ARDF no.: MM128

Latitude: 63.5354 **Quadrangle:** MM C-2

Longitude: 150.9656

Location description and accuracy:

The Galena mine (Cobb, 1980 [OFR 80-363]) is on the southwest end of Quigley Ridge between elevations of about 2050 and 2300 feet. The patented Galena claim abuts the Frances claim to the east.. The main mine workings are in the SW1/4 SW1/4 section 12, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within 300 feet.

The mine site corresponds to number 8 of Cobb (1972 [MF 366]), 6 of MacKevett and Holloway (1977), 16 of Bundtzen, Smith, and Tosdal (1976), 20 of Bundtzen (1981), and 27 of Thornsberry, Smith, and Tosdal (1984). Its relation to nearby patented and unpatented claims in force in about 1960 is shown in Hawley and Associates (1978).

Commodities:

Main: Ag, Au

Other: Cu, Pb, Zn

Ore minerals: Arsenopyrite, chalcopyrite, galena, limonite, pyrite, sphalerite, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:

The country rocks at the Galena mine are metafelsite, quartzite, and graphitic and chloritic phyllite of the Spruce Creek sequence (Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984, fig. K-2 and occurrence map, v. 2). The deposit is a quartz-siderite vein that strikes about N. 45 E., and dips 60 to75 SE (Capps, 1919, p. 105-106; Davis, 1923, p. 123). The vein has a sharp hanging wall and a gradational foot wall; it is about 8 or 9 feet thick where developed in a crosscut. The vein is limonitic and contains pyrite, galena, sphalerite, tetrahedrite, and arsenopyrite. The sulfides locally form pods up to 1 foot thick. About 300 feet northeast of the mine portal, and on strike with the vein, an open cut developed a foot-thick quartz vein containing chalcopyrite and tetrahedrite.

About 50 to 100 tons of ore was mined from the adit and open cut, and shipped to a smelter before 1923 (Brooks, 1922; Davis, 1923). Some of the ore was very rich, assaying up to 131 ounces of silver per ton (Capps, 1919, p. 105-106).

Alteration:

Silicification. Oxidation of iron minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The deposit was discovered and mine development began before 1920 (Capps, 1919). About 50 to 100 tons of ore was mined in the winter of 1920-1921 and shipped to a smelter (Brooks, 1922, p. 53; Davis, 1923, p. 123). The workings were largely caved by 1931 (Wells, 1933). The area was explored in about 1960 by Moneta-Porcupine (Seraphim, 1962), but no ore was developed. The Galena mine area was mapped and sampled by Bundtzen (1981); Hawley and Associates (1978); and, in 1983, by the U.S. Bureau of Mines (Thornsberry, McKee, and Salisbury, 1984, v. 2, location 27). During their investigation, the Bureau drilled one core hole below the discovery adit (hole K-17). This hole intersected what is probably the Galena vein between 234.1 feet and 240.5 feet. The weighted assay of the 5.2-foot vein intercept is 0.2 ounce of gold per ton and 8.14 ounces of silver per ton. Copper, lead, and zinc contents each average about 0.1-0.4 percent. During the same study, a selected surface sample of the vein assayed more than 45 ounces of silver per ton, 3.3 percent lead, 5.5 percent zinc, and small amounts of gold and copper.

Production notes:

The Galena mine produced 50 to 100 tons of ore which reportedly yielded about 17,000 ounces of silver (Bundtzen, Smith, and Tosdal, 1976, p. 25).

Reserves:

Additional comments:

The mine is in Denali National Park and Preserve.

References:

Capps, 1919; Brooks, 1922; Davis, 1923; Wells, 1933; Seraphim, 1962; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923; Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/29/01

Site name(s): Unnamed (ridge between Moose Creek and Eureka Creek)

Site type: Occurrence

ARDF no.: MM129

Latitude: 63.5331 **Quadrangle:** MM C-2

Longitude: 150.8746

Location description and accuracy:
This occurrence is between elevations 3500 and 3600 feet on the crest and south flank of the ridge that separates Eureka and Moose Creeks. It is about 1/4 mile east of the head of No Name Creek, in the NE1/4 NE1/4 of section 17, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet. The site corresponds to an unnumbered mineral occurrence east of number 42 of Bundtzen, Smith, and Tosdal (1976), to number 143 of Hawley and Associates (1978), and number 54 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Zn

Other: Cu, Pb

Ore minerals: Chalcopyrite, galena, sphalerite

Gangue minerals: Actinolite, garnet, quartz, tremolite

Geologic description:
The country rocks in the area of this occurrence are mainly quartz-feldspar schist and quartzite of the upper Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 54). Outcrop is poor. The occurrence consists of a boulder of quartz-garnet-actinolite (tremolite) schist that contains abundant sphalerite and lesser amounts of galena and chalcopyrite. Soil samples collected along the NW trend of the Birch Creek country rocks are anomalous in lead, zinc, antimony, and arsenic (Hawley and Associated, 1978).

Alteration:

Age of mineralization:

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

The occurrence is in Denali National Park and Preserve.

References:

Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/30/01

Site name(s): Rainy Creek

Site type: Mine

ARDF no.: MM130

Latitude: 63.5329 **Quadrangle:** MM C-2

Longitude: 150.8028

Location description and accuracy:
Rainy Creek (Cobb, 1980 [OFR 80-363]) rises against unnamed ridges south and west of Glacier Creek, and drains the southeast flank of the Kantishna Hills. The creek is about 2 1/2 miles long; it flows over a half-mile-long fan above its junction with Moose Creek. The location is on Rainy Creek in the northwest corner of section 14, T. 16 S., R. 17 W., Fairbanks Meridian. It is about on the boundary between the R6 and R7 claims located in 1966 (Heiner and Porter, 1972, KX 66-115), and between the R1 and R2 gold placer resource blocks of Thornsberry, McKee, and Salisbury (1984, fig. K-3; Levell, 1984 [v. 2]).

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:
The main, south-southeast-flowing, segment of Rainy Creek is controlled by the same fault that controls the course of upper Yellow Creek (MM079) (Thornsberry, McKee, and Salisbury, 1984, fig. K-2). In upper Rainy Creek, this fault juxtaposes Spruce Creek lithologies (to the east) against Birch Creek Schist. Lower Rainy Creek cuts Birch Creek Schist to the point where it begins to flow across an alluvial fan, about 1/2 mile above Moose Creek (Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

Upper Rainy Creek is steep, with a gradient of more than 300 feet per mile. The uppermost unnamed east fork and the segment that trends south-southeast contain thin, irregular deposits of angular-cobble alluvium. In the lower course of the creek, the alluvial deposits are bordered by terrace gravels.

Little is known about the placer deposits in Rainy Creek. One operation was reported in 1922 (Davis, 1923). The unnamed headwater east fork drains an area of lode deposits, such as MM086, MM090, MM093, and MM095. Small colluvial and alluvial deposits derived from those lodes probably occurred in the upper part of the creek and presumably were mined in the early years of the district. In 1983, an operation was being set up to test alluvium in the fan near the mouth of the creek, but mining had not started when the project was visited by Levell (1984, v. 2).

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The Rainy Creek placer deposit was discovered and mining was in progress in 1922 (Davis, 1923), but there has been little recorded production. The lower course of the creek was explored in 1983, but there is no public information about the results of that work.

Production notes:

Unknown, but probably a maximum of 500 ounces of gold.

Reserves:

Levell (1984, v. 2) estimated a total of 5000 cubic yards of high-potential placer resources on ground claimed in 1983.

Additional comments:

The creek is in Denali National Park and Preserve.

References:

Davis, 1923; Heiner and Porter, 1972; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Levell, 1984 (v. 2); Cox and Singer, 1986.

Primary reference: Davis, 1923; Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Unnamed (between Rainy Creek and Dry Creek)

Site type: Occurrence

ARDF no.: MM131

Latitude: 63.5328 **Quadrangle:** MM C-2

Longitude: 150.7908

Location description and accuracy:
This occurrence is at an elevation of about 2750 feet near the south end of the ridge separating Rainy Creek and Dry Creek. It is in the NE1/4 NW1/4 section 22, T. 16 S., R 17 W., Fairbanks Meridian. The location is accurate.

Commodities:

Main: Au(?)

Other:

Ore minerals: Gold(?)

Gangue minerals: Quartz

Geologic description:
This occurrence is a nearly vertical quartz vein exposed over a distance of about 1/2 mile on the east side of Rainy Creek. The vein strikes NE and cuts upper Precambrian Birch Creek Schist (Bundtzen, 1981; Hawley and Associates, 1978, fig. 4.1-A(1)); Thornsberry, McKee, and Salisbury, 1984).
The vein consists mainly of quartz; it is resistant and crops out locally. There are no published reports of any metalliferous minerals in the vein. A placer deposit in Rainy Creek below this site suggests that the vein locally contains free gold.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide gold(?)-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/02/01

Site name(s): Moose Creek

Site type: Mines

ARDF no.: MM132

Latitude: 63.5319 **Quadrangle:** MM C-2

Longitude: 150.9738

Location description and accuracy:

Moose Creek is one of the major placer creeks of the Kantishna Hills (Cobb, 1980 [OFR 80-363]) . Commencing at the junction of Moose Creek and its North Fork, the creek flows westerly for about six miles, turns northwesterly about a half-mile above the village of Kantishna and flows northwest for several miles, then turns almost due north about a mile north of Reindeer Hill. For this record, the location is on Moose Creek about a half-mile upstream from the mouth of Eureka Creek, in the NE1/4 of section 14, T. 16 S., R. 18 W., Fairbanks Meridian. Cobb (1972 [MF 366]) divides the Moose Creek placer into two segments. One (no. 44) nearly coincides with the foregoing location; the other (no. 42) is in the north-trending, lower canyon of Moose Creek. Thornsberry, McKee, and Salisbury (1984, fig. K-3) also subdivide the deposit: upper Moose Creek is the part of the creek above Eureka Creek; lower Moose Creek extends downstream from Eureka Creek.

Commodities:

Main: Au

Other: Ag

Ore minerals: Gold

Gangue minerals:

Geologic description:

Moose Creek mainly drains an area underlain by Precambrian Birch Creek Schist. Near Eureka Creek, it traverses semischist and phyllite of the Paleozoic Spruce Creek sequence for about a mile before it flows again over Birch Creek bedrock. It is a wide, meandering stream with a floodplain up to a mile wide. A thin alluvial gravel deposit lies along the modern course of the creek, which is incised into thick terrace gravels. Locally, as below Rainy and Glen Creeks, extensive fans encroach on the creek from the north. Till of Wisconsin age is probably buried by the terrace gravels west of Rainy and Glen creeks and near Willow Creek. In general, the alluvium near modern Moose Creek is on false bedrock (Davis, 1923; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, figs. K-2 and K-3).

In section 16, the North Fork of Moose Creek is somewhat auriferous below Willow and Spruce creeks. The main course of Moose Creek is auriferous from the junction of North Fork, about two miles west of the mouth of Spruce Creek. Moose Creek is fed by several streams containing gold placers. Named in order from the upper reaches, they are Willow (MM107), Spruce (MM104), Glen (MM108), Rainy (MM130), Eureka (MM122), Eldorado (MM028), and Friday (MM113) creeks.

Except where very rich creeks enter Moose Creek, the terrace gravels generally are too lean to mine. The important resource is in relatively thin alluvial deposits along modern Moose Creek, especially in the part below Eureka Creek. In the lower canyon (Cobb, 1972 [MF-363]), the alluvium probably carried point bar and related riverine concentrations of fine gold that were discovered about 1905 (Prindle, 1907).

In 1984, testing of Moose Creek alluvium above Eureka Creek yielded values of about 0.0025 to 0.0074 ounce of gold per cubic yard . Below Eureka Creek, testing yielded values of as much as 0.0193 ounce of gold per cubic yard. About a mile of this alluvium has been mined (Levell, 1984, in Thornsberry, McKee, and Salisbury, 1984, table A-5). Values reported in 1984 are much less than those reported in 1923 (Davis, 1923, p. 116-119). In 1923, when gold was priced at $20.67 per ounce, placer ground 8-10 feet thick was

reported to be worth 50 cents (0.025 ounce of gold) per bedrock foot. On a per-yard basis, this ground would have been worth about $1.75 (about 0.075 ounce of gold). Side pay was reported to be worth about eight to ten cents per bedrock foot. An attempt was made to mine the alluvium with hydraulic giants, but the gold recovered from a 50,000-square-foot cut was much less than had been suggested by the testing. The values were probably overestimated and some gold was probably lost in the hydraulic mining process. Mechanical mining in in the 1970s and 1980s near the mouth of Eureka Creek was successful. It probably worked Moose Creek alluvial gravels that had been enriched by gold contributed from Eureka and Eldorado creeks.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer deposits: reworked alluvial deposits and downstream riverine deposits (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Extensive testing in about 1920 led to an attempt to hydraulic mine Moose Creek alluvial deposits near Eureka Creek in 1922. Apparently the values were not as good as those suggested by exploration, or gold was lost in sluicing. The increase in the value of gold in 1934 led to renewed prospecting and possibly to mining from 1937 to 1939 (Cobb, 1980, p. 70 [OFR 80-363]). Further increase in the price of gold and development of efficient mechanical equipment resulted in successful mining in Moose Creek between 1973 and 1984.

Production notes:
About 5000 ounces of gold probably was recovered from Moose Creek.

Reserves:
Levell (1984, table A-5 [v. 2]) calculated ranges of gold resources on Moose Creek, based on measured volumes of alluvium and on grades determined by testing. In the section below Eureka Creek, where there was some commercial mining, 3,700,000 cubic yards of stream and bench alluvium could contain 740 to 71,410 ounces of gold on then-claimed ground. In the section above Eureka Creek, where the maximum grade found by testing was only 0.0074 ounce of gold per cubic yard, a moderate potential resource of 10,200,000 cubic yards of alluvium could contain 25,500 to 75,480 ounces of gold on then-claimed ground. A significant increase in the constant-dollar price of gold would be necessary to convert these theoretical resources to theoretical reserves.

Additional comments:
Moose Creek was claimed continuously from the junctions of Willow and Spruce creeks at the head of the North Fork to about one mile below the junction of Friday Creek (Hawley and Associates,1978). Except for the stretch between Eureka and Friday creeks, where the claims are double wide, the claims on Moose Creek are single width and closely follow the general meandering course of the creek. The claims are in Denali National Park and Preserve and are inactive except possibly for recreational panning by park visitors.

References:

Prindle, 1907; Davis, 1923; Cobb, 1972 (MF 366); Hawley and Associates, 1978; Cobb, 1980 (OFR 90-363); Bundtzen, 1981; Levell, 1984 (v. 2); Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 04/21/01

Site name(s): Eureka Stibnite (Pick claim group)

Site type: Mine

ARDF no.: MM133

Latitude: 63.5306 **Quadrangle:** MM C-2

Longitude: 150.9518

Location description and accuracy:

The Eureka Stibnite mine is in the canyon of lower Eureka Creek about 0.4 mile above the mouth of the creek. It is at an elevation of about 1800 feet, about 0.25 mile north of the center of section 13, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within about 500 feet.

The site corresponds to number 14 of Bundtzen, Smith, and Tosdal (1976), 140 of Hawley (1978), 16 of Bundtzen (1981), and 33 of Thornsberry, McKee, and Salisbury (1984). The deposit is classified as an unnamed prospect by Cobb (1980 [OFR 80-363]), and is briefly noted in his description of the Eureka Creek placer deposit (1980, number 46).

Commodities:

Main: Sb

Other: Ag, Au, Pb

Ore minerals: Arsenopyrite, pyrite, stibiconite, stibnite

Gangue minerals: Quartz

Geologic description:

The country rocks at the Eureka Stibnite mine are quartz schist with ankeritic interlayers and quartz-chlorite-muscovite schist with graphitic interlayers. The rocks belong to the upper Precambrian Birch Creek Schist (Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 33). The deposit consists of mineralized quartz veins in a fault zone more than 50 feet wide that strikes about N 40 W. The principal vein is near the center of the zone. It is about 3 feet thick and consists of quartz and stibnite, and lesser amounts of arsenopyrite and pyrite. In part, the stibnite and quartz form dendritic intergrowths. Stibnite-rich quartz stringers occur in the zone for a distance up to 50 feet from the central vein. Stibiconite is abundant in the weathered part of the deposit. Assays show up to 0.12 ounce of gold per ton, 0.92 ounce of silver per ton, and 0.12 percent lead (Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984, v. 2).

The Eureka Stibnite mine produced about 112 tons of stibnite ore. The deposit is similar to those at the Stampede (MM144) and Slate Creek (MM153) mines.

Alteration:

Oxidation of antimony mineral.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Simple Sb deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

27d

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:

The deposit was discovered during the early period of placer mining in the Kantishna district. Prindle (1907) reported stibnite in the placer concentrates of Eureka Creek. The deposit was mined in 1915, 1970, and between 1970 and 1983. The property currently (2001) is inactive and the workings are caved.

Production notes:

About 112 tons of stibnite ore were mined from 1915 to 1983, including 50 tons in 1915 (Bundtzen, 1981); 12 tons in 1970; and 50 tons between 1970 and 1983 (Thornsberry, McKee, and Salisbury, 1984, v. 2). The ore mined in 1970 contained 62 percent antimony.

Reserves:

Additional comments:

The mine is in Denali National Park and Preserve.

References:

Prindle, 1907; Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/23/01

Site name(s): Unnamed (west part of ridge between Moose Creek and Eureka Creek)

Site type: Prospect

ARDF no.: MM134

Latitude: 63.5303 **Quadrangle:** MM C-2

Longitude: 150.8929

Location description and accuracy:

This unnamed prospect is at an elevation of about 3500 feet on the crest of the western part of the ridge that separates Eureka and Moose Creeks. The prospect is west of the head of No Name Creek, about in the center of the NW1/4 of section 17, T. 16 S., R. 17 W., Fairbanks Meridian. The location is accurate within 500 feet.

The site corresponds to number 42 of Bundtzen, Smith, and Tosdal (1976), 142 of Hawley and Associates (1978), and 53 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Au

Other: Ag, As

Ore minerals: Arsenopyrite, pyrite

Gangue minerals: Quartz

Geologic description:

The country rock at this prospect is mainly quartz-mica schist of the upper Precambrian Birch Creek Schist (Bundtzen, 1981; Hawley and Associates, 1978). The deposit consists of a weakly auriferous quartz vein that contains arsenopyrite and pyrite. Samples assay about 0.01 to 0.03 ounce of gold per ton, small amounts of silver, and up to 0.99 percent arsenic. According to Bundtzen (1981), the vein strikes N 40 W and is vertical. Hawley and Associates (1978) mapped a vein that appears to strike ENE and dip steeply NW.

