Alaska Resource Data File, Nulato quadrangle, Alaska

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Open-File Report 02–54

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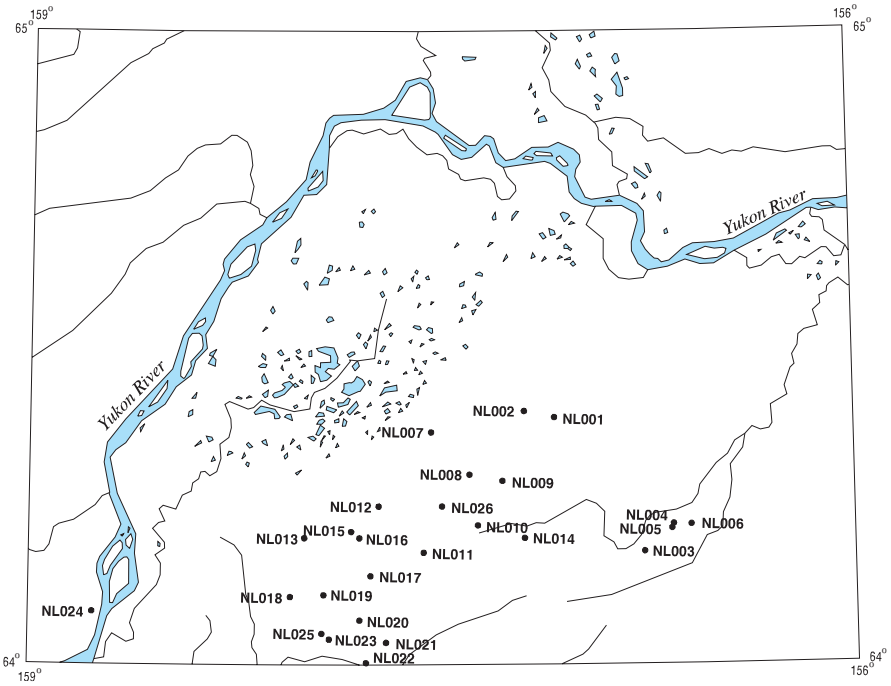
Alaska Resource Data File

Nulato 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 Nulato 1:250,000-scale quadrangle, Alaska

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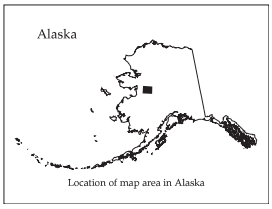

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OPEN-FILE REPORT 02-54

Site name(s): Perseverance; Valley; Bishop Creek

Site type: Mines

ARDF no.: NL001

Latitude: 64.39 **Quadrangle:** NL B-3

Longitude: 157.09

Location description and accuracy:

The Perseverance mine is along Bishop Creek, on the northern flank of the Kaiyuh Mountains. It is located approximately 5 miles northeast of Totson Mountain, in NW1/4 sec. 31, T. 11 S., R. 8 E., and is marked by a mine symbol on the Nulato B-3 topographic map. The mine is location 1 of Cobb (1972 [MF423]). The geologically similar Valley mine is apparently located nearby (Cobb, 1976 [OFR 76-866]), but Anaconda Mining Company geologists could not locate it in 1980. For this record, the description of the Valley mine is included with that of the Perseverance mine.

Commodities:

Main: Ag, Pb

Other: Cu, Zn

Ore minerals: Argentiferous galena, tetrahedrite

Gangue minerals: Quartz

Geologic description:

The country rocks in the vicinity of the Perseverance mine are quartzose, micaceous, and chloritic schist and limestone (Brooks, 1923). The chloritic schist is light green and locally contains fuchsite (Flanigan, 1998). The mineralization occurs as poddy, massive, coarse-grained, argentiferous galena and tetrahedrite in quartz veins (Flanigan, 1998). These quartz veins are parallel to schist foliation, strike northeast, and range up to 1 meter thick (Berg and Cobb, 1967; Flanigan, 1998).

Underground workings and mineralized outcrops at the deposit are no longer exposed, but fresh sulfides, gossan, and wallrock remain in the dump. Two assays of galena and tetrahedrite samples from the dump contain up to 90.4 ounces of silver per ton, 71.71% lead, 0.20% zinc, 1.28% copper, and 10,000 ppm antimony (Flanigan, 1998).

Small-scale mining took place at the Perseverance mine between 1921 and 1923. Production was about 275 tons of ore grading 73% lead and 104 ounces of silver per ton (Brooks and Capps, 1924; Mertie, 1937; Berg and Cobb, 1967). Small scale mining of lead and silver also took place at the nearby Valley mine at that time, and shipments from the two mines were probably combined (Mertie, 1937; Cass, 1959).

Alteration:
Local iron-oxide alteration (gossan).

Age of mineralization:

Deposit model:
Polymetallic (Pb-Zn) 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 Perseverance deposit was discovered in 1918 (Brooks, 1923), and underground mining took place between 1921 and 1923 (Cass, 1959).

Production notes:
The Perseverance mine produced about 275 tons of ore that contained 73% lead and 104 ounces of silver per ton (Brooks and Capps, 1924; Mertie, 1937; Berg and Cobb, 1967). Small scale mining of lead and silver also took place at the nearby Valley mine at that time, and shipments from the two mines were probably combined (Mertie, 1937; Cass, 1959).

Reserves:

Additional comments:

References:
Brooks, 1923; Mertie, 1937; Cass, 1959; Berg and Cobb, 1967; Cobb, 1972 (MF 423); Cobb, 1976 (OFR 76-866); Flanigan, 1998.

Primary reference: Brooks, 1923

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Ptarmigan I; Ptarmigan II; R-2290

Site type: Occurrences

ARDF no.: NL002

Latitude: 64.4 **Quadrangle:** NL B-3

Longitude: 157.2

Location description and accuracy:

The geologically similar Ptarmigan I, Ptarmigan II, and R-2290 occurrences are in area east and south of Totson Mountain. The coordinates are for the Ptarmigan I occurrence, which is at the approximate center of the area. Ptarmigan I is approximately 2 miles east of the summit of Totson Mountain and 1 mile north of Hill 2591. Ptarmigan II is approximately 2 miles southeast of Ptarmigan I, and 1 mile east-northeast of hill 2613. R-2290 is approximately 2 1/2 miles southwest of Ptarmigan I, and 2 miles south of Totson Mountain. The location is accurate within 5 miles.

Commodities