Alteration:

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Weakly auriferous, low-sulfide quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

36a

Production Status: None

Site Status: Inactive

Workings/exploration:

The prospect was explored by single pit, since sloughed.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978; Bundtzen, 1981

Reporter(s): C.C. Hawley

Last report date: 05/01/01

Site name(s): Lucky Strike

Site type: Prospect

ARDF no.: MM135

Latitude: 63.5302 **Quadrangle:** MM C-2

Longitude: 150.9671

Location description and accuracy:
The Lucky Strike prospect (Cobb, 1980 [OFR 80-363]) is on the lower slope of Quigley Ridge, on the east side of the Kantishna road along Moose Creek. It is at an elevation of about 1750 feet, about 3000 feet northwest of Kantishna. The prospect corresponds to number 5 of Cobb (1972 [MF 366]), 5 of MacKevett and Holloway (1977), 13 of Bundtzen, Smith, and Tosdal (1976), 16 of Bundtzen (1981), and 26 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Ag, Au

Other: Cu, Pb, Zn

Ore minerals: Galena, gold, sphalerite, tetrahedrite

Gangue minerals: Quartz, siderite

Geologic description:
The country rocks at the Lucky Strike prospect are mainly quartz-muscovite semischist of felsic volcanic origin. The rocks are part of the Spruce Creek sequence (Bundtzen, 1981). The prospect is immediately northwest of an inferred high-angle fault that separates Spruce Creek sequence rocks from the Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, fig. K-2).

The discovery vein on the patented Lucky Strike claim strikes N. 59 E., and dips 84 SE, roughly parallel to the attitude of the inferred fault (Davis, 1923, p. 124); the vein is at least 6 feet thick and consists mainly of quartz and siderite. The average grade of two samples across a 6 foot width was about 0.045 ounce of gold per ton and 8.2 ounces of silver per ton. A second vein, poorly exposed in cuts about 125 feet to the north of the discovery cut, appears to be at least 8 feet thick. Higher-grade material has been reported at the prospect. Moffit (1933, p. 331) was told of samples that contained more than 0.4 ounce of gold per ton. Bundtzen (1981, table 9) reported free gold, galena, sphalerite, and lesser amounts of tetrahedrite in the deposit.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

The claims were explored by open cuts and a short drift adit driven before 1922 (Davis, 1923); the workings were caved by 1931 (Moffit, 1933). There has been no important work on the prospect since then.

Production notes:

Possible minor production of gold and silver ore in about 1922.

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve.

References:

Davis, 1923; Moffit, 1933; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Davis, 1923

Reporter(s): C.C. Hawley

Last report date: 04/24/01

Site name(s): Unnamed (lower Eldorado Creek)

Site type: Occurrence

ARDF no.: MM136

Latitude: 63.5229 **Quadrangle:** MM C-2

Longitude: 150.9754

Location description and accuracy:
This occurrence is on a trail along lower Eldorado Creek. It is in the SE1/4 SE1/4 section 14, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate within 500 feet. The occurrence corresponds to number 69 of Hawley and Associates (1978), 12 of Bundtzen, Smith, and Tosdal (1976), and 15 of Bundtzen (1981). The site is probably the same as an occurrence described by Morrison (1964,sample A16).

Commodities:

Main: Au(?)

Other: Ag, As, Pb

Ore minerals: Arsenopyrite, galena, pyrite

Gangue minerals: Calcite, quartz, siderite

Geologic description:
The country rock at this occurrence is quartzite, probably of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). The occurrence consists of a poorly exposed quartz-siderite vein that strikes strikes about N 25-35 E., and dips 80 SE. The vein contains pyrite, arsenopyrite, and probably galena. Samples assay 0.01 ounce of gold per ton, 0.16 ounce of silver per ton, as much as 0.24 percent lead, and 0.45-0.95 percent arsenic (Thornsberry, McKee, and Salisbury, 1978, v. 2, site 24; Bundtzen, 1981, table 10, number 15). Morrison (1964) reported pyrite and arsenopyrite in quartz-calcite veins at this or a nearby locality. A sample assayed 0.04 ounce of gold per ton.

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide Au(?)-quartz vein (Cox and Singer, 1986; model 36a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
36a

Production Status: None

Site Status: Inactive

Workings/exploration:
The occurrence is a natural exposure in a road cut. There are no workings.

Production notes:

Reserves:

Additional comments:

The occurrence is in Denali National Park and Preserve. It is probably within the boundary of a former placer claim on Eldorado Creek.

References:

Morrison, 1964; Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/08/01

Site name(s): Iron Dome

Site type: Occurrence

ARDF no.: MM137

Latitude: 63.5226 **Quadrangle:** MM C-2

Longitude: 150.9880

Location description and accuracy:

This occurrence is at an elevation of about 2500 feet on Iron Dome, in the SE1/4 SW1/4 section 14, T. 16 S., R. 18 W., Fairbanks Meridian. The location is accurate. The occurrence is number 70 of Hawley and Associates (1978), 16 of Bundtzen (1981), and 19 of Thornsberry, McKee, and Salisbury (1984). The site also represents a nearby mineral occurrence described by Bundtzen, Tosdal, and Smith (1976, location 11), Hawley and Associates (1978, location 68), and Thornsberry, McKee, and Salisbury (1984, location 22).

Commodities:

Main: Cu

Other: Mn, Pb, Zn

Ore minerals: Arsenopyrite, chalcopyrite, galena, limonite, pyrite, pyrolusite(?), pyrrhotite, sphalerite

Gangue minerals: Calcite, clinozoisite, garnet, idocrase, quartz, serpentine

Geologic description:

This occurrence consists of approximately stratiform tactite in marble of the Spruce Creek sequence. The marble is part of a quartzite unit that structurally underlies quartz-feldspar schist and gneiss (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 19). The tactite is banded and consists mostly of garnet, clinozoisite, and idocrase, along with sparsely disseminated chalcopyrite, pyrite, and pyrrhotite. It is partly oxidized and stained with limonite and a black oxide, possibly pyrolusite. The country rocks are cut by quartz-calcite-potassium feldspar veinlets.

Samples collected by Bundtzen (1981) contained as much as 0.044 percent copper; samples collected by Hawley and Associates (1978) assayed more than a percent manganese, possibly originally in manganiferous carbonate or silicate that was oxidized to pyrolusite or manganiferous limonite.

The tactite is superimposed on the regionally metamorphosed country rocks. It may reflect a buried Tertiary intrusive downdip to the west. Thin quartz-carbonate veins containing small amounts of arsenopyrite, galena, and sphalerite occur nearby (Bundtzen, Smith, and Tosdal, 1976, location 11; Hawley and Associates, 1978, location 68; Thornsberry, McKee, and Salisbury, 1984, v. 2, location 20).

Alteration:

Development of tactite in calcareous beds of the Spruce Creek sequence. Oxidation of iron and manganese minerals.

Age of mineralization:

The deposit is assumed to be Eocene (see record MM091).

Deposit model:

Cu skarn deposit (Cox and Singer, 1986; model 18b).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

18b

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Unnamed (northwest bank of Eldorado Creek)

Site type: Occurrence

ARDF no.: MM138

Latitude: 63.5180 **Quadrangle:** MM C-2

Longitude: 150.9865

Location description and accuracy:
This occurrence is on the floor of the canyon of Eldorado Creek about 0.3 mile south of Iron Dome. It is in the NE1/4NW 1/4 section 23, T. 16 S., R. 18 W., Fairbanks Meridian. The location is probably within 1000 feet of location 21 of Thornsberry, McKee, and Salisbury (1984), and within 500 feet of location 68 Hawley and Associates (1978). It also corresponds to number 11 of Bundtzen, Smith, and Tosdal ((1976) and 14 of Bundtzen (1981), but their map sites apparently do not agree with their text descriptions of the site.

Commodities:

Main: Fe

Other: As, Au

Ore minerals: Pyrite

Gangue minerals:

Geologic description:
This occurrence consists of stratiform, semimassive to massive pyrite layers or lenses 1 to 18 inches thick and possibly as much as fifty feet long, in calcareous quartz-muscovite schist of the lower Paleozoic Spruce Creek sequence (Bundtzen, 1981). Samples assay up to 0.005 ounce of gold per ton and 0.027 percent arsenic (Thornsberry, McKee, and Salisbury, 1984, occurrence 21, Appendix II).

Alteration:

Age of mineralization:
This stratiform, possibly syngenetic, deposit may be early Paleozoic, the protolith age of the Spruce Creek sequence hostrocks (Bundtzen, 1981).

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The deposit has been reconnaissance mapped and sampled (Bundtzen, Smith, and Tosdal, 1976; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984). There are no significant workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/08/01

Site name(s): Lucky Tuesday

Site type: Prospect

ARDF no.: MM139

Latitude: 63.5129 **Quadrangle:** MM C-2

Longitude: 150.9714

Location description and accuracy:
The Lucky Tuesday prospect is at an elevation of about 2500 feet, about 1/2 mile north of the top of Busia Mountain. It is about 4000 feet east of the center of section 23, T. 16 S., R. 18 W., Fairbanks Meridian. The location is probably accurate within 500 feet. The prospect is number 7 of Bundtzen, Smith, and Tosdal (1976) and Bundtzen (1981), 18 of MacKevett and Holloway (1977), KX 66-105 of Hawley and Associates (1978), and 22 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Sb

Other: Ag, Au, Pb

Ore minerals: Stibnite

Gangue minerals: Quartz

Geologic description:
The country rock at the Lucky Tuesday prospect is weakly ironstained quartz-sericite schist of the Birch Creek Schist (T. K. Hinderman in Thornsberry, McKee, Salisbury, 1984, v. 2, occurrence 22). The deposit consists of poorly explosed quartz-stibnite veins up to about 3 feet thick. The veins apparently strike E-W to about N 30 E. Grab samples from high-grade ore piles and a sloughed pit contain as much as 54.2 percent antimony. Small amounts of gold and silver are present; samples assay up to 0.07 ounce of gold per ton and 0.21 ounce of silver per ton. Lead is abundant enough in one sample (0.31 percent) to be present as galena or a lead sulfosalt.

Alteration:
Weak iron staining.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Simple stibnite deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The prospect was developed by one pit, probably excavated by Jim Fuksa, who owned two Lucky Tuesday claims. The pit is sloughed.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 04/20/01

Site name(s): Little Moose Creek

Site type: Mine

ARDF no.: MM140

Latitude: 63.7486 **Quadrangle:** MM C-1

Longitude: 150.4427

Location description and accuracy:

The upper reaches of Little Moose Creek (Cobb, 1980 [OFR 80-363]) have been placer mined for about 7000 feet. The placer mine extends from the Mt. McKinley C-1 into the Mt. McKinley D-1 quadrangle (Hawley and Associates, 1978). For this record, the location is at the approximate midpoint of the mined section of the creek, near the center of the NW1/4 section 34, T. 13 S., R. 15 W., Fairbanks Meridian. The lowermost two miles of Little Moose Creek (on Mt. McKinley D-1 quadrangle) were staked and prospected for many years but had limited mining (Heiner and Porter, 1972: Kardex locations 66-1, -6, and -28).

Commodities:

Main: Au

Other: Ag, Cu, W, Zn

Ore minerals: Gold, limonite, scheelite, silver

Gangue minerals:

Geologic description:

Little Moose Creek mostly flows through Birch Creek Schist (Bundtzen, 1981). In the headwaters of Little Moose Creek, across the divide from an unnamed north fork tributary of the North Fork of Canyon Creek, a half-mile- wide band of siliceous and graphitic schist of the Keevy Peak Formation is downfaulted into the Birch Creek Schist (Hawley and Associates, 1978, fig. 4.1-A(2)). Below the outcrops of Keevy Peak Formation, ferricrete and limonitic spring deposits strongly discolor about 1500 feet of uppermost Little Moose Creek. A stream-sediment sample collected in Little Moose Creek about a mile below the limonite deposit and just above the placer mine contained 150 ppm copper, 65 ppm lead, and 1150 ppm zinc (Hawley and Associates, 1978, sample 62). A fault mapped immediately east of the placer mine places felsic schist of the Birch Creek against mainly calc-schist and quartzite-rich units. If this fault continues into the creek, it would be about at the head of the placer deposit.

The placer deposits occur in a narrow canyon with steep to moderately steep walls. The gravel section mined in about 1916 was about 8 to 10 feet thick, too deep for open-cut mining in the narrow canyon. Placer gold recovered was about 600 fine, shot-like in appearance, and accompanied by small nuggets of native silver (Capps, 1919, p. 93). Scheelite is a common mineral in the placer concentrates (Joesting, 1942).

Annual reports of the U. S. Geological Survey reported mining or active prospecting in many years between 1920 (Brooks, 1922) and 1933 (Smith, 1934). In 1922, Davis (1923) reported that miners cleaned 30,000 feet of bedrock at an average value of 22 cents per bedrock foot. Assuming that all of that value was due to gold (at $20.67 per ounce), the approximate production in 1922 was about 350 ounces of gold.

The Little Moose Creek deposit is of interest geologically because of the low fineness (600) of the gold, and the occurrence of native silver in the placer.

Alteration:

Age of mineralization:

Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
Little Moose Creek creek was explored and mined at least from 1916 until 1941. The creek was extensively mined in 1922 (Davis, 1923). Antimony miner Earl Pilgrim mined the creek in 1941 (White, 1942). In 1955, claims on lower Little Moose Creek were active, and the creek was being prospected (Heiner and Porter, 1972). Early mining may have been from shallow drifts. The creek was probably mined on a small scale with tractors in the 1930s and in 1941.

Production notes:
Based on records cited by Davis (1923), about 350 ounces of gold were recovered from on Little Moose Creek in 1922. The approximate value of the production, computed at $20.67 per fine ounce of gold, was about $7,000. In general, annual production was less than this. Moffit (1933) reported that, in most years up to 1931, annual production amounted only to a few hundred dollars.

Reserves:

Additional comments:
The mine is in Denali National Park and Preserve.

References:
Capps, 1919; Brooks, 1922; Davis, 1923; Moffit, 1933; Smith, 1934 (B 864); Joesting, 1942; White, 1942; Heiner and Porter, 1972; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Cox and Singer, 1986.

Primary reference: Capps, 1919; Davis,1923; Moffit, 1933; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Upper Ridge

Site type: Mine

ARDF no.: MM141

Latitude: 63.7452 **Quadrangle:** MM C-1

Longitude: 150.3891

Location description and accuracy:
The Upper Ridge mine (Cobb, 1980 [OFR 80-363]) is at an elevation of about 2800 feet on the divide between Little Moose and Stampede creeks. It is about 2300 feet east of the center of section 36, T. 13 S., R. 15 W., Fairbanks Meridian. The location is accurate within 500 feet. The mine site corresponds to number 67 of Bundtzen, Smith, and Tosdal (1976), 76b of Bundtzen (1981), and 109 of Thornsberry, McKee, and Salisbury (1984). Hawley and Associates (1978) position it nearly at the common end line between the Ridge No. 1 and 2 claims.

Commodities:

Main: Sb

Other: Ag, Au, Zn

Ore minerals: Kermesite, limonite, pyrite, stibiconite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rocks at the Upper Ridge mine are quartz-feldspar schist and gneiss, and quartzite of the Birch Creek Schist (Bundtzen, 1981). The deposit is on the north flank of the Stampede warp (antiform) (Thornsberry, McKee, and Salisbury, 1984, plate K-4; Hawley and Associates, 1978, fig. 4.1-A(2)).
The principal deposit was a lens of massive stibnite that has been largely mined out. Small veins of stibnite, partly oxidized to stibiconite and kermesite, remain at the mine site. There also are quartz veins, stained with limonite after pyrite. A grab sample of stibnite-bearing float assayed 38.5 percent antimony and 0.026 ounce of gold per ton. A sample of a quartz-stibnite gash vein assayed 14.5 percent antimony and 0.06 ounce of gold per ton (Hawley and Associates, 1978). Sulfidized schist near the occurrence contained 1.2 percent zinc and anomalous amounts of copper, lead, and silver (Bundtzen, 1981, p. 226).

Alteration:
Partial oxidation of stibnite. Iron-oxide alteration.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Simple Sb deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
The stibnite ore body was surface mined.

Production notes:
An unknown amount of antimony ore was mined at the Upper Ridge deposit.

Reserves:

Additional comments:
The Upper Ridge mine is in Denali National Park.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, 1981; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Stampede Creek

Site type: Mine

ARDF no.: MM142

Latitude: 63.7427 **Quadrangle:** MM C-1

Longitude: 150.3648

Location description and accuracy:
Stampede Creek (Cobb, 1980 [OFR 80-366]) is auriferous just above and below the Stampede antimony lode mine (MM144). For this record, the location is at the approximate midpoint of 1800 feet of placer workings, in the SE 1/4 of section 36, T. 13 S., R. 15 W., Fairbanks Meridian. The location is accurate within about 500 feet. The mine is number 57 of Cobb (1972 [MF 366]) and 60 of MacKevett and Holloway (1977). Four placer claims were patented: the relation of these claims to patented lode claims is shown by Hawley and Associates (1978).

Commodities:

Main: Au

Other: Sb, W

Ore minerals: Gold, scheelite, stibnite

Gangue minerals:

Geologic description:
Stampede Creek flows through a moderately steep canyon. Its gravels are not extensive, but they are locally auriferous and have been mined about a half-mile below the Stampede lode mine (MM144). The mined section appears to coincide in part with the mineralized Stampede fault, which cuts the creek at a high angle. In Stampede Creek, the fault places light-colored quartzite of the Birch Creek Schist against dark-colored carbonaceous quartzite of the Keevy Peak Formation (Bundtzen,1981). In addition to gold, the placer gravels contain scheelite and grains and small cobbles of stibnite (Joesting, 1942; White, 1942; Cobb, 1975 [MR 66]). In 1941, a small placer mine operated on upper Stampede Creek, a half-mile or so above the main workings, in 1941 (White, 1942, p. 335).

Placer gold from Stampede Creek was very rich in silver; fineness ranged between 544 and 567 (Bundtzen, 1981, table 19). Of all the creeks in the Kantishna area, only the gold on Little Moose Creek is similar in fineness.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au-PGE placer deposit (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Yes; small

Site Status: Inactive

Workings/exploration:
The deposit was worked in an open cut.

Production notes:
Reported production is 183 ounces of gold (Levell, 1984, table A-6).

Reserves:
About 15,000 cubic yards of placer alluvium remain in upper Stampede Creek; about 200,000 cubic yards remain at the main mine site; and there are about 500,000 cubic yards in an unevaluated fan deposit at the mouth of the creek (Levell, 1984, v. 2, table A-6). Sluice samples collected at the main mine site contained 0.2925 and 0.0418 ounce of gold per cubic yard. Using the lower sample value, there is a possible resource of about 8400 ounces of placer gold in the 200,000 cubic yard alluvial deposit. There is additional resource potential in the untested fan deposit. The alluvium in upper Stampede Creek is bouldery and difficult to mine; the 200,000 cubic yard resource can be mined with conventional placer equipment (Levell, 1984, v. 2).

Additional comments:
Stampede Creek is in Denali National Park and Preserve.

References:
Joesting, 1942; White, 1942; Cobb, 1972 (MF 366); Cobb, 1975 (MR 66); MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Levell, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates; 1978, Levell, 1984 (v. 2)

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Unnamed (in Stampede Creek)

Site type: Prospect

ARDF no.: MM143

Latitude: 63.7410 **Quadrangle:** MM C-1

Longitude: 150.3853

Location description and accuracy:
This prospect is on the south bank of Stampede Creek at an elevation of about 2150 feet (White, 1942). It is in the SW1/4 SW1/4 section 36, T. 13 S, R. 15 W., Fairbanks Meridian. The location is probably accurate within 500 feet. The prospect corresponds to number 110 of Thornsberry, McKee and Salisbury (1984).

Commodities:

Main: Sb

Other:

Ore minerals: Pyrite, stibiconite, stibnite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of this prospect are calcareous muscovite schist and quartzite of the Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, pl. K-4; White, 1942, pl. 49). The deposit consists of stibnite, partly oxidized to stibiconite, in quartz veins. Locally, the stibnite forms massive veins and lenses as much as 5 feet across. Pyrite locally accompanies the stibnite. A grab sample of the stibnite contained 19 percent antimony, but essentially no gold or other valuable metals.

Alteration:
Partial oxidatiion of stibnite to stibiconite.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Simple Sb deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
The prospect was explored by one small cut excavated in 1941 or earlier (White, 1942). Exposures in the area are poor.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
White, 1942; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/06/00

Site name(s): Stampede

Site type: Mine

ARDF no.: MM144

Latitude: 63.7393 **Quadrangle:** MM C-1

Longitude: 150.3760

Location description and accuracy:

The Stampede antimony mine (Cobb, 1980 [OFR 80-363] is in the valley of Stampede Creek at an elevation of about 2100-2400 feet. Stampede Creek is a northeasterly-flowing tributary of Clearwater Fork, a major tributary to the Toklat River. The main workings of the mine are south of Stampede Creek, in the SE1/4 SW 1/4, section 36, T. 13 S., R. 15 W., Fairbanks Meridian. The location is accurate within a few hundred feet. The mine is number 25 of Cobb (1972 [MF 366]) and 66 of Bundtzen, Smith, and Tosdal (1976).

Commodities:

Main: Sb

Other: Ag, As, Au, Zn

Ore minerals: Arsenopyrite, cervantite, gold, kermesite, pyrite, sphalerite, stibiconite, stibnite

Gangue minerals: Calcite, chlorite, quartz, sericite

Geologic description:

The deposit at the Stampede mine consists of antimony-bearing shear zones and veins in or closely related to the Stampede fault. Regionally, the fault strikes ENE and dips SE; it has normal displacement. Near the mine, the fault juxtaposes Keevy Peak Formation, of probable Devonian and Mississippian age, against Birch Creek Schist, of probable late Precambrian age (Bundtzen, 1981, p. 62). On the west, or footwall, side of the fault, the Birch Creek Schist (Bundtzen, 1981, p. 37) is warped into gentle, east-trending folds (White, 1942; Hawley and Associates, 1978, fig. 4.1-A(2); Thornsberry, McKee, and Salisbury, 1983, plate K-4). One of the Birch Creek units, a tan- to purple-colored, fine-grained quartz schist, forms the footwall of the Stampede fault in the most highly mineralized part of the mine. At this location, the hanging wall of the fault consists of black, carbonaceous quartzite of the Keevy Peak Formation. There are no nearby plutons, but a Tertiary andesite dike was emplaced in a subsidiary fault before mineralization (White, 1942).

In the mine workings, the strike of the Stampede fault ranges from about N 80 E to N 30 E (Hawley and Associates, 19, fig. 4.1-A(2)-d2). Beginning in the west, in the vicinity of the old Main shaft, the strike is about N 80 E. About 300 feet to the east, near the so-called DMEA crosscut (Barker, 1963, pl. 3), the fault bends to about N 20-30 E and is cut by two crossfaults. The fault gradually bends easterly east of the DMEA crosscut, then northerly again in the vicinity of the East Mooney ore body. (Either the main fault or a strong branch strikes slightly west of north in the vicinity of the Mooney ore body). Bends in the fault structure, cross-faults perhaps caused by abrupt bending, and quartzitic walls appear to control individual ore bodies along the Stampede fault (White, 1942; Barker, 1963). At the surface, the 26-foot-wide discovery outcrop of the deposit appears to be localized where a subsidiary fault splits from the main Stampede fault (White, 1942, fig. 39).

Stibnite is the dominant metallic mineral in the deposit. It forms nearly massive ore bodies that range in thickness from less than a foot to a maximum of 26 feet. It also occurs as disseminations in shear zones. These two types of ore appear to be gradational. According to White (1942), the main (discovery) ore body changed downward and on strike into a breccia zone of vein quartz, pyrite, and small amounts of stibnite. Other veins of massive stibnite occurred in the main fault in the Emil and Mooney ore bodies. Ebbley and Wright (1948) proposed that the massive ore grades downward into an aggregate of fine-grained stibnite,

quartz, and sericite.

Pyrite is the second most abundant metallic mineral. It forms disseminations and dominates in the antimony-poor parts of the deposit. Arsenopyrite occurs principally in quartz-rich, antimony-poor, zones. Red-brown sphalerite occurs locally, as in the Kobuk deposit northeast of the main ore body (Hawley and Associates, 1978, p. 4-40). The antimony oxides, cervantite and stibiconite, occur near the surface, and kermesite forms directly on stibnite ore in the upper part of the workings (White, 1942, p. 339). Calcite and dolomite are minor components of the veins.

The ore contains small amounts of gold and silver. Representative samples of concentrate assayed about 60 percent antimony, 0.62 percent arsenic, 0.03 ounce of gold per ton, and 0.41 ounce of silver per ton (White, 1942, p. 341-342). White (1942, p. 338) also reported as much as 0.09 ounce of gold per ton in pyritic parts of the deposit, and cited Earl Pilgrim to the effect that table concentrates that consist of about 50 percent pyrite contain more than 1.7 ounces of gold per ton.

The age of the Stampede deposit is uncertain. It post-dates emplacement of the Tertiary andesite dike, and is assumed to be Eocene (also see record MM091).

Alteration:

Sericite in quartz-antimony veins. Oxidation of stibnite.

Age of mineralization:

The deposit postdates a Tertiary andesite dike emplaced in the Stampede fault, and is assumed to be Eocene (see record MM091).

Deposit model:

Simple Sb deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

27d

Production Status: Yes; medium

Site Status: Inactive

Workings/exploration:

The deposit was discovered sometime before 1915, and an open cut on an outcropping mass of high-grade ore was excavated in 1916 (Capps, 1918; 1919, p. 109). Ore was sacked but probably not shipped. Moffit (1933, p. 311-313), who visited the property in 1931, found that little had changed since Capps's visit, although there had been some underground exploration. Extensive development began after the property was leased by Earl Pilgrim in 1936 (White, 1942, p. 332). Pilgrim assigned his lease to Morris P. Kirk & Sons, a contract miner affiliated with National Lead Co., but Pilgrim continued to manage the property. All early shipments were of hand-picked ore containing more than 52 percent antimony. A mill constructed in 1939 had poor recovery and produced a concentrate too fine grained for optimum smelting at National Lead. Mining occurred in most years between the winter of 1936 until March, 1941. It began again in 1942, under the impetus of World War II, and the mine shipped ore from 1942-1944, 1947-49, and in 1951. The U. S. Bureau of Mines conducted trenching, drifting and test stoping in 1942 (Ebbley and Wright, 1948). From 1953 until 1956, the owners of the property conducted exploration partly funded by a federal (Defence Minerals Exploraton Administration) loan. The exploration included driving about 600 feet of drifts and crosscuts, about 1400 feet of diamond drilling, and hundreds of feet of trenching. The program successfully developed ore in the Neese Winze ore body. The area has also been tested by soil sampling (Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984). Although the soil is deep, studies indicate that such sampling can be effective in exploration.

Production notes:

Between 1937 and 1951, the mine produced 3,278 tons of ore, or concentrates that contained 1,729 tons of antimony (Barker, 1963). Mining continued intermittently until about 1970. Total mine production is about 3,594.5 tons of ore and concentrate that contained about 2000 short tons of antimony metal

(Bundtzen, 1981).

Reserves:

Some high-grade ore remains in place. MacKevett, Singer, and Holloway (1978, p. 35) estimated that there is a resource of more than 7000 short tons of ore containing about 10 to 15 percent antimony. Hawley and Associates (1978) proposed that a main ore shoot rakes northeast and that there is potential for additional ore at least to the Kobuk prospect workings. The main Stampede fault zone locally is mineralized to a width of about 30 feet; it has not been significantly explored to the southwest.

Additional comments:

The mine is in Denali National Park and Preserve.

References:

Capps, 1918; Capps, 1919; Moffit, 1933; White, 1942; Ebbley and Wright, 1948; Barker, 1963; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett, Singer, and Holloway, 1978; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: White, 1942; Ebbley and Wright, 1948; Barker, 1963

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Unnamed (upper south fork of Stampede Creek)

Site type: Occurrence

ARDF no.: MM145

Latitude: 63.7306 **Quadrangle:** MM C-1

Longitude: 150.3871

Location description and accuracy:
This occurrence is at an elevation of about 2750 feet at the head of an unnamed south fork of Stampede Creek. It is approximately at the midpoint of the boundary between sections 1 and 2, T. 14 S., R. 15 W., Fairbanks Meridian. The occurrence corresponds to number 65a of Bundtzen, Smith, and Tosdal (1976), and 108 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Cu

Other: Ag, Mo, Sb, Zn

Ore minerals: Chalcopyrite, malachite, pyrite

Gangue minerals: Quartz

Geologic description:
The country rocks in the area of this occurrence are quartz-feldspar schist and gneiss of the upper Precambrian Birch Creek Schist, and graphitic quartzite either of the Birch Creek Schist or of the lower Paleozoic Keevy Peak Formation. The rocks appear to be cut by NE-striking faults subsidiary to the Stampede fault (Thornsberry, McKee, and Salisbury, 1984, pl. K-4; Hawley and Associates, 1978, fig. 4-1-A(2)).

The occurrence consists of a foot-thick quartz vein that contains disseminated chalcopyrite and pyrite, and is stained by malachite (Bundtzen, Smith, and Tosdal (1976, occurrence 65a). Hawley and Associates (1978; fig. 4.1-A(2), samples 128-131) collected soil samples on the ridge above the occurrence that contained up to 3.8 ppm silver, 10 ppm molybdenum, 46 ppm antimony, and 255 ppm zinc.

Alteration:
Oxidation of copper mineral.

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Polymetallic vein (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The vein was discovered and described by Bundtzen, Smith, and Tosdal (1976). Later investigators mapped and collected soil samples in the area (Hawley and Associates, 1978).

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Unnamed (near elevation 3228 south of the Stampede Mine)

Site type: Occurrence

ARDF no.: MM146

Latitude: 63.7297 **Quadrangle:** MM C-1

Longitude: 150.4018

Location description and accuracy:

This occurrence is on an east-trending ridge about a mile south-southwest of the Stampede mine (MM144). It is about 0.2 mile east-southeast of hilltop elevation 3228, near the center of section 2, T. 14 S., R. 15 W., Fairbanks Meridian. The occurrence corresponds to number 65b (map number 65) of Bundtzen, Smith, and Tosdal (1976), 124 of Hawley and Associates (1978), and 107 of Thornsberry, McKee, and Salisbury (1984). The location is accurate within 500 feet.

Commodities:

Main: Sb

Other: Ag, Au, Cu, Mo, Pb, Zn

Ore minerals: Limonite, pyrite, stibnite

Gangue minerals: Quartz

Geologic description:

This occurrence consists of stibnite-bearing quartz veins in the southwest extension of the Stampede fault (Hawley and Associates, 1978, fig. 4.1-A(2); White, 1942, pl. 49). At the occurrence, the fault strikes about N 35 E and dips 45 SE, essentially parallel to and nearly coincident with, the contact between quartzitic schist (northwest) of the Birch Creek Schist and graphitic rocks of the Keevy Peak Formation (Hawley and Associates, 1978, fig. 4.1-A(2); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984, pl. K-4).

Where the fault crosses the ridge below hilltop 3228, it is a limonitic silicified zone that contains pyrite and small amounts of stibnite (oral commun., Earl Pilgrim, 1976). A sample collected by Bundtzen, Smith, and Tosdal (1976) assayed about 0.05 percent antimony, 51 ppm molybdenum, and traces of gold, copper, silver, and zinc. Hawley and Associates (1978, Fig. 4.1-A(2)) ran a soil line down the ridge from hilltop 3228 across the Stampede fault. At about the trace of the fault, the soil samples contained up to 160 ppm antimony, 3.8 ppm silver, 42 ppm molybdenum, and weakly anomalous amounts of copper, lead, and zinc.

Alteration:

Silicification. Iron-oxide alteration.

Age of mineralization:

The deposit is assumed to be Eocene, the probable age of the Stampede antimony deposit (MM144), (also see record MM091).

Deposit model:

Simple Sb deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

27d

Production Status: None

Site Status: Inactive

Workings/exploration:

The occurrence was discovered by Earl Pilgrim, the longtime operator of the Stampede mine, who found stibnite in a fault zone where it crosses the ridge below elevation 3228. Hawley and Associates (1978, fig. 4.1-A(2) made a reconnaissance map of the area and collected soil samples across the Stampede fault and a possible subsidiary fault to the south. The soils near the occurrence are mainly anomalous in antimony (to 160 ppm), silver (to 3.8 ppm), and molybdenum (to 42 ppm), and weakly anomalous in copper, lead, and zinc. The molybdenum appears to correlate with the graphitic rocks. Bundtzen (1981) collected gossan at the occurrence that contained about 500 ppm antimony and 51 ppm molybdenum.

Production notes:

Reserves:

Additional comments:

The site is in Denali National Park and Preserve.

References:

White, 1942; Bundtzen, Smith, and Tosdal, 1976; Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 05/06/01

Site name(s): Unnamed (bank of Clearwater Fork)

Site type: Occurrence

ARDF no.: MM147

Latitude: 63.7109 **Quadrangle:** MM C-1

Longitude: 150.3393

Location description and accuracy:
This occurrence is on the west bank of the Clearwater Fork about 1.5 miles below the mouth of Canyon Creek. It is in the SE1/4SW1/4 section 7, T. 14 S., R. 14 W., Fairbanks Meridian. The location is probably accurate within 500 feet. The occurrence was first reported by Thornsberry, McKee, and Salisbury (1984, no. 112).

Commodities:

Main: Ag

Other: Pb

Ore minerals: Galena, pyrite

Gangue minerals: Quartz

Geologic description:
The country rock at this occurrence is quartzite of the Birch Creek Schist. The quartzite is cut by quartz veins and a mineralized fault zone. Samples of a foot-thick quartz vein containing pyrite and sparse galena assayed 0.51 percent lead and 11 ppm silver. No gold was detected and only background levels of zinc and antimony (Thornsberry, McKee, and Salisbury, 1984, v. 2, occurrence 112).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Low-sulfide quartz vein.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
The deposit was discovered by U.S. Bureau of Mines geologists in 1983 (Thornsberry, McKee, and Salisbury, 1984). There are no workings.

Production notes:

Reserves:

Additional comments:

The occurrence is in Denali National Park and Preserve.

References:

Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/08/01

Site name(s): Unnamed (North Fork of Canyon Creek)

Site type: Occurrences

ARDF no.: MM148

Latitude: 63.7042 **Quadrangle:** MM C-1

Longitude: 150.4769

Location description and accuracy:

This record represents two little-known occurrences in the North Fork of Canyon Creek. Thornsberry, McKee, and Salisbury (1984, pl. K-8, number 104) report one occurrence at an elevation of about 3000 feet on the north side of the North Fork of Canyon Creek. It is about three-quarters of a mile above the confluence of the North Fork with Canyon Creek, and is the location of the coordinates for this record. The other occurrence is also in the canyon of the North Fork, about a mile above the confluence. It is in the bottom of the canyon on the south side of the North Fork, and corresponds to number 65 of Hawley and Associates (1978).

Commodities:

Main:

Other:

Ore minerals:

Gangue minerals:

Geologic description:

The country rocks on lower North Fork of Canyon Creek are mainly Birch Creek Schist (Bundtzen, 1981). There is no public information describing the geology of either of these occurrences. The data sheet for occurrence 104 of Thornsberry, McKee, and Salisbury, 1984, v. 2) is missing, and there are no assay data for mineral deposit 65 of Hawley and Associates (1978, fig. and table 4.1-A(2)).

Alteration:

Age of mineralization:

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

The sites are in Denali National Park and Preserve.

References:

Hawley and Associates, 1978; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 05/06/00

Site name(s): Bloom

Site type: Prospect

ARDF no.: MM149

Latitude: 63.6924 **Quadrangle:** MM C-1

Longitude: 150.4596

Location description and accuracy:
The Bloom prospect is on a north-facing cliff on the south bank of Canyon Creek, about 500 feet below the mouth of the North Fork. The location is accurate within 500 feet. The prospect is occurrence 103 of Thornsberry, McKee, and Salisbury (1984).

Commodities:

Main: Fe(?)

Other:

Ore minerals: Pyrite(?)

Gangue minerals:

Geologic description:
The country rocks at the Bloom prospect are interlayered, thinly- laminated and locally graphitic black quartzite and thinly-laminated tan quartzite. The rocks are sheared subparallel to their foliation (Thornsberry, McKee, and Salisbury, 1983, occurrence 103). The graphitic units are thickly coated with yellow to white sulfate(?), a common indicator of pyrite in unweathered rock. In 1983, the U.S. Bureau of Mines collected several samples at the site, but assays showed no significant concentrations of valuable metals. Gold and silver were not determined. Antimony values ranged from 6 to 30 ppm (Thornsberry, McKee, and Salisbury, 1984, v. 2).

Alteration:
Extensive surface development of secondary sulfates.

Age of mineralization:
Holocene weathering of Precambrian country rocks.

Deposit model:
Possible stratabound sulfide occurrences in graphitic layers of Birch Creek Schist.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
Workings consist of a 3- by 3- foot pit (adit-cut).

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Thornsberry, McKee, and Salisbury, 1984.

Primary reference: Thornsberry, McKee, and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 12/26/00

Site name(s): Moonlight

Site type: Occurrence

ARDF no.: MM150

Latitude: 63.6793 **Quadrangle:** MM C-1

Longitude: 150.4685

Location description and accuracy:
This occurrence is at an elevation of about 3250 feet, on the crest of a ridge approximately one mile southwest of the junction of Canyon Creek and Moonlight Creek. It is approximately at the midpoint of the section line between sections 21 and 28, T. 14 S., R. 15 W., Fairbanks Meridian. The site coincides with number 64 of Bundtzen, Smith, and Tosdal (1976), 102 of Thornsberry, McKee, and Salisbury (1984), and 25 of MacKevett and Holloway (1977).

Commodities:

Main: Sb

Other: Ag, Cu, Pb, Zn

Ore minerals: Stibnite

Gangue minerals: Quartz

Geologic description:
This occurrence consists of a stibnite-quartz gash vein in Birch Creek Schist, near a contact with the Keevy Peak Formation (Bundtzen, 1981). The vein is roughly parallel to the schistosity of the country rocks. It is less than a foot thick and is exposed in outcrop for about 6 feet. Assays of the vein show a trace of gold, as much as 0.33 ounce of silver per ton, 65 percent antimony, and 0.74 percent lead, and detectable copper, lead, and zinc (Bundtzen, Smith, and Tosdal, 1976).

Alteration:

Age of mineralization:
The deposit is assumed to be Eocene (see record MM091).

Deposit model:
Simple stibnite deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: No

Site Status: Inactive

Workings/exploration:
The deposit was discovered during mapping of the Kantishna district by the Alaska Division of Geological & Geophysical Surveys (Bundtzen, Smith, and Tosdal, 1976). There are no workings.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, Smith, and Tosdal, 1976; Thornsberry, McKee, and Salisbury, 1994

Reporter(s): C.C. Hawley

Last report date: 12/26/00

Site name(s): Slippery Creek

Site type: Prospect

ARDF no.: MM151

Latitude: 63.3980 **Quadrangle:** MM B-3

Longitude: 150.3233

Location description and accuracy:
These placer claims are on Slippery Creek about six miles north of the front of the Alaska Range. For this record, the site is approximately located on Slippery Creek, on the boundary between T. 18 S., and T. 19 S., R. 19 W., Fairbanks Meridian. Near this point, Slippery Creek is in the NW 1/4 of T. 19 S., and the SW 1/4 of T. 18 S. The location is number 63 of MacKevett and Holloway (1977); claims at this location were reported by the U. S. Bureau of Mines (1973). Another placer claim was reported by Heiner and Porter (1972, location 127) on Slippery Creek near the Greenback and Terminus lode claims (MM173).

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:
This placer gold prospect is on a broad, braided section of Slippery Creek about 6 miles north of the front of the Alaska Range and about 8 miles below a gold lode exposed on the Greenback, Terminus, Magnet, and Old Sourdough claims (MM173 and MM172). The gold presumably occurs as fine particles locally concentrated on river bars. In this type of occurrence, gold often accompanies heavy minerals such as garnet or magnetite and accumulates in red or black sands as ephemeral placers in the river bars.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Au placer deposit, river-bar subtype (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
Claims were reported on Slippery Creek by the U. S. Bureau of Mines (1973), several miles north of the front of the Alaska Range. Arley Taylor may also have held placer claims in 1970 on 'Slippery Bench' in Slippery Creek, near the Greenback and Terminus claims (MM173) (Heiner and Porter, 1972, Mt. McKinley quadrangle, location 127).

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Heiner and Porter, 1972; U. S. Bureau of Mines, 1973; MacKevett and Holloway, 1977; Cox and Singer, 1986.

Primary reference: U. S. Bureau of Mines, 1973 and this record

Reporter(s): C.C. Hawley

Last report date: 12/13/00

Site name(s): Slate Creek

Site type: Mine

ARDF no.: MM152

Latitude: 63.3718 **Quadrangle:** MM B-3

Longitude: 150.3502

Location description and accuracy:
Slate Creek flows east-northeast to Eldorado Creek; it rises below the southwest end of Brooker Mountain in the westernmost Kantishna Hills. The creek is auriferous from near the Slate Creek antimony mine (MM153) downstream for about two miles where it enters Eldorado Creek. For this record, the site is approximately halfway from the Slate Creek mine to the confluence of Slate and Eldorado Creeks.

Commodities:

Main: Au

Other: Sb

Ore minerals: Gold, stibnite

Gangue minerals:

Geologic description:
Slate Creek originates at the Slate Creek (Taylor) mine (MM153), a complex antimony deposit in a quartzitic unit of the Birch Creek Schist (Thornsberry, McKee, and Salisbury, 1984, p. 144). Hawley and Associates (1978) found 3.6 ppm of gold (0.12 ounce of gold per ton) in a soil sample collected southwest of, and upstream from, the mine. The soil also contains 660 ppm of antimony (Hawley and Associates, 1978, no. 4, table 4.1-A.(1). Placer claims were located in the creek below the mine and are listed in the Alaska state Kardex file as 66-131. Nothing is known of the grade of the placer deposit.

Alteration:

Age of mineralization:
Holocene.

Deposit model:
Alluvial gold and possibly antimony placer (Cox and Singer, 1986; model 39a).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
39a

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:
Pits and hand-scale testing.

Production notes:

Reserves:

Additional comments:
The deposit is in Denali National Park and Preserve.

References:
Hawley and Associates, 1978; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Hawley and Associates, 1978

Reporter(s): C.C. Hawley

Last report date: 12/18/00

Site name(s): Slate Creek; Taylor mine

Site type: Mine

ARDF no.: MM153

Latitude: 63.3306 **Quadrangle:** MM B-3

Longitude: 150.4847

Location description and accuracy:

The Slate Creek antimony mine (Cobb, 1980, p. 75-76 [OFR 80-363]) is at the head of Slate Creek. It is at an elevation of about 2700 feet, about one mile south of the rounded top of Brooker Mountain. The mine is accessible by a bulldozed trail up Eldorado Creek and Slate Creeks. The mine, marked by a mine symbol on the Mt. McKinley B-3 quadrangle map, is in the SE1/4 sec. 32, T. 16 S., R. 18 W., Fairbanks Meridian. The location is acccurate within 500 feet. It is location 1 of both Cobb (1972 [MF 366]) and MacKevett and Holloway (1977).

Commodities:

Main: Sb

Other: Pb

Ore minerals: Arsenopyrite, boulangerite, cervantite, kermesite, pyrite, stibiconite, stibnite

Gangue minerals: Quartz

Geologic description:

The Slate Creek antimony deposit is in a quartzitic unit of the Precambrian Birch Creek Schist (Bundtzen, 1981). The ore is in a shear zone that, as developed in underground workings, strikes N50E and dips steeply S. As exposed in an open pit east of the underground workings, the zone appears to turn northerly and then easterly (Thornsberry, McKee, and Salisbury, 1984). The deposit has been traced by underground and surface workings for about 650 feet. The shear zone and antimony mineralization appear to continue beyond the known limits of the deposit. Soil samples collected in 1983 define a 200-foot-wide antimony anomaly that extends 1000 feet east and 500 feet west of the workings (Thornsberry, McKee, and Salisbury, 1984, p. 144). Hawley and Associates (1978) found anomalous amounts of antimony in stream-sediment samples about 1/2 mile west-southwest of the mine.

The deposit is a reticulated quartz stockwork in the shear zone. As developed before 1918, the deposit is up to about 15 feet wide, strikes N50E and dips 82S (Capps, 1919, p. 107-108). Subsequent work showed that the shear zone is locally about 40 feet thick, and that the ore zones locally are more than 20 feet thick (Ebbley and Wright, 1948). The deposit appears to thin with depth; an operator in 1983 reported that it is about 1 foot wide at the base of the pit (Thornsberry, McKee, and Salisbury, 1984).

Quartz is the chief gangue mineral. Pyrite occurs locally, but is not closely associated with the ore. Arsenopyrite and the lead-antimony sulfide boulangerite occur locally in the ore. As exposed in surface cuts, stibnite grades into its oxidation products stibiconite, kermesite, and cervantite. The presence of kermesite in particular appears to indicate a nearby pod of high-grade ore. The deposit is probably early to mid-Tertiary; mineralization at the nearby Bonnell prospect (MM030) postdates a lower Tertiary quartz porphyry pluton. The Slate Creek deposit has long been recognized as one of the main antimony deposits in the Kantishna district (Berg and Cobb, 1967, p. 229-231).

Alteration:

Locally significant oxidation of antimony minerals.

Age of mineralization:

The deposit is probably early to mid-Tertiary; mineralization at the nearby Bonnell prospect (MM030) postdates a lower Tertiary quartz porphyry pluton.

Deposit model:
Simple stibnite deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: Yes

Site Status: Inactive since about 1985.

Workings/exploration:
The Slate Creek antimony deposit was discovered in 1905 and staked in 1907. It was reported to Brooks (1916) in 1914 or 1915, but was first visited by the U. S. Geological Survey in 1916 (Capps, 1918, 1919). Capps described a 97-foot-long drift adit with 22 feet of crosscuts and a cut above the underground workings. At that time there was about 125 tons of hand-sorted stibnite stockpiled at the mine. None had been shipped. The mine appears to have closed at the end of World War I and to have been inactive in the 1920s. Wells, who studied the area in 1931, reported that the workings were caved (Wells, 1933, p. 376-377).

Mining resumed during World War II, and some ore was shipped in 1942 (Joesting, 1942). The prospect was examined in July 1942 by the U. S. Bureau of Mines, who suggested that limited exploration could add to the mine reserves. A bulldozer trenching program in August, 1942, dug 5 trenches over an approximate strike length of 400 feet along the northeast trend of the deposit. Two of the trenches cut commercial ore. The ore body intersected in trench 2 was about 26 feet wide and contained an estimated 18.7 percent antimony. The trenching was followed by churn drilling (Ebbley and Wright, 1948, p. 23). Further exploration work was done in 1943 and 1944. The reserve developed by Bureau of Mines drilling and trenching totaled about 10,000 tons grading 9.4 percent antimony, and 6,700 tons of partly developed ore containing about 10 percent antimony (Bain, 1946, p.67). The mine remained active from 1942 until 1949; it operated again in 1971-72 (Bundtzen, Smith, and Tosdal, 1976) and in the early 1980s (Thornsberry, McKee, and Salisbury, 1984). No significant work has been done at the mine since about 1985.

Production notes:
The Slate Creek or Taylor antimony mine has produced a total of about 679 tons of hand-picked antimony ore. Production from the time the mine opened before 1916 to the end of World War II totaled about 325 tons of ore averaging 49 percent antimony. From World War II to 1983, the mine produced about 354 tons of ore that averaged 60 percent antimony.
About 22 tons of antimony ore were produced in 1983 (Thornsberry, McKee, and Salisbury, 1984).

Reserves:

Additional comments:
The mine is in Denali National Park and Preserve.

References:
Brooks, 1916; Capps, 1918; Capps, 1919; Wells, 1933; Joesting, 1942; Bain, 1946; Ebbley and Wright, 1948; Berg and Cobb, 1967; Cobb, 1972 (MF 366); Bundtzen, Smith, and Tosdal, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Bundtzen, 1981; Thornsberry, McKee, and Salisbury, 1984; Cox and Singer, 1986.

Primary reference: Bundtzen, Smith, and Tosdal, 1976; Thornsberry, McKee and Salisbury, 1984

Reporter(s): C.C. Hawley

Last report date: 12/18/00

Site name(s): Unnamed (upper East Fork of Clearwater Creek)

Site type: Occurrence

ARDF no.: MM154

Latitude: 63.3997 **Quadrangle:** MM B-2

Longitude: 150.3028

Location description and accuracy:
This occurrence is on the west side of a prominent ridge in the upper part of the East Fork of Clearwater Creek. The ridge lies between two north- flowing tributaries to the East Fork. Its position is known only from a location by Reed (1961) on a 1:250,000-scale map. The occurrence is probably in the SW 1/4 of section 36, T. 18 S., R. 16 W., Fairbanks Meridian. The location is probably correct within one-half mile.

Commodities:

Main: Zn

Other: Ag(?), Au(?), Cu, Pb

Ore minerals: Chalcopyrite, galena, pyrite, pyrrhotite, sphalerite

Gangue minerals:

Geologic description:
This occurrence is in the Eocene or Oligocene McGonagall pluton (Reed and Lanphere, 1974; Cole, 1998). Reed (1961, explanation on plate 1) described it only as a mixed sulfide deposit consisting mainly of pyrrhotite and sphalerite accompanied by lesser amounts of galena, pyrite, and chalcopyrite. The deposit is inferred to be Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall pluton. A similar deposit about 1/2 mile ENE is described in record MM155.

Alteration:

Age of mineralization:
The deposit is inferred to be Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall pluton.

Deposit model:
Pluton-hosted, polymetallic lode (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The occurrence is known only from a map location. No claims are known to have been filed on it.

Production notes:

Reserves:

Additional comments:
The occurrence is within Denali National Park and Preserve.

References:
Reed, 1961; Reed and Lanphere, 1974; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1961

Reporter(s): C.C. Hawley

Last report date: 12/13/00

Site name(s): Unnamed (upper East Fork of Clearwater Creek)

Site type: Occurrence

ARDF no.: MM155

Latitude: 63.3996 **Quadrangle:** MM B-2

Longitude: 150.2881

Location description and accuracy:
This occurrence is on the east side of a prominent ridge in the upper part of the East Fork of Clearwater Creek. The ridge lies between two north-flowing tributaries to the East Fork. Its position is known only from a location by Reed (1961) on a 1:250,000-scale map. The occurrence is probably a few hundred feet east of the center of section 36, T. 18 S., R. 16 W., Fairbanks Meridian, between 4000 and 4500 feet elevation. The location is probably correct within one-half mile. A nearby deposit is described in record MM154.

Commodities:

Main: Zn

Other: Ag(?), Au(?), Cu, Pb

Ore minerals: Chalcopyrite, galena, pyrite, pyrrhotite, sphalerite

Gangue minerals:

Geologic description:
This mineral occurrence is in the Eocene or Oligocene McGonagall pluton (Reed and Lanphere, 1974; Cole, 1998). Reed (1961, explanation on plate 1) described the occurrence only as a mixed sulfide deposit consisting mainly of pyrrhotite and sphalerite, accompanied by lesser amounts of galena, pyrite, and chalcopyrite. The deposit is inferred to be Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall pluton.

Alteration:

Age of mineralization:
The deposit is inferred to be Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall pluton (Reed and Lanphere, 1974; Cole, 1998).

Deposit model:
Pluton-hosted, polymetallic lode (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: None

Site Status: Inactive

Workings/exploration:
The occurrence is known only from a map location. No claims are known to have been filed on it.

Production notes:

Reserves:

Additional comments:
The occurrence is within Denali National Park and Preserve.

References:
Reed, 1961; Reed and Lanphere, 1974; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1961

Reporter(s): C.C. Hawley

Last report date: 12/13/00

Site name(s): Copper Lode

Site type: Prospect

ARDF no.: MM156

Latitude: 63.3037 **Quadrangle:** MM B-2

Longitude: 151.2433

Location description and accuracy:

The Copper Lode prospect (Cobb, 1980, p. 20 [OFR 80-363]) is in the upper west fork of Carlson Creek at an elevation of about 3600 feet (Moffit, 1933, p. 322). The approximate location is about on the section line between sections 17 and 18, T. 19 S., R. 17 W., Fairbanks Meridian. The location appears to match Moffit's description of a prospect on the north bank of this part of the creek. It is probably accurate within 1/2 mile. The prospect is number 33 of Cobb (1972 [MF 366]) and number 42 of MacKevett and Holloway (1977).

Commodities:

Main: Cu

Other: Au(?)

Ore minerals: Chalcopyrite, limonite, malachite(?), pyrrhotite

Gangue minerals:

Geologic description:

The country rocks at the Copper Lode prospect in upper Carlson Creek are strata of Paleozoic (Devonian?) age. The Paleozoic rocks form a thin wedge north of the mid-Tertiary McGonagall batholith, and south of sedimentary rocks of the Cretaceous or Tertiary Cantwell Formation. The contact between Paleozoic rocks and Cantwell Formation is a fault that strikes NE and is roughly parallel to the Denali fault, which is about 5 1/2 miles to the southeast (Reed, 1961).

The Copper Lode deposit consists of irregular masses of pyrrhotite and minor chalcopyrite up to several feet across in mainly dark-colored, fine-grained rock provisionally called altered limy shale (Moffit, 1933, p. 322). The mineralized hostrock strikes NE; it is about 25 feet thick and has been traced for about 250 feet. The mineralized outcrop is pervasively iron stained and locally copper stained (malachite?). Rocks northwest of the mineralized outcrop are bluish-gray limestone locally interbedded with conglomerate. The mineralization is probably middle Tertiary, roughly contemporaneous with the emplacement of the McGonagall pluton (Reed and Lanphere, 1974).

Alteration:

Oxidation of iron and copper minerals.

Age of mineralization:

The deposit is probably Oligocene, roughly contemporaneous with the emplacement of the McGonagall batholith (Reed and Lanphere, 1974).

Deposit model:

Fault-controlled, polymetallic replacement lode.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: No

Site Status: Inactive

Workings/exploration:
Some surface cuts. The prospect was staked in about 1930 and probably has been inactive since about 1940.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Moffit, 1933; Reed, 1961; Cobb, 1972 (MF 366); Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363).

Primary reference: Moffit, 1933

Reporter(s): C.C. Hawley

Last report date: 12/13/00

Site name(s): Galena Lode

Site type: Prospect

ARDF no.: MM157

Latitude: 63.2687 **Quadrangle:** MM B-2

Longitude: 150.8642

Location description and accuracy:
The Galena Lode (Cobb, 1980, p. 35 [OFR 80-363]) is in the east fork of upper Carlson Creek. Its location is approximate, inasmuch as Moffit's (1933, p. 322) description of its position relative to the nearby Copper Lode (MM156) is ambiguous. Moffit's description does not match the location of the site on Plate 4 of Capps' geologic map of the area (Capps, 1933). For this record, the location is approximately that of the unnamed prospect shown in the east fork of upper Carlson Creek on Capps' Plate 4. It is in the SW1/4NW1/4 sec. 16, T. 19 S., R. 17 W., Fairbanks Meridian. The location is probably accurate within 1/2 mile. The Galena Lode is number 34 of Cobb (1972 [MF 366]) and number 43 of MacKevett and Holloway (1977).

Commodities:

Main: Au, Pb, Zn

Other:

Ore minerals: Galena, pyrite, sphalerite

Gangue minerals: Quartz

Geologic description:
The country rocks at the Galena Lode are Paleozoic, contorted black schist invaded by sill-like masses of Eocene or Oligocene granite porphyry. The prospect is in a narrow wedge of Paleozoic rocks between the McGonagall batholith to the south and the Tertiary or Cretaceous Cantwell Formation to the north (Reed, 1961). The deposit is mainly in contorted schist bounded by steep, NE-striking faults that separate the schist from granite porphyry. The schist is cut by lenticular seams up to a foot thick of quartz that locally contains galena, sphalerite and pyrite. The sulfides also are locally disseminated in the schist. The deposit is probably Oligocene, roughly contemporaneous with emplacement of the McGonagall batholith.
The Galena Lode is in the same belt and probably related to polymetallic deposits of the Greenback and Magnet group of prospects (MM173 and MM172).

Alteration:

Age of mineralization:
The deposit is probably middle Tertiary, roughly contemporaneous with the Eocene or Oligocene emplacement of the McGonagall batholith (Reed and Lanphere, 1974; Cole, 1998).

Deposit model:
Polymetallic veins (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:

The prospect was probably explored by surface pits. It was first staked in about 1930, probably by H. Carlson. It was relocated for gold by Arley Taylor in the mid-1960s and was active in 1972 (Heiner and Porter, 1972, Mt. McKinley quadrangle, serial number 52).

Production notes:

Reserves:

Additional comments:

The Galena Lode is in Denali National Park and Preserve.

References:

Capps, 1933; Moffit, 1933; Reed, 1961; Heiner and Porter, 1972; Cobb, 1972 (MF 366); Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Moffit, 1933

Reporter(s): C.C. Hawley

Last report date: 12/13/00

Site name(s): Unnamed (easternmost tier of claims, Mt. Eielson district)

Site type: Prospects

ARDF no.: MM158

Latitude: 63.4851 **Quadrangle:** MM B-1

Longitude: 151.0396

Location description and accuracy:
This record describes prospects on the Highlander (Lead No. 3) and Cleary (Nord) claims, herein referred to as the easternmost tier of claims of the part of the Mt. Eielson (Copper Mountain) district west of the Thorofare River. The location is the approximate center of the side line between the Highlander and Cleary claims; it is an elevation of about 3400 feet in the SW1/4NW1/4 sec. 32, T. 17 S., R. 14 W., Fairbanks Meridian. The location is probably accurate to 500 feet.

Commodities:

Main: Pb, Zn

Other: Ag, Au, Cu

Ore minerals: Chalcopyrite, galena, sphalerite

Gangue minerals: Calcite, epidote, quartz

Geologic description:
The deposits on the Highlander and Cleary claims are well exposed in the cliff faces above the Thorofare River, near the east end lines of the claims. On the Highlander claim, altered and fresh Paleozoic sedimentary rocks strike N. 75 W., and dip about 50 N. These rocks are cut by many sills of porphyritic granodiorite (Reed, 1933, p. 283). A mineralized bed about 60 feet thick is exposed about in the middle of the east side line. A chip sample representing the best mineralized half of the bed assayed 0.01 ounce of gold and 1.50 ounces of silver per ton, 0.83 percent copper, 2.89 percent lead, and 5.57 percent zinc. A five-foot-thick band of ore is at the east side line of the Cleary claim. The best two feet of the band assayed 0.01ounce of gold and 15.3 ounces of silver per ton, 0.78 percent copper, 4.22 percent lead, and 20.16 percent zinc (Reed, 1933, p. 283-284). The mineralization probably is Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Alteration:
Introduction of epidote and quartz into calcareous sedimentary rocks.

Age of mineralization:
The mineralization probably is Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:
Polymetallic replacement deposits; Pb-Zn skarn (Cox and Singer, 1986; models 19a; 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
19a, 18c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

Sometime before 1931, the Highlander claim was staked by Hugh Matheson and the Cleary claim was staked by Ben Cleary. Shortly before World War II, these claims were restaked, respectively, as the Lead No. 3 and Nord (Muir, Thomas, and Sanford, 1947). They probably have not been active since about 1950.

Production notes:

Reserves:

Additional comments:

The claims are in Denali National Park and Preserve.

References:

Reed, 1933; Muir, Thomas, and Sanford, 1947; Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Unnamed (claims on lower Granite Creek, Mt. Eielson district)

Site type: Prospects

ARDF no.: MM159

Latitude: 63.4825 **Quadrangle:** MM B-1

Longitude: 151.0736

Location description and accuracy:
The MacKenzie and Mary claims abut each other in lower Granite Creek north of Mt. Eielson. The location is the approximate center of the end line between the claims. This location is at an elevation of about 4000 feet in the SW1/4NE1/4 sec. 31, T. 17 S., R. 14 W., Fairbanks Meridian. The location is accurate to about 500 feet.

Commodities:

Main: Pb, Zn

Other: Ag, Cu

Ore minerals: Chalcopyrite, galena, pyrite, sphalerite

Gangue minerals: Epidote, quartz

Geologic description:
The McKenzie and Mary claims are in lower Granite Creek and are mainly covered by talus and alluvial fan deposits. South of the McKenzie claim, pyrite and chalcopyrite are disseminated in altered sedimentary rock cut by Eocene or Oligocene, fine-grained granodiorite and porphyritic granodiorite (Reed,1933, p. 283; Decker and Gilbert, 1978; Reed and Lanphere, 1974, and Cole, 1998). On the east part of the Mary claim, sulfide-bearing rock is exposed in two pits. At one pit, mineralized strata strike about N. 75 E. and dip about 75 N. Epidotized sedimentary rock exposed in an eight-foot-high face contains sphalerite, galena, and chalcopyrite; a chip sample assayed 0.3 ounce of silver per ton, 0.2 percent copper, and 2.31 percent zinc. At the other pit, the rocks are appreciably copper stained (Reed, 1933, p. 283). The mineralization is probably Oligocene, roughly contemporaneous with the emplacement age of the granodiorite.

Alteration:
Introduction of epidote and silica into metasedimentary rocks. Local oxidation of copper minerals.

Age of mineralization:
The mineralization is probably Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:
Polymetallic replacement deposits; Pb-Zn skarn (Cox and Singer, 1986; models 19a; 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
19a; 18c

Production Status: None

Site Status: Inactive

Workings/exploration:

The McKenzie and Mary claims were owned by prospector Hugh Matheson at the time of Reed's study in 1931 (Reed, 1933). The claims lapsed and were later restaked as the Lead No. 1 and Lead No. 2 (Muir, Thomas, and Sanford, 1947). The claims were prospected with shallow pits.

Production notes:

Reserves:

Additional comments:

The claims are in Denali National Park and Preserve.

References:

Reed, 1933; Muir, Thomas, and Sanford, 1947; Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Unnamed (Mt. Eielson district west of Muldrow Glacier)

Site type: Occurrence

ARDF no.: MM160

Latitude: 63.3989 **Quadrangle:** MM B-1

Longitude: 150.3364

Location description and accuracy:
This record describes Mt. Eielson-type (MM166) mineral deposits reported by Reed (1933, pl. 22) on the west side of Muldrow Glacier 'along the south side of the valley lying north of mountain principally composed of Tertiary volcanic rocks.' The area is probably about due west of the point that Intermittent Creek flows into the east side of Muldrow Glacier and south of the point where the glacier begins to trend almost due west. For this record, the site is at an elevation of about 3200 feet in the NW1/4 sec. 8, T. 18 S., R. 15 W., Fairbanks Meridian. The location is probably accurate within a radius of one mile.

Commodities:

Main: Pb, Zn

Other: Ag, Au, Cu

Ore minerals: Chalcopyrite, galena, sphalerite

Gangue minerals: Calcite, epidote, quartz

Geologic description:
A mass of mid-Tertiary, porphyritic granodiorite containing roof pendants of Paleozoic sedimentary rocks crops out of north of an outcrop area of Tertiary volcanic rocks on the west side of lower Muldrow Glacier (Reed, 1933, plate 22). Although Reed did not describe any specific mineral occurrences at this site, he reported that mineral deposits of Mt. Eielson-type (MM166) are relatively abundant (Reed, 1933, p. 284). By extrapolation from the type area, the deposits are presumed to be replacement lodes or skarn containing sphalerite, along with lesser amounts of galena and chalcopyrite. The mineralization presumably is Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the Mt. Eielson granodiorite (Decker and Gilbert, 1978; Cole, 1998).

Alteration:
Introduction of calcite, epidote, and quartz into sedimentary rock roof pendants in porphyritic granodiorite.

Age of mineralization:
The mineralization presumably is Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the Mt. Eielson granodiorite (Decker and Gilbert, 1978; Cole, 1998).

Deposit model:
Presumably similar to the Zn-Pb replacement and skarn deposits of the main Mt. Eielson district (Cox and Singer, 1986; models 19a, 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
19a; 18c

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:
The area is within Denali National Park and Preserve.

References:
Reed, 1933; Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Highway

Site type: Prospect

ARDF no.: MM161

Latitude: 63.3979 **Quadrangle:** MM B-1

Longitude: 150.3319

Location description and accuracy:
The location corner of the Highway claim (Cobb, 1980 [OFR 80-363]) was reported by Reed (1933, p. 284) to be on the northwest ridge of Bald Mountain at an elevation of 4600 feet. He also reported other mineralization in the same area 'near the northwest base of Bald Mountain and above the east side of the Thorofare River.' For this record, the approximately located site represents mineral deposits on the northwest side of Bald Mountain. The Highway claim is number 41 of Cobb (1972 [MF 366]).

Commodities:

Main: Zn

Other:

Ore minerals: Sphalerite

Gangue minerals:

Geologic description:
The northwest flank of Bald Mountain is underlain by Paleozoic, calcareous sedimentary rocks cut by numerous sills of mid-Tertiary porphyritic granodiorite. The mountain is about 1/2 mile north of the main east-west Contact fault of the Mt. Eielson district. The main granodiorite intrusion forms a small, wedge-shaped mass north of the fault (Reed, 1933, plate 22).
The Highway claim was prospected by two small pits that exposed a sphalerite-bearing deposit. Reed (1933, p. 284) stated that the northwest base of Bald Mountain, including the area of the Highway claim, is appreciably mineralized. The mineralization is Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Alteration:

Age of mineralization:
The mineralization is Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:
Replacement deposit or zinc-bearing skarn (Cox and Singer, 1986; models 19a, 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
18c, 19a

Production Status: None

Site Status: Inactive

Workings/exploration:

The area was prospected by Ben Cleary around 1931. Cleary excavated small pits that disclosed sphalerite. There apparently has been no further exploration of the deposit.

Production notes:

Reserves:

Additional comments:
The site is in Denali National Park and Preserve.

References:
Reed, 1933; Cobb, 1972 (MF 366); Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Unnamed (Mt. Eielson district near Crystal and Intermittent Creeks)

Site type: Occurrence

ARDF no.: MM162

Latitude: 63.3957 **Quadrangle:** MM B-1

Longitude: 150.3453

Location description and accuracy:
This generalized location represents mineral deposits reported by Reed (1933, p. 284) on the topographic noses between Intermittent and Crystal Creeks. For this record, the site at an elevation of about 3800 feet on the east side of Muldrow Glacier about 1 mile north-northeast of Green Point. It is in the NW1/4 sec. 12, T. 18 S., R. 15 W., Fairbanks Meridian. The location is probably accurate within one-half mile.

Commodities:

Main: Pb, Zn

Other: Ag, Au, Cu

Ore minerals: Chalcopyrite, galena, sphalerite

Gangue minerals: Calcite, epidote, quartz

Geologic description:
The area between Intermittent and Crystal Creeks, east of Muldrow Glacier, contains dikes and sills of porphyritic granodiorite that strike about north. The dikes and sills cut Paleozoic calcareous rocks. The area is south of the main east-west fault that separates primarily bedded rocks from the main body of the Mt. Eielson granodiorite pluton. A probable faulted continuation of the main Mt. Eielson granodiorite mass crops out south of Crystal Creek (Reed, 1933, plate 22). The area is structurally equivalent to the main part of the Mt. Eielson district.

Although Reed (1933, p. 284) did not describe any specific mineral occurrences, he reported substantial mineralization on the topographic noses between Intermittent and Crystal Creeks and in areas between Crystal and Glacier Creeks. He implied that the deposits are similar mineralogically to those in the main part of the Mt. Eielson district. Based on Reed's description, the deposits at this site are inferred to comprise chalcopyrite, galena and sphalerite in an epidote-quartz-calcite gangue. The mineralization probably is Oligocene, roughly copntemporaneous with the Eocene or Oligocene emplacement age of the McGonagall-type Mt. Eielson granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Alteration:
Presumed formation of epidote-quartz-calcite alteration zones in calcareous sedimentary rocks.

Age of mineralization:
The mineralization probably is Oligocene, roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall-type Mt. Eielson granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:
Polymetallic replacement deposits; Pb-Zn skarn (Cox and Singer, 1986; models 19a; 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
19a; 18c

Production Status: None

Site Status: Inactive

Workings/exploration:
No known workings.

Production notes:

Reserves:

Additional comments:
The area is in Denali National Park and Preserve.

References:
Reed, 1933; Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Unnamed (on a tributary to upper Pirate Creek)

Site type: Occurrence

ARDF no.: MM163

Latitude: 63.3852 **Quadrangle:** MM B-1

Longitude: 150.2430

Location description and accuracy:
This occurrence is on the west side of a north-flowing tributary of Pirate Creek about a mile west of Muldrow Glacier. It is probably within a few hundred feet of the north end of the section line between sections 29 and 30, T. 18 S., R. 15 W., Fairbanks Meridian. The occurrence is included in the description of the Twin Hills lode (MM168) by Cobb (1972, location 35 [MF 366]; 1980 [OFR 80-363]), and in the description of location 44 by MacKevett and Holloway (1977).

Commodities:

Main: Fe

Other: Cu, Zn

Ore minerals: Chalcopyrite, copper carbonate(?), iron oxide, magnetite, sphalerite

Gangue minerals:

Geologic description:
This occurrence is immediately east of the Twin Hills lode (MM168), in the contact zone of the McGonagall granitic pluton mapped by Reed (1961, plate 1). The deposit consists of replacement veins and disseminations of magnetite in a zone estimated to be 20 to 30 feet wide (Moffit, 1933, p. 324). A small amount of chalcopyrite occurs with the magnetite, and the rocks locally are ironstained and coated with copper carbonate(?). Sphalerite occurs in a fracture zone about 100 yards north of the magnetite deposit. The deposit probably is middle Tertiary, the approximate age of the emplacement of the Eocene or Oligocene McGonagall pluton (Reed and Lanphere, 1974). The occurence is one of several in a belt of mineral deposits along the north flank of the McGonagall pluton.

Alteration:
Oxidation of iron and copper minerals.

Age of mineralization:
The deposit probably is middle Tertiary, the approximate age of the emplacement of the Eocene or Oligocene McGonagall pluton (Reed and Lanphere, 1974; Cole, 1998).

Deposit model:
Disseminated and vein-form, polymetallic lodes and contact deposits (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22c

Production Status: No

Site Status: Inactive

Workings/exploration:

The deposit was discovered by W. J. Shannon in about 1930.

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:
Moffit, 1933; Reed, 1961; Cobb, 1972 (MF 366); Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Moffit, 1933

Reporter(s): C.C. Hawley

Last report date: 10/23/00

Site name(s): Unnamed (west tier of claims, Mt Eielson district)

Site type: Prospects

ARDF no.: MM164

Latitude: 63.3308 **Quadrangle:** MM B-1

Longitude: 150.4805

Location description and accuracy:

The prospects, herein defined as the west tier of claims of the Mt. Eielson or Copper Mountain district, are: Hugh John (restaked as the Galena No. 2 or Bear); Christenia (Beaver); Sour Dough (Fox); Copper Base (Wolverine); and the Galena claim north of the Hugh John. The claims are on the west side of Grant Creek, a north-flowing tributary of Thorofare River. They are about 1.5 miles east of the Muldrow Glacier and occupy an approximately rectangular area about 1500 feet east-west by 2600 feet north-south. The claims are the westernmost block of the main Mt. Eielson claim group (MM166). They are on the northwest flank of Mt. Eielson between elevations of about 3500 and 4200 feet.

For this record, the location is the approximate center of the side line between the Christenia and Sour Dough claims as described by Reed (1933, fig. 37). The claims were relocated prior to World War II; the equivalent location is the approximate center of the side line between the Beaver and Fox claims (Muir, Thomas, and Sanford, 1947). The location is accurate within about 500 feet.

Commodities:

Main: Pb, Zn

Other: Ag, Au

Ore minerals: Galena, pyrite, sphalerite

Gangue minerals: Andradite, calcite, epidote, quartz

Geologic description:

The country rocks in the area of the claim block are Devonian, thin-bedded limestone and minor amounts of sandstone, argillite, graywacke, and schist. They are cut by dike- and sill-like masses of mid-Tertiary porphyritic granodiorite. The claim block is extensively mantled by talus and glacial moraine. The main exposures of the bedded rocks are on the western part of the Sour Dough and Copper Base claims (Reed, 1933, fig. 37 and plate 24).

The mineral deposits are replacement bodies composed dominantly of epidote, quartz, and calcite, along with lesser amounts of sphalerite, galena, and pyrite, in approximately that order of abundance.

Mineral exposures on Hugh John, the most northerly claim, are limited by moraine cover to the north-central area of the claim. A 10-foot-thick body of epidotized rock contains sphalerite and galena. Exposures are also limited on the Christenia (Beaver) claim, where prospect pits expose rocks rich in sphalerite, epidote, and calcite, along with minor pyrite and pale-green andradite. A sample consisting mainly of sphalerite assayed 41.37 percent zinc and 0.20 ounce of silver per ton (Reed, 1933, p. 277-278). Exposures on the southernmost claims (Copper Base and Sour Dough) are also poor because of thick surficial deposits. Dumps on caved pits on the Copper Base claim contain epidote-rich rock hosting banded sulfide ore composed of sphalerite, galena, and pyrite. The Sour Dough claim contains low-grade, sphalerite-bearing material (Reed, 1933, p. 278).

Alteration:

Metasomatic (skarn) alteration of calcareous sedimentary rocks. Propylitic alteration of granodiorite.

Age of mineralization:

The deposits are mid-Tertiary, roughly contemporaneous with the Eocene or Oligocene emplacement age of the Mt. Eielson granodiorite pluton (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:
Polymetallic replacement deposits; Zn-Pb-(Cu) skarn deposits (Cox and Singer, 1986, models 19a, 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
19a, 18c

Production Status: None

Site Status: Inactive

Workings/exploration:
The deposits were found and staked before 1931 by early Mt. Eielson prospectors O. M. Grant and Hugh Matheson (Reed, 1933). They were restaked and renamed by prospectors before World War II (Muir, Thomas, and Sanford, 1947). The claims were explored by pits, but have been inactive for many years.

Production notes:

Reserves:

Additional comments:
The claims are in Denali National Park and Preserve.

References:
Reed, 1933; Muir, Thomas, and Sanford, 1947; Reed and Lanphere, 1973; Reed and Lanphere, 1974; Hawley and Associates, 1978; Decker and Gilbert, 1978; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 10/15/00

Site name(s): Unnamed (west-central tier of claims, Mt. Eielson district)

Site type: Prospects

ARDF no.: MM165

Latitude: 63.3217 **Quadrangle:** MM B-1

Longitude: 150.4549

Location description and accuracy:

This record describes prospects on the following claims, herein called the west-central tier of claims of the Mt. Eielson or Copper Mountain district: Snowdrift (Wolf); Virginia (Eva); Denver (Lillian); Marjorie (Kentucky or Martin); Matheson (Mary); and Weasel north of the Snowdrift. The tier is bisected by Grant Creek, a tributary to the Thorofare River on the northwest flank of Mt. Eielson. The claims form a block about 1500 feet east-west by 3300 feet north-south. The block is east of, and adjoins, the west tier of claims described in record MM164. The west-central tier of claims are between 3300 and 4000 feet elevation. For this record, the site is approximately at the center of the side line between the Virginia and Mary claims, near the center of section 36, T. 17 S., R. 15 W., Fairbanks Meridian. Based on Reed's 1:24,000-scale map (1933, pl. 24), the location is accurate within about 500 feet.

Commodities:

Main: Pb, Zn

Other: Ag, Au, Cu

Ore minerals: Azurite, chalcopyrite, galena, malachite, pyrite, sphalerite

Gangue minerals: Calcite, epidote, quartz

Geologic description:

The country rocks in the area of the west-central tier of claims are Paleozoic, thin-bedded limestone and lesser amounts of clastic sedimentary rocks and schist, intruded by Eocene or Oligocene porphyritic granodiorite. Locally, the bedded rocks and the granodiorite are cut by Tertiary basaltic dikes. Exposures are poor on the northernmost Snowdrift claim, but are moderately good on the other claims of the group. The surficial deposits on the Snowdrift claim are part of an extensive alluvial fan (Reed, 1933, plate 24).

The mineral deposits are mainly replacement skarns, rich in sphalerite and galena, developed in limy sedimentary rocks. They are similar to the other deposits in the Mt. Eielson district (MM166).

The strata mostly are nearly horizontal and are cut by dikes and sills of porphyritic granodiorite. Most of the replacement deposits are nearly parallel to original bedding, which is well preserved. Reed reported a crosscutting ore body adjacent to a dike, along with relatively abundant vein quartz (1933, p. 278-279). Xenoliths of sedimentary rocks up to about 10 feet across in the granodiorite are largely replaced by sulfide ore. One such body at least 12 feet thick assayed 0.90 ounce of silver per ton, 0.14 percent copper, 3.56 percent lead, and 3.99 percent zinc. Sparse exposures along Grant Creek on the Snowdrift claim consist of epidotized limy sedimentary rocks containing small amounts of pyrite, chalcopyrite, and sphalerite (Reed, 1933, p. 278).

Gates and Wahrhaftig (1944) mapped extensive sulfide bodies on the Virginia claim, then called the Eva. Sampling by the U. S. Bureau of Mines (Muir, Thomas, and Sanford, 1947, nos. E-17 to E-22) showed some moderately high silver values in addition to lead and zinc. Sample E-18 (3.1 feet) assayed 9.8 ounces of silver and 0.015 ounce of gold per ton, 5 percent lead, 4.99 percent zinc, and 0.90 percent copper. One sample contained 1.15 percent copper and about 11 percent combined lead and zinc. A picked but representative sample from the Big Cliff claim west of Grant Creek assayed 6.8 percent lead, 8.7 percent zinc, and 2 ounces of silver per ton.

Relict bedding on the Denver claim dips 55 N, which is much steeper than the nearly horizontal bedding

on the Virginia claim (Reed, 1933, p. 279). According to Reed, a north-dipping mineralized bed about 10 feet thick on the Denver claim may correlate with a more gently-dipping mineralized bed on the Virginia claim. Reed also reports that chalcopyrite is relatively abundant on these claims and that it is locally oxidized to azurite and malachite.

Reed (1933, p. 280) reports relatively high gold and copper values in samples from the Marjorie claim, and cites assays by Harry Townsend of 0.03 ounce of gold per ton in two samples. (Townsend worked for the U. S. Geological Survey in the 1920s and for Anaconda Copper Company in the 1930s.) One of the samples contained 2.3 percent copper in addition to 10.5 percent combined lead and zinc. The southernmost Matheson claim is on steeply north-dipping epidotized rock containing disseminated sphalerite.

Alteration:

Introduction of epidote and quartz into calcareous sedimentary rocks; extensive sulfide replacement of inclusions engulfed in the granodiorite. Local oxidation of copper minerals.

Age of mineralization:

The mineral deposits are inferred to be mid-Tertiary, slightly younger than the Eocene or Oligocene granodiorite (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:

Polymetallic replacement deposits; Zn-Pb-(Cu) skarn deposits (Cox and Singer, 1986, models 19a, 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

19a, 18c

Production Status: None

Site Status: Inactive

Workings/exploration:

The claims were originally staked by O. M. Grant and Hugh Matheson before 1931 and prospected fairly systematically into the 1930s. Government agencies examined the claims during World War II, but since then there has been little activity. By World War II, the claims were owned by O. M. Grant, John Anderson, and Mrs. Frank McGarvey (Muir, Thomas, and Sanford, 1947). The Virginia claim was developed by pits and two short adits.

Production notes:

Reserves:

Additional comments:

The claims are in Denali National Park and Preserve.

References:

Reed, 1933; Gates and Wahrhaftig, 1944; Muir, Thomas, and Sanford, 1947; Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Mt. Eielson or Copper Mountain

Site type: Prospects

ARDF no.: MM166

Latitude: 63.3114 **Quadrangle:** MM B-1

Longitude: 150.5240

Location description and accuracy:

The Mount Eielson or Copper Mountain district (Reed, 1933; Gates and Wahrhaftig, 1944; Muir, Thomas, and Sanford, 1948; Cobb, 1980 [OFR 80-363]) contains numerous zinc-lead replacement deposits. The main group of deposits is on the north flank of Mt. Eielson and extends easterly for at least four miles from Glacier Creek on the east side of Muldrow Glacier to Bald Mountain south of Sunrise Creek. For this record, the site is at the approximate center of a group of nineteen claims which were actively explored in about 1922 to 1924. The site also is at the approximate center of the most intensely mineralized area identified in the district. The main part of the district is covered by locations 37-40 of Cobb (1972 [MF 366]) and by location 46 of MacKevett and Holloway (1977).

Commodities:

Main: Pb, Zn

Other: Ag, Au, Cu, Ni

Ore minerals: Azurite, cerussite, chalcopyrite, copper, galena, garnierite, limonite, malachite, millerite, pentlandite(?), pyrargyrite, pyrite, pyrrhotite, smithsonite, tetrahedrite

Gangue minerals: Calcite, clinozoisite, epidote, garnet, quartz, zoisite

Geologic description:

The country rocks in the Mt. Eielson district are probably Paleozoic (Devonian?) and consist of limestone, calcareous argillite, slate, and schist. These rocks are cut by gabbro and locally overlain(?) by Triassic(?) greenstone. Tertiary coal-bearing rocks and Nenana Gravel form a local basin that probably underlies much of the alluvium-filled valley of Thorofare Creek on the north side of the district (Reed, 1933, plate 24). The mineral deposits are largely hosted by the limestone and calcareous argillite.

The pre-coal-bearing rocks are intruded by granodiorite and porphyritic granodiorite (Reed, 1933). The granodiorite mass near Mt. Eielson is approximately on strike with the east-northeasterly-elongated McGonagall granodiorite batholith (Reed, 1961), and is probably related to it (Decker and Gilbert, 1978; Cole, 1998). The McGonagall granodiorite is north of the Denali fault. It is equivalent to the Foraker granodiorite that is exposed south of the fault. Reed (1933) considered the granodiorite at Mt. Eielson to be Jurassic, but it is now known to be Late Eocene or Early Oligocene (Reed and Lanphere, 1973, 1974; Decker and Gilbert, 1978; Cole, 1998). The mineralization in the district is closely associated with the granodiorite and porphyritic granodiorite; it probably formed in Oligocene time, during the waning stages of McGonagall plutonism.

The granodiorite is greenish-gray and contains abundant phenocrysts of oligoclase-andesine and fewer of hornblende. K-feldspar veins and locally replaces plagioclase. The porphyritic granodiorite is more variable; some is relatively free of phenocrysts, and some contains large feldspar and hornblende phenocrysts as much as 1.5 inches long (Reed, 1933, p. 257-58). The hornblende is extensively altered to chlorite, and secondary epidote, sphene, calcite, and sericite occur widely in the rock. Locally the granodiorite contains pyrite and pyrrhotite; this rock weathers to dark rusty brown limonite. The main granitic mass on Mt. Eielson is even-grained granodiorite that grades upward into porphyritic granodiorite that forms many sill-like and dike-like apophyses in the calcic country rocks. The calcic strata generally dip northerly at a low angle.

Reed (1933, plates 22, 23, 24 and figures 35 and 36) shows that the major structure in the district is a

steeply-dipping fault that strikes east and is exposed about 1/2 mile south of Mt. Eielson. Rocks north of the fault are uplifted vertically.

The mineral deposits are in stratiform, epidotized and silicified layers that formed by replacing favorable calcic argillite and limestone beds. The ore minerals replace the epidote-silica rock. The deposits occur in a belt at least four miles long which can be traced eastward from Muldrow Glacier to Bald Mountain.

The ore is banded. According to Reed (1933, p. 273), sulfide-rich bands 1/16th to 1 inch thick alternate with bands of epidote-silica rock. The most abundant gangue minerals are members of the epidote group, dominantly clinozoisite. Garnet occurs rarely; quartz and calcite are minor gangue minerals. Quartz occurs most commonly as a fine-grained replacement product, but occasionally forms veins. Locally, layers as much as 40 feet thick are mineralized. Because of glacial cover, tracing the individual mineralized beds is difficult, but some appear to be continuous for distances of hundreds of feet.

Sphalerite, mainly fine-grained, is the most abundant ore mineral, followed by coarsely crystalline galena. Chalcopyrite is less abundant but may increase in content near the contact with the underlying massive granodiorite. The chalcopyrite is paragentically younger than the sphalerite and galena. Pyrite is common, and pyrite and pyrrhotite occur as disseminations in the granodiorite. Pyrargyrite was tentatively identified microscopically in the galena. Scattered high-silver values occur in the pyrargyrite-bearing lodes and in some galena-rich lodes, but silver content is generally less than three ounces per ton. Gold is not detected in most samples, but a few assays show 0.02-3 ounces per ton. Azurite and malachite and rare native copper are oxidation products of chalcopyrite and probably rare tetrahedrite. Metallurgical studies by the U. S. Bureau of mines identified the oxidized lead and zinc minerals cerussite and smithsonite in the near-surface ore (Muir, Thomas, and Sanford, 1947). The Bureau's studies were carried out in cooperation with detailed field mapping by the U. S. Geological Survey (Gates and Wahrhaftig, 1944).

Nickel, in garnierite, millerite, and possibly pentlandite also occurs in the district. Samples containing these minerals were submitted to the Territorial Department of Mines by F. B. Jiles in 1924 and 1926 and by W. J. Shannon in 1929 (Joesting, 1941-43, p. 18-19). The minerals probably occur in contact-metamorphosed magnesian carbonate rocks.

Alteration:

Introduction of epidote-group minerals and silicification of calcic argillite. Granodiorite is propylitized; the hornblende has been chloritized. Sericite is locally present in the granodiorite. Locally conspicuous surface oxidation of iron-, copper-, lead-, and zinc-bearing minerals.

Age of mineralization:

The mineralization is mid-Tertiary, roughly contemporaneous with the Eocene or Oligocene emplacement age of the granodiorite (Reed and Lanphere, 1973, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:

Polymetallic replacement deposits; Zn-Pb-(Cu) skarn deposits (Cox and Singer, 1986; models 19a, 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

19a, 18c

Production Status: No

Site Status: Inactive

Workings/exploration:

The district was discovered in 1920 by Joe and Fannie Quigley. More deposits were found in 1921 by O. M. Grant and others. The area was actively explored from 1921 to 1924; some prospecting continued into the 1940s. The area was explored by W. E. Dunkle in 1923 for Kennecott Copper Corporation (Fairbanks Daily News-Miner, February 23, 1923.) Dunkle's miners drove at least one adit about 100 foot long; there are at least two other short adits and many prospect pits.

Because of the extent of the mineralized area, it was of substantial interest to government agencies, whose investigations began soon after discovery with the work of Davis (1923). Other early government investigations included those by Capps (1927), Moffit (1933), and Reed's definitive study (1933). World War II

triggered investigations by the U. S. Geological Survey (Gates and Wahrhaftig, 1944) and U. S. Bureau of Mines (Muir, Thomas, and Sanford, 1947). The area was briefly studied by Chadwick (1975) on behalf of the U. S. Park Service. Earlier studies were summarized by Berg and Cobb (1967). Hawley and Associates (1978) also summarized earlier studies in an investigation related to Alaska National Interest Lands.

Muir, Thomas, and Sanford (1947) reported poor recovery of lead and zinc in flotation tests. At least part of the poor recovery was due to the partly oxidized sample material available for test work. Chadwick (1975) proposed that there is about 100,000 tons of material in talus that might support a small custom mill. Earlier estimates of resources had been made by Reed (1933), Gates and Wahrhaftig (1944), and Twenhofel (1953).

Production notes:

Reserves:

There are no measured reserves. Reed (1933) estimated a resource of many hundreds of thousands of tons of ore containing about 10 percent combined lead and zinc. Gates and Wahrhaftig (1944) estimated 200,000 tons of ore in place and in talus. Twenhofel (1953) estimated a similar tonnage grading about 5 percent zinc, 3 to 5 percent lead, and 0.2 to 0.3 percent copper. Chadwick (1975) estimated that there was about 100,000 tons of material in talus containing about 10 percent combined lead and zinc, and suggested that this material and other outcropping high-grade ore might support a small concentrating mill.

Additional comments:

The peak known as Mt. Eielson was originally called Copper Mountain. The area is entirely in Denali Park and Preserve. It was originally in Mount McKinley National Park . At the time of the mineral discovery in 1920 until the 1970s, claim location and mining were legal in the National Park. There has been no substantial work in the area since the 1940s.

In general, all of the mineral occurrences on the north flank of Mt. McKinley historically have constituted the Kantishna district. Reed (1933) and others, however, segregated the intensely mineralized area near Mt. Eielson as the Mt. Eielson or Copper Mountain district.

References:

Davis, 1923; Capps, 1927; Moffit, 1933; Reed, 1933; Joesting, 1941-43 (MR 195-23); Joesting, 1941-43 (MR 195-23A); Gates and Wahrhaftig, 1944; Muir, Thomas, and Sanford, 1947; Twenhofel, 1953; Reed, 1961; Berg and Cobb, 1967; Cobb, 1972 (MF 366); Reed and Lanphere, 1973; Reed and Lanphere, 1974; Chadwick, 1975; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Decker and Gilbert, 1978; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Carlson; Averil

Site type: Prospects

ARDF no.: MM167

Latitude: 63.3090 **Quadrangle:** MM B-1

Longitude: 150.5338

Location description and accuracy:
The Carlson and Averil prospects (Cobb, 1980, p. 16 [OFR 80-363]) are in the headwaters of Pirate Creek, about 0.8 mile west of Muldrow Glacier. Their location is uncertain; for this record the site corresponds to the location given by Heiner and Porter (1972, Mt. McKinley quadrangle, serial number 69). It is south of location 36 of Cobb (1972 [MF 366]) and location 45 of MacKevett and Holloway (1977). The location probably is accurate within a mile.

Commodities:

Main: Ag, Cu, Pb

Other:

Ore minerals: Chalcopyrite(?), galena(?), pyrite or pyrrhotite?

Gangue minerals:

Geologic description:
The Carlson and Averil prospects are in the northern contact zone of the Eocene or Oligocene McGonagall and related granitic plutons (Reed, 1933; Reed, 1961; Reed and Lanphere, 1973,1974). Capps (1927) noted widespread introduction of iron sulfides, presumably pyrite or pyrrhotite, in the contact zone. Based on the distribution of numerous claims, the lodes are probably mainly of disseminated type. Capps did not describe the mineral species present, but both Capps (1927) and Heiner and Porter (1972) report that the claims were valuable mainly for silver, copper, and lead. Such metals commonly occur in chalcopyrite and galena, and their oxidized equivalents.

The deposits probably are mid-Tertiary, roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall pluton (Reed and Lanphere, 1973, 1974). The area of these prospects is geologically similar to that at the Mt. Eielson and Slippery Creek deposits.

Alteration:

Age of mineralization:
The deposits probably are mid-Tertiary, roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall pluton (Reed and Lanphere, 1973, 1974).

Deposit model:
Disseminated(?) deposit.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: No

Site Status: Inactive

Workings/exploration:

The area was prospected subsequent to the discoveries at Mt. Eielson in the early 1920s. H. Carlson reportedly staked numerous claims in the area west of Muldrow Glacier in 1925 (Heiner and Porter, 1972). There has been little, if any, exploration of the deposits described in this record.

Production notes:

Reserves:

Additional comments:
The area is within Denali National Park and Preserve.

References:
Capps, 1927; Reed, 1933; Reed, 1961; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Reed and Lanphere, 1973; Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363).

Primary reference: Capps, 1927

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Twin Hills

Site type: Prospect

ARDF no.: MM168

Latitude: 63.2689 **Quadrangle:** MM B-1

Longitude: 150.8275

Location description and accuracy:

The Twin Hills prospect (Cobb, 1980, p. 109 [OFR 80-363]) is on the west side of a north-flowing tributary of Pirate Creek. The prospect is near location 35 of Cobb (1972 [MF 366]). Its location in the NE1/4NE1/4 sec. 30, T. 18 S., R. 15 W., Fairbanks Meridian, matches Moffit's (1933, p. 323) topographic description, but there are other nearby locations that could match his description. Cobb's location is also near the position of the Twin Hills lode described by Heiner and Porter (1972, Mt. McKinley quadrangle, serial number 67). The location selected for this record is probably correct within 1/2 mile. The Twin Hills prospect is number 44 of MacKevett and Holloway (1977).

Commodities:

Main: Ag, Au, Cu, Pb, Zn

Other: Fe

Ore minerals: Chalcopyrite, galena, magnetite, pyrrhotite, sphalerite

Gangue minerals: Hornblende, quartz

Geologic description:

The Twin Hills prospect is in the Eocene or Oligocene McGonagall granitic pluton, as mapped by Reed (1961, pl. 1). The deposit is probably in the faulted contact zone of the pluton. Moffit (1933, p. 323) noted porphyritic granite, silicified banded limestone, and an unidentified altered rock, possibly argillite or diabase, at the prospect. This altered rock contains radiating fibers of green hornblende.

The prospect consists of veins and disseminated deposits. A quartz vein at least 10 feet wide contains pyrrhotite, chalcopyrite, magnetite, possibly sphalerite, and fibrous hornblende. White porphyry near the vein assayed about about 0.11 ounce of gold per ton, along with detectable silver, lead, and zinc (Moffit, 1933, p. 323). Moffit traced float containing sphalerite, magnetite, and lesser amounts of galena easterly to the ridge crest, where the float contains pyrrhotite and magnetite.

The Twin Hills lode is one of a number of deposits in a mineral belt along the north flank of the McGonagall pluton. The deposits are probably roughly contemporaneous with the Eocene or Oligocene emplacement age of the McGonagall pluton.

Alteration:

Propylitic alteration, including formation of fibrous hornblende on fracture surfaces; silicification of limestone; 'leaching' of white porphyry (Moffitt, 1933, p. 323).

Age of mineralization:

The deposit formed subsequent to the Eocene or Oligocene intrusion of granitic rocks probably related to the McGonagall pluton (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:

Polymetallic veins and pluton-hosted gold (Cox and Singer, 1986; model 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The Twin Hills lode and nearby deposits were located by prospector W. J. Shannon in 1930. Mr. Shannon prospected this general area between about 1920 and 1939. There are no known workings. The prospect is inactive.

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Moffit, 1933; Reed, 1961; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Decker and Gilbert, 1978; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Moffit, 1933

Reporter(s): C.C. Hawley

Last report date: 12/13/00

Site name(s): Unnamed (east-central tier of claims, Mt. Eielson district)

Site type: Prospects

ARDF no.: MM169

Latitude: 63.1547 **Quadrangle:** MM B-1

Longitude: 151.4769

Location description and accuracy:

This record describes prospects on the following claims, herein called the east-central tier of claims in the Mt. Eielson or Copper Mountain district: Carrie (Dee); Tennessee (Ruth); Georgia (Venora or Silver Mine); Jiles (Zelma); Kelly (Silver Peak), and Isobel. The claims are between Grant and Granite Creeks, which are north-flowing tributaries of Thorofare River north of Mt. Eielson. They are at elevations between 3500 to 4600 feet. For this record, the site is approximately at the center of the south-side line of the Tennessee claim, which is the northeast corner of the Georgia and the northwest corner of the Jiles claims. The location is in the NE1/4SE1/4 sec. 36, T. 17 S., R. 15 W., Fairbanks Meridian. The location is accurate within about 500 feet. The claims are included in numbers 37-40 of Cobb (1972 [MF 366], 1980 [OFR 80-363]).

Commodities:

Main: Pb, Zn

Other: Ag, Cu

Ore minerals: Cerussite, chalcopyrite, galena, limonite, malachite, smithsonite, sphalerite

Gangue minerals: Calcite, epidote, garnet, quartz, siderite

Geologic description:

The country rocks in the area of these claims generally are Paleozoic calcareous strata cut by dikes and sills of Eocene or Oligocene porphyritic granodiorite. The sills mainly strike west to west-northwest (Reed, 1933, plate 24). Outcrop is sporadic, and in many places is concealed by extensive talus fields derived from the mineralized rocks.

The Jiles and adjacent claims cover the most intensely mineralized part of the area and also have been the most studied. In addition to the work summarized by Reed (1933), these claims were mapped by Gates and Wahrhaftig (1944), and sampled by the U. S. Bureau of Mines (Muir, Thomas, and Sanford, 1947).

The Carrie (Dee) is the northwestern claim in the block. It was explored by small pits, some of which exposed high-grade ore relatively rich in sphalerite (Reed, 1933, p. 280). The Tennessee (Ruth) claim was also explored by pits showing 'considerable fair ore.' Strata near the SW corner of the Tennessee claim strike about N. 80 E. and dip about 50 N. The adjacent (south) Georgia (Venora or Silver Mine) claim featured good mineralization near its west side line. A composite sample across a width of about 40 feet, representing 150 feet along strike, assayed 0.02 ounce of gold and 2 ounces of silver per ton, 0.22 percent copper, 2.33 percent lead, and 5.46 percent zinc. A high-grade part of the lode contained 21 percent zinc. Mineralization is`sparse at the Isobel claim, where the wall rock contains chalcopyrite, garnet, quartz, and epidote (Reed, 1933, p. 282).

The Jiles (Zelma) claim was developed by eight pits or open cuts and three short adits. Two of the adits were about 100 feet long; the third was about 70 feet long (Reed, 1933). This area was mapped in detail by Gates and Wahrhaftig (1944), and the Bureau of Mines collected seven samples near the Big Cut on the Jiles claim. The samples were 2 to12.5 feet long and assayed as much as 0.4 percent copper, 0.74 to 2.14 ounces of silver per ton, 1.46 to 4.68 percent lead, and 3.64 to 7.5 percent zinc. A representative grab sample of talus collected along 250 feet assayed 0.35 percent copper, 1.5 ounces of silver per ton, 5.09 percent lead, and 5.2 percent zinc (Muir, Thomas, and Sanford, 1947). A galena-rich zone in the middle tunnel

(adit) assayed 8.7 ounces of silver per ton and 62.11 percent lead.

The Bureau of Mines (1947) conducted metallurgical studies on a composite sample largely derived from the Jiles claim. The sample contained a considerable amount of oxidized ore, including cerussite and smithsonite. The head grade of the sample was 4.22 percent lead, of which 1.27 percent was in non-sulfide minerals, and 5.27 percent zinc, of which 0.37 percent was in non-sulfide minerals. Partly because of the oxidized nature of the ore, recoveries were poor. The lead concentrate contained 36.3 percent lead, representing a recovery of 59.6 percent. The zinc concentrate contained 49.5 percent zinc, representing a recovery of 76.5 percent. An unoxidized underground sample probably would give better recoveries.

The mineralization is Oligocene, forming during, or shortly after, the emplacement of the Eocene or Oligocene Mt. Eielson pluton (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Alteration:

Silification and replacement of country rocks by epidote and rarely garnet. Local surface oxidation of copper, lead, and zinc minerals.

Age of mineralization:

The mineralization is Oligocene, forming during, or shortly after, the emplacement of the Eocene or Oligocene Mt. Eielson pluton (Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cole, 1998).

Deposit model:

Polymetallic replacement deposits; Zn-Pb-(Cu) skarn deposits (Cox and Singer, 1986; models 19a and 18c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

19a; 18c

Production Status: None

Site Status: Inactive

Workings/exploration:

The claims were extensively explored by shallow pits and trenches in the 1920s and 1930s. The discoveries made by Fannie and Joe Quigley, O. M. Grant and others led to an option by Kennecott Copper Company in 1923.

The area was also sampled for Kennecott Copper Corporation by W. E. Dunkle in 1923. Dunkle's crew, led by foreman Ira McCoid (written commun., W. E. Dunkle to Bradford Washburn, March 20, 1953), drove short underground workings on the Jiles claim. The claims were prospected until about 1931. During World War II, the Jiles and nearby claims were mapped by the U. S. Geological Survey (Gates and Wahrhaftig, 1944) and sampled and studied metallurgically by the U. S. Bureau of Mines (Muir, Thomas, and Sanford, 1947). The claims are inactive.

Production notes:

Reserves:

Some of the generalized reserves or resources cited by Reed (1933), Gates and Wahrhaftig (1944), and Twenhofel (1953) must have been on the block of claims that included the Jiles. In general, resources are on the order of 100s of thousands of tons assaying about 10 percent combined lead and zinc and a few tenths percent copper.

Additional comments:

The area is in Denali National Park and Preserve.

References:

Reed, 1933; Gates and Wahrhaftig, 1944; Muir, Thomas, and Sanford, 1947;
Twenhofel, 1953; Cobb, 1972 (MF 366); Reed and Lanphere, 1974; Decker and Gilbert, 1978; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed, 1933

Reporter(s): C.C. Hawley

Last report date: 12/15/00

Site name(s): Unnamed (near the foot of Straightaway Glacier)

Site type: Occurrence

ARDF no.: MM170

Latitude: 63.3718 **Quadrangle:** MM A-3

Longitude: 150.4789

Location description and accuracy:
This occurrence is on the southwest side of Straightaway Glacier near its terminal moraine. It probably is in the E1/2 sec. 25, T. 20 S., R. 21 W., Fairbanks Meridian. The location was reported in claim records compiled by the U. S. Bureau of Mines (1973). The locality is number 62 of MacKevett and Holloway (1977). The location is probably accurate within a radius of 1 mile.

Commodities:

Main: Au

Other:

Ore minerals:

Gangue minerals:

Geologic description:
The country rocks near the terminus of Straightaway Glacier are probably rhyolite, conglomerate and other units that Reed (1961) proposed were interstratified with the Cretaceous or Tertiary Cantwell Formation. The rhyolite is probably Tertiary. Nothing is known of the geologic nature of this mineral occurrence, whose existence is inferred from a gold claim at this site (U.S. Bureau of Mines, 1973).

Alteration:

Age of mineralization:

Deposit model:

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Inactive

Workings/exploration:
A gold claim was staked at this site prior to 1973 (U.S. Bureau of Mines, 1973).

Production notes:

Reserves:

Additional comments:
The occurrence is in Denali National Park and Preserve.

References:

Reed, 1961; U. S. Bureau of Mines, 1973; MacKevett and Holloway, 1977.

Primary reference: U. S. Bureau of Mines, 1973

Reporter(s): C.C. Hawley

Last report date: 12/18/00

Site name(s): Question Mark

Site type: Prospect

ARDF no.: MM171

Latitude: 63.2059 **Quadrangle:** MM A-3

Longitude: 151.1683

Location description and accuracy:
The Question Mark prospect (Cobb, 1980, p. 85 [OFR 80-363]) is at an elevation of about 4000 feet on the west side of an unnamed middle fork of upper Slippery Creek. It is in the SE 1/4 SW 1/4 sec. 3, T. 20 S., R. 19 W., Fairbanks Meridian. Its location is known mainly from a 1:6,000-scale map made by Earl Pilgrim in 1929 (Hawley and Associates, 1978, fig. 4.1-B). The location is accurate within a radius of 1000 feet. The prospect is number 29 of Cobb (1973 [MF-366]) and number 39 of MacKevett and Holloway (1977).

Commodities:

Main: Cu

Other:

Ore minerals: Copper (native), cuprite, iron oxides

Gangue minerals:

Geologic description:
The Question Mark lode is in a porphyritic mafic dike with fine-grained groundmass that cuts dark shale of Paleozoic age. The dike contains disseminated grains and tissue-thin seams of native copper. Copper oxide (cuprite) is locally present. The shale country rock is stained, probably by iron oxides (Moffit, 1933, p. 321). Pilgrim's map (fig. 4.1-B; Hawley and Associates, 1978) indicates that the dike trends west, possibly reflecting topographic deflection of a body that strikes northeast and dips southeast.

Alteration:
Oxidation of iron and copper minerals.

Age of mineralization:
Uncertain but possibly middle Tertiary, assuming that it is related to nearby antimony and polymetallic lodes on the north flank of the McGonagall pluton of Eocene or Oligocene age (Reed and Lanphere, 1973, 1974).

Deposit model:
Native copper occurrence in a mafic igneous dike.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: No

Site Status: Inactive

Workings/exploration:
Some surficial material was removed to expose the lode, which was discovered by W. J. Shannon before 1929. The Question Mark prospect was restaked in 1930 by A. Taylor (Heiner and Porter, 1972, Mt.

McKinley qudrangle, number 38).

Production notes:

Reserves:

Additional comments:
The prospect is in Denali National Park and Preserve.

References:
Moffit, 1933; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Reed and Lanphere, 1973; Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363).

Primary reference: Moffit, 1933, and this record

Reporter(s): C.C. Hawley

Last report date: 12/12/00

Site name(s): Magnet; Old Sourdough

Site type: Prospects

ARDF no.: MM172

Latitude: 63.2056 **Quadrangle:** MM A-3

Longitude: 151.0899

Location description and accuracy:

The Magnet and Old Sourdough prospects (Cobb, 1980, p. 64, 80 [OFR 80-363]) are at the head of Iron Creek. The claims are the northeast continuation of the Terminus and Greenback claims (MM173), and are part of an approximately six-mile-long belt of mineral deposits on the north flank of the Alaska Range.

The Magnet and Old Sourdough claims are on the Iron Creek side of the Slippery Creek-Iron Creek divide, in the SE1/4 SE1/4 sec. 1, T. 20 S., R. 19 W., Fairbanks Meridian. For this record, the site is at an elevation of about 5200 feet. The location is based on a planetable topographic-geologic map of the claim block prepared by Earl R. Pilgrim in 1929 (copied as fig. 4.1-B, Hawley and Associates, 1978). The location is accurate within about 500 feet. The Magnet and Old Sourdough claims are combined as location 32 in Cobb (1972 [MF 366]) and as number 41 in MacKevett and Holloway (1977).

Commodities:

Main: Au

Other: Cu, Pb, Zn

Ore minerals: Azurite, chalcopyrite, galena, gold, malachite, pyrite, pyrolusite, pyrrhotite, sphalerite

Gangue minerals: Quartz

Geologic description:

The country rocks at the Magnet and Sourdough claims are limestone, shale or argillite, quartzite, and sill-like granitic dikes. The strata strike northeast and probably generally dip southeast. The sedimentary rocks are of Paleozoic age. The dikes are probably apophyses of the McGonagall pluton of mid-Tertiary age. The main outcrop area of the McGonagall pluton is about 1/4 mile southeast of the claims (Reed, 1961; Reed and Lanphere, 1973, 1974).

The mineral deposits are closely associated with the granitic dikes. Moffit (1933, p. 321-322) reported that a cut on the Magnet claim exposed dark, fine-grained silicified rock containing pyrrhotite, galena, and sphalerite. A felsic dike exposed in the canyon of Iron Creek on the Old Sourdough claim contains disseminated to massive pyrrhotite that probably is auriferous. Rock exposed upstream of the dike on the north side of Iron Creek contains pyrrhotite, sphalerite, chalcopyrite, and copper carbonates. Brecciated sedimentary country rock is cemented with malachite and azurite, and the dikes contain specks of pyrolusite. Sampling by W. E. Dunkle in about 1936 or 1937 (see MM173) showed that vein-like zones in the walls of the dikes assay about 0.16 to 0.43 ounce of gold per ton. The deposits were explored by surface and undergound workings in 1937.

The mineralization probably is Oligocene, forming shortly after the emplacement of the McGonagall pluton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1974).

Alteration:

Silicification and sulfidation of sedimentary rocks and granitic dikes. Local oxidation of copper and manganese minerals.

Age of mineralization:

The mineralization probably is Oligocene, forming shortly after the emplacement of the McGonagall plu-

ton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1974).

Deposit model:
Polymetallic gold lodes affiliated with granitic intrusive rocks (Cox and Singer, 1986; models 22b and 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
22b and 22c

Production Status: No

Site Status: Inactive

Workings/exploration:
The Magnet and Old Sourdough claims were located before 1929 by W. J. Shannon, who explored them until about 1935. The claims were optioned by W. E. Dunkle in 1936 and explored by Dunkle and the Anaconda Copper Company in 1937. Although gold-bearing dikes were found over a strike length of at least one mile, the gold-bearing rock was refractory and the grade found during underground testing was less than on the surface. The property was returned to Shannon. The claims were relocated by Arley Taylor in 1967 (Heiner and Porter, 1972).

Production notes:

Reserves:
Possible low-grade gold resource.

Additional comments:
The area is in Denali National Park and Preserve.

References:
Moffit, 1933; Reed, 1961; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Reed and Lanphere, 1973; Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986.

Primary reference: Moffit, 1933, and this record

Reporter(s): C.C. Hawley

Last report date: 10/09/00

Site name(s): Greenback; Terminus

Site type: Prospects

ARDF no.: MM173

Latitude: 63.1996 **Quadrangle:** MM A-3

Longitude: 151.1134

Location description and accuracy:

The Greenback and Terminus prospects (Cobb, 1980, p. 46, 106 [OFR 80-363]) are two of four claims staked end to end which extend from upper Slippery Creek to upper Iron Creek on the northwest flank of Mount McKinley. The westernmost claim is the Terminus. The easternmost claims in the four claim group are the Old Sourdough and Magnet (MM172). The coordinates are for the approximate center of the end line between the Terminus and Greenback claims (see map by Earl R. Pilgrim, fig. 4.1-B, Hawley and Associates, 1978). It is in the NW1/4NW1/4 sec. 12, T. 20 S., R. 19 W., Fairbanks Meridian. The claims trend northeast and lie beween about 4500 and 5000 feet in elevation. The location is probably accurate to 500 feet. The Greenback and Terminus claims are locations 30 and 31 of Cobb (1972 [MF 366]) and 40 of MacKevett and Holloway (1977).

Commodities:

Main: Ag, Au, Cu

Other: Mn, Pb, Zn

Ore minerals: Arsenopyrite, azurite, chalcanthite, chalcopyrite, galena, gold , malachite, pyrite, pyrolusite(?), pyrrhotite, sphalerite

Gangue minerals: Calcite, garnet, quartz

Geologic description:

The Greenback and Terminus claims trend northeasterly, subparallel to a belt of Paleozoic shale, limestone, and mafic intrusives that are intruded by sill-like granitic dikes of probable mid-Tertiary age. These rocks are on the north flank of the McGonagall batholith, which also trends northeast (Reed, 1961; Reed and Lanphere, 1973, 1974). Near the west end of the south endline of the Greenback claim a contact between limestone and a granitic sill strikes slightly east of north and dips 60 east. The discovery location on the Greenback claim is in the limestone, as mapped by Pilgrim (Hawley and Associates, 1978, fig. 4.1-B).

Moffit (1933, p. 321) reported that mineral deposits on the Greenback and Terminus claims are associated with apophyses of granite dikes. Minerals include pyrrhotite, chalcopyrite, sphalerite, galena, and, in altered limestone, garnet. The sulfide minerals are locally partly oxidized to azurite, chalcanthite, malachite, and possibly pyrolusite. Sedimentary beds on the Terminus claim locally are replaced by chalcopyrite, galena and sphalerite.

In 1936-37, W. E. Dunkle prospected gold-bearing lodes associated with granitic dikes in the Slippery Creek area. The dikes strike east-northeast to northeast, about the same as the strike of the sedimentary country rocks. The location of the gold deposits relative to the Greenback-Terminus-Magnet-Old Sourdough claims is uncertain. The deposits are continuous for at least one mile and possibly as much as three miles and probably coincide with the claims. The deposits are in the wallrocks of a granitic dike 3 to 20 feet thick. Both walls of the dikes contain quartz-calcite veins 2.5 to 12 feet thick. The veins contain about 10 percent pyrite and arsenopyrite. At one point, the hanging (south?) wall is cut by a 10-foot vein, and the footwall by a 12-foot vein, making that part of the deposit a total of about 42 feet thick, including 20 feet of intervening dike material. The dike material is oxidized and contains narrow ribbons of quartz carrying about 8 percent pyrite. Although this material does not pan gold , it evidently contains free gold, inasmuch as about 50 percent of the assay gold in surface samples was soluble in cyanide (W. E. Dunkle to J. G. Ba-

ragwanath, written commun., 1936). Samples collected by Dunkle assayed $5.60 to $15.00 (0.16 to 0.43 ounce) in gold per ton over thicknesses of 2.5 to 15 feet. .

The age of mineralization is probably middle Tertiary (Oligocene), about contemporaneous with emplacement of the youngest phases of the McGonagall batholith.

Alteration:

Replacement and silicification of dikes along their walls; replacement (sulfidation) of sedimentary and volcanic host rocks. Secondary (supergene) alteration caused by acidic, oxygenated, near-surface water produced chalcanthite, azurite, malachite, and possibly pyrolusite.

Age of mineralization:

The mineralization is probably middle Tertiary (Oligocene), somewhat younger than the emplacement age of the McGonagall batholith, which has been dated as Late Eocene or Early Oligocene (Reed and Lanphere, 1974; Cole, 1998).

Deposit model:

Low- to moderate-sulfide gold-quartz deposits; disseminated and replacement lodes of copper, lead, and zinc (Cox and Singer, 1986; models 22b and 22c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

22b and 22c

Production Status: Undetermined.

Site Status: Inactive

Workings/exploration:

The Greenback and Terminus claims were located on prospects discovered by W. J. Shannon before 1929. Although the region was extremely remote, Shannon made a large number of significant discoveries. About 1935, he interested W. E. Dunkle, a mining operator then affiliated with Pardners Mines of New York. Shannon optioned the claims to Dunkle in 1936. The option included the antimony-bearing lodes at the Straightaway Glacier (MM176) and Merinser (MM174) prospects . Shannon then staked more claims to cover a solid block of land 3 miles long in the Slippery Creek-Iron Creek area (Heiner and Porter, 1972, Mt. McKinley quadrangle, serial number 39; W. E. Dunkle letter dated Sept. 10, 1936 to J. G. Baragwanath). Dunkle brought in men and equipment to prospect the claims (Smith, 1938, p. 35; Capps, 1940, p. 188). Dunkle also flew a small tractor from the Golden Zone mine to the Shannon properties in a Ford Trimotor, the first time a tractor had been flown across the Alaska Range (Fairbanks Daily News-Miner, April 22, 1937). Dunkle optioned the property to Anaconda Copper Co. in 1937. Dunkle and Anaconda drove a short adit, possibly on the Merinser claim, and collected a bulk sample of the vein material. The sample assayed 0.16 ounce of gold per ton, no antimony, 2.04 percent arsenic and 5.2 percent sulfur. The samples were tested in Anaconda's laboratory at Butte, Montana; the tests showed that the unoxidized ore was highly refractory (written communs., Francis Cameron to M. H. Gidel, July 1937, and F. F. Frick to Reno Sales, November 1937). Results of the sampling and testing showed that a resource on the order of tens of millions of tons was available at the prospect, but that it was too low-grade and refractory to be developed at the remote location in Slippery Creek. The claims were returned to Shannon. At some later time Shannon abandoned the claims, but they were restaked in about 1967 by Arley Taylor of Kantishna (Heiner and Porter, 1972; Chadwick, 1976). Chadwick believed that the Greenback was a good prospect, but did not have enough information to evaluate it.

Production notes:

Production for testing only.

Reserves:

Low-grade resource of tens of millions of tons.

Additional comments:

The prospects are in Denali National Park and Preserve. They constiture a possibly significant gold resource. Written communications between W. E. Dunkle and J. G. Baragwanath are in C. C. Hawley's Dunkle files. The Anaconda written communications are in the collection at the Western Heritage Center, University of Wyoming.

References:

Moffit, 1933; Smith, 1938; Capps, 1940; Reed, 1961; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Reed and Lanphere, 1973; Reed and Lanphere, 1974; Chadwick, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Moffit, 1933, and this record

Reporter(s): C.C. Hawley

Last report date: 12/12/00

Site name(s): Merinser

Site type: Prospect

ARDF no.: MM174

Latitude: 63.1858 **Quadrangle:** MM A-3

Longitude: 151.2068

Location description and accuracy:

The Merinser prospect is on steep, north-trending ridge in the headwaters of an upper unnamed west fork of Slippery Creek. The prospect is in the NW1/4 sec.16, T. 20 S., R. 19 W., Fairbanks Meridian. A lode claim at the Merinser site (unnamed westernmost claim on fig. 4.1-B, Hawley and Associates, 1978) includes two deposits: a mercury deposit on the crest of the ridge; and a stibnite deposit on the southwest flank of the ridge. The coordinate location is at the mercury deposit site. It is accurate within 500 feet. The Merinser prospect is number 28 of Cobb (1972 [MF-366]; 1980, p. 69 [OFR 80-363]) and number 38 of MacKevett and Holloway (1977).

The Mt. McKinley A-3 quadrangle map shows an adit symbol at an elevation of 4300 feet The adit is about 0.2 mile northeast of the mercury occurrence. It is possible that this adit is at a gold prospect tested in 1937.

Commodities:

Main: Au(?), Hg, Sb

Other: Cu

Ore minerals: Cinnabar, hematite, mercury, stibnite, unspecified copper and iron sulfide and oxide minerals

Gangue minerals: Calcite, quartz

Geologic description:

In structurally ascending order, the country rocks at the Merinser prospect consist of basic igneous flows, a limestone (marble?)-dark shale unit cut by thin granitic or felsitic dikes, and a granitic sill. The rocks strike NE and dip about 30 SE (Hawley and Associates, 1978, fig. 4.1-B). At least two types of mineral deposits occur on the property.

A deposit containing cinnabar, native mercury, iron and copper sulfides and their oxidation products occurs at an elevation of about 5000 feet on the ridge crest. The host rock was mapped as limestone by Earl Pilgrim (written commun., Oct. 16, 1929). As described by Moffit (1933, p. 321-322), dark-gray, altered sedimentary rocks are cut by light-gray granite or felsite. The occurrence was developed by a 36-foot-long open cut. Cinnabar and native mercury occur in a one-foot vein (W. E. Dunkle, Sept. 10, 1936 letter to J. G. Baragwanath). According to Dunkle, 'On top of one of the higher ridges what appears to be one of the veins carries no gold values but shows considerable cinnabar over a width of a foot or more and up to three or four percent of native quicksilver, which oozes out in drops and beads when this rock is broken.' The vein contains calcite and quartz. Iron and copper sufides occur in small amounts, and iron oxide, including hematite, and oxidized copper minerals stain the rocks.

A nearly stratabound stibnite vein is exposed on the hillside southwest of the cinnabar deposit. It was developed by several pits. As mapped by Pilgrim, the vein could be followed for more than 500 feet; it dips about 30 SE. As described by Moffit (1933, p. 314), the stibnite is in a decomposed sandy bed highly colored by oxide minerals. The bed is capped by a thin, black shale unit and underlain by partly serpentinized dark igneous rock. Fragments of stibnite as much as 1 foot across were found below the vein zone and smaller fragments were dug from the vein.

A gold-bearing lode may occur at the location of the adit shown on the Mt. McKinley A-3 quadrangle. The topography of the area seems to match that described in a Sept. 9, 1936 letter from W. E. Dunkle to J.

G. Baragwanath: 'We can start a drift tunnel on the vein at any one of several places but the handiest place will be in a very steep hillside with about 1000 feet over us to the top of the ridge.'

The mineralization is inferred to be Oligocene in age, related to the intrusion of the McGonagall pluton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1973, 1974; Cole, 1998).

Alteration:

Oxidation of unspecified iron and copper minerals.

Age of mineralization:

The mineralization is inferred to be Oligocene in age, related to the intrusion of the McGonagall pluton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1973 and 1974; Cole, 1998).

Deposit model:

Multiple deposit types, including Almaden or silica-carbonate mercury deposits (27b or c), simple antimony deposit (27d), and possibly gold-bearing polymetallic veins (22b or c) (Cox and Singer, 1986).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

27b or 27c; 27d; 22b or 22c

Production Status: No

Site Status: Inactive

Workings/exploration:

The cinnabar lode was developed by a 36-foot-long open cut; an associated stratabound stibnite lode was developed by small cuts. The prospect was discovered and developed before 1929 by W. J. Shannon, who also found the Straightaway Glacier (MM176) and Stibner (MM175) antimony deposits. The Merinser deposit(s) and possibly the other antimony deposits were actively prospected in 1930 (Smith, 1933). The Merinser deposit was visited by W. E. Dunkle in 1936 and probably was covered by the Greenback, Terminus, Magnet, and Old Sourdough claims optioned by Dunkle from Shannon in 1936 and 1937. An adit about 0.2 mile northeast of the mercury occurrence may have been the site of underground work on a gold lode in a granite dike (W. E. Dunkle, Sept. 10, 1936 letter to J. G. Baragwanath). The Shannon claims were abandoned by Dunkle at the end of 1937 or possibly early in 1938 (expense ledger, W. E. Dunkle, 1934-1937). The claims were subsequently restaked for antimony by Arley Taylor in the late 1960s and he attempted to develop the deposit. Chadwick (1976) thought that the attempt was premature, and that more exploration should be done before development.

Production notes:

Possibly some mining of complex gold ore for metallurgical testing ; possible hand-scale mining of stibnite.

Reserves:

Additional comments:

The deposits are in Denali National Park and Preserve.

References:

Moffit, 1933; Smith, 1933; Cobb, 1972 (MF 366); Reed and Lanphere, 1973; Reed and Lanphere, 1974; Chadwick, 1976; MacKevett and Holloway, 1977; Hawley and Associates, 1978; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Moffit, 1933, and this record

Reporter(s): C.C. Hawley

Last report date: 12/12/00

Site name(s): Stibner

Site type: Prospect

ARDF no.: MM175

Latitude: 63.1726 **Quadrangle:** MM A-3

Longitude: 151.2441

Location description and accuracy:

The Stibner prospect is near the head of Birch Creek, which is the northerly-flowing creek west of Slippery Creek and east of the Foraker River. Its location is poorly known; for this record, it is based on Moffit's statement (1933, p. 314) that the claim is 'on the Birch Creek side of the top of the ridge west of the small glacier' which lies west of the Merinser prospect (MM174). The prospect is number 27 of Cobb (1972 [MF-366]; 1980 [OFR 80-363]) and 37 of MacKevett and Holloway (1977). The location for this record is about 1.5 miles north of Cobb's location, and close to the one given for the Stibner by Heiner and Porter (1972, number 36). The prospect is probably in the NW1/4 sec. 20, T. 20 S., R. 19 W., Fairbanks Meridian. The location is probably accurate within a mile.

Commodities:

Main: Sb

Other: As, Cu

Ore minerals: Stibnite, tennantite or tetrahedrite

Gangue minerals:

Geologic description:

The prospect is probably within the narrow band of mainly sedimentary rocks mapped by Moffit (1933, plate 4) north of the granitic massif now called the McGonagall pluton. Veins of stibnite and tennantite or possibly tetrahedrite cut basic igneous rocks similar to those which crop out on the Merinser claim (MM174). The veins are in a fault zone that strikes N. 20 E. (Moffit, 1933, p. 314). The veins are inferred to be of Oligocene age, somewhat younger than the McGonagall pluton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1973, 1974; Cole, 1998).

The deposit is probably related geologically to the Straightaway Glacier (MM176) and Merinser (MM174) deposits. It is in a mineral belt that extends for six or more miles along the north flank of the Alaska Range.

Alteration:

Age of mineralization:

The age is inferred to be Oligocene based on proximity to the McGonagall pluton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1973 and 1974; Cole, 1998).

Deposit model:

Simple antimony lode (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

27d

Production Status: No

Site Status: Inactive

Workings/exploration:

The details of the workings are unknown. The prospect was discovered in about 1930 by W. J. Shannon, who located one claim at the site (Heiner and Porter, 1972, Mt. McKinley quadrangle, serial number 36). The claim was relocated by Arley Taylor in 1970.

Production notes:

Reserves:

Additional comments:

The prospect is in Denali National Park and Preserve.

References:

Moffit, 1933; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Reed and Lanphere, 1973; Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Moffit, 1933

Reporter(s): C.C. Hawley

Last report date: 12/12/00

Site name(s): Straightaway Glacier

Site type: Prospect

ARDF no.: MM176

Latitude: 63.1144 **Quadrangle:** MM A-3

Longitude: 151.3057

Location description and accuracy:
This is an antimony prospect on the northeast side of Straightaway Glacier about 3.5 mi. southwest of Peters Dome. It is probably within one-half mile of the center of the NW1/4NW1/4 sec. 12, T. 21 S., R. 20 W., Fairbanks Meridian. The location is consistent with Moffit's (1933) description, and with the coordinates of a claim reported by Heiner and Porter (1972, number 3). The prospect is number 36 of MacKevett and Holloway (1977) and number 26 of Cobb (1972 [MF-366]; 1980 [OFR 80-363]).

Commodities:

Main: Sb

Other:

Ore minerals: Stibnite

Gangue minerals:

Geologic description:
The Straightaway Glacier antimony prospect probably is in a belt of Paleozoic sedimentary and volcanic rocks on the north flank of the McGonagall pluton. The belt of Paleozoic rocks strikes ENE and is subparallel to a major fault which in turn parallels the Denali Fault and lies about 3 to 8 miles north of it (Reed, 1961). The unnamed fault separates weakly metamorphosed strata of Paleozoic age, which are the inferred hosts of the antimony deposit, from sedimentary rocks of Late Cretaceous and Tertiary age north of the fault.

Very little is known about the deposit. Moffit (1933, p. 314) did not visit the prospect but compared it with the Merinser prospect (MM174), where stratabound stibnite occurs in sandstone overlain by a thin, black shale unit. Both the Straightaway and Merinser prospects occur in an east-northeast trending mineral belt. The belt contains the Stibner (MM175) stibnite prospect, and other, more mineralogically complex, deposits, such as the Greenback (MM173).

The deposit is inferred to be somewhat younger than the McGonagall pluton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1973, p. 2603; Reed and Lanphere, 1974; Cole, 1998).

Alteration:

Age of mineralization:
The deposit is inferred to be somewhat younger than the McGonagall pluton of Late Eocene or Early Oligocene age (Reed and Lanphere, 1973, p. 2603; Reed and Lanphere, 1974; Cole, 1998).

Deposit model:
Simple antimony deposit (Cox and Singer, 1986; model 27d).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
27d

Production Status: No

Site Status: Inactive

Workings/exploration:
The prospect was discovered in about 1930 by W. J. Shannon, who staked one claim on it (Heiner and Porter, 1972). There are probably no workings other than small hand-dug pits that almost certainly are completely caved.

Production notes:

Reserves:

Additional comments:
The deposit is in Denali National Park and Preserve.

References:
Moffit, 1933; Reed, 1961; Cobb, 1972 (MF 366); Heiner and Porter, 1972; Reed and Lanphere, 1973; Reed and Lanphere, 1974; MacKevett and Holloway, 1977; Cobb, 1980 (OFR 80-363); Cox and Singer, 1986; Cole, 1998.

Primary reference: Moffit, 1933

Reporter(s): C.C. Hawley

Last report date: 12/12/00

Site name(s): Unnamed (near Foraker Glacier)

Site type: Occurrences

ARDF no.: MM177

Latitude: 62.9999 **Quadrangle:** MM A-3

Longitude: 151.4193

Location description and accuracy:
These occurrences are approximately on the boundary of the Mt. McKinley A-3 and Talkeetna D-3 quadrangles. For this record, the site is in the north-central part of section 20, T. 22 S., R. 20 W., Fairbanks Meridian. The location is generalized.

Commodities:

Main: Mo

Other: Cu

Ore minerals: Chalcopyrite, molybdenite, pyrite

Gangue minerals: Quartz

Geologic description:
These occurrences are in the mid-Tertiary Foraker pluton, which has been dated at 38 Ma (Reed and Lanphere, 1974; Reed and Nelson, 1980). The pluton is composed mainly of biotite-hornblende granodiorite; it is chemically and mineralogically identical to the McGonagall batholith, which crops out north of the Denali fault in the Mt. McKinley quadrangle. The Foraker and McGonagall bodies formerly were continuous but have been offset by the Denali fault (Reed, 1961; Reed and Lanphere, 1973, 1974).

Reed and Nelson (1980) suggest that the Foraker pluton hosts molybdenite-quartz veins, and report that cobbles of the pluton on the Yentna and Lacuna Glaciers in the Talkeetna quadrangle contain sparse fractures filled with chalcopyrite, molybdenite, and pyrite. The Foraker pluton in the Mt. McKinley quadrangle has not yet (2000) been explored in detail for mineral deposits, but its offset equivalent, the McGonagall granodiorite, probably is the source of antimony, copper, and precious-metal deposits in the mineral belt near Slippery Creek. The granodiorite on Mt. Eielson that is associated with zinc-lead deposits in the Mt. Eielson district (MM166) probably is also related to the McGonagall intrusion (Decker and Gilbert, 1978; Cole, 1998).

Alteration:

Age of mineralization:
Oligocene, roughly contemporaneous with the the Eocene or Oligocene emplacement age of the Foraker-McGonagall batholith (Lanphere 1973; 1974; Cole, 1998).

Deposit model:
Molybdenum-copper porphyry (Cox and Singer, 1986; models 17, 21a or 21b).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
17, 21a or 21b

Production Status: None

Site Status: Inactive

Workings/exploration:

The part of the Foraker pluton in the Mt. McKinley quadrangle is in an extremely rugged and inaccessible area. As of the date of this record, it has not been prospected to any significant degree.

Production notes:

Reserves:

Additional comments:

The Foraker pluton is in Denali National Park and Preserve.

References:

Reed, 1961; Reed and Lanphere, 1973; Reed and Lanphere, 1974; Decker and Gilbert, 1978; Reed and Nelson, 1980; Cox and Singer, 1986; Cole, 1998.

Primary reference: Reed and Nelson, 1980

Reporter(s): C.C. Hawley

Last report date: 12/18/00

Site name(s): Unnamed (northeast of Eldridge Glacier)

Site type: Occurrence

ARDF no.: MM178

Latitude: 63.0401 **Quadrangle:** MM A-1

Longitude: 150.0027

Location description and accuracy:
This occurrence is on the ridge between Eldridge Glacier and Partin Creek about two miles east of Eldridge Glacier. It is at an elevation of about 5200 feet, about on the boundary between the N1/2 of sections 2 and 3, T. 22 S., R. 13 W., Fairbanks Meridian. The locality is number 39 of Hawley and Clark (1974, pl. 1, table 16). The location is accurate.

Commodities:

Main: Au, Cu

Other:

Ore minerals: Chalcopyrite, malachite

Gangue minerals:

Geologic description:
This occurrence is in tuff in a dominantly calcareous argillite unit (Hawley and Clark, 1974). Small amounts of chalcopyrite are disseminated in the tuff, which locally is stained with malachite. Samples of the tuff contain about 1500 ppm of copper and 0.2 ppm gold. The occurrence is approximately on strike with and two miles southwest of the Partin Creek occurrence in the Healy A-6 quadrangle (Hawley and Clark, 1974, p. B46). The Partin Creek occurrence is in interlayered basalt and limestone of Late Triassic age. Exploration by private interests at Partin Creek since 1974 has discovered lenses of massive, auriferous pyrrhotite in the limestone adjacent to a monzodiorite stock of Late Cretaceous age.

Alteration:
Local oxidation of copper minerals.

Age of mineralization:
Probably Late Cretaceous, related to emplacement of monzodiorite of Late Cretaceous age, as at the nearby Partin Creek occurrence in the Healy A-6 quadrangle.

Deposit model:
Replacement deposit in tuff.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Surface exploration only.

Production notes:

Reserves:

Additional comments:

The occurrence is on state-selected land within one mile of the boundary of Denali National Park and Preserve. It is about 2 miles southwest of the Partin Creek occurrence in the Healy A-6 quadrangle, a complex skarn and vein deposit of gold, copper, and antimony (Hawley and Clark, 1974).

References:

Hawley and Clark, 1974.

Primary reference: Hawley and Clark, 1974

Reporter(s): C.C. Hawley

Last report date: 12/18/00

Site name(s): Unnamed (southwest of Eldridge Glacier)

Site type: Occurrence

ARDF no.: MM179

Latitude: 63.0248 **Quadrangle:** MM A-1

Longitude: 150.3351

Location description and accuracy:
The approximate location of this occurrence is on peak 8715 in section 12, T. 22 S., R. 15 W., Fairbanks Meridian.

Commodities:

Main: F, Sn, U

Other:

Ore minerals: Cassiterite(?), fluorite, limonite, unknown radioactive minerals

Gangue minerals: Apatite, topaz, tourmaline, zircon

Geologic description:
This occurrence is in the northern part of the Ruth pluton, a late-stage granite differentiate of the lower Tertiary McKinley batholith (Reed and Lanphere, 1973). The pluton has not been studied in the Mt. McKinley quadrangle, but in the adjacent Talkeetna quadrangle it is locally enriched in fluorine, tin and uranium (Friedmann and Hinderman, 1979; Reed and Nelson, 1980).

According to Reed and Nelson (1980), the north part of Ruth pluton is largely leucocratic, coarse-grained biotite or biotite-muscovite granite. Tin is anomalous in pan-concentrate samples collected below iron-stained, altered zones. Fluorite, tourmaline, and topaz, characteristic accessories of tin-granites, occur locally in the north part of the Ruth pluton, and are associated with zircon and apatite, which are typical accessory minerals in less-differentiated parts of the McKinley batholith. A rock sample (Reed and Nelson, number 122) collected about a quarter-mile south of the boundary of the Mt. McKinley quadrangle was dated at 55.7 Ma, a typical age for the McKinley batholith (Reed and Lanphere, 1973).

Alteration:
Iron-staining; alteration of feldspar.

Age of mineralization:
Early Tertiary.

Deposit model:
Sn greisen (Cox and Singer, 1986; model number 15c).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
15c

Production Status: None

Site Status: Inactive

Workings/exploration:
As of the date of this record, there is no record of any mineral exploration in the northern part of the Ruth

pluton in the Mt. McKinley quadrangle. Reconnaissance exploration of the pluton in the adjacent Talkeetna quadrangle disclosed locally anomalous radioactivity (Friedmann and Hinderman, 1979). The granite is characterized by accessory fluorite, topaz, and tourmaline. Cassiterite or another tin mineral probably is present locally, as indicated by anomalous amounts of tin in pan-concentrate samples.

Production notes:

Reserves:

Additional comments:
This part of the Ruth pluton is in Denali Park and Preserve.

References:
Reed and Lanphere, 1973; Friedmann and Hinderman, 1979; Reed and Nelson, 1980; Cox and Singer, 1986.

Primary reference: Reed and Nelson, 1980

Reporter(s): C.C. Hawley

Last report date: 12/18/00

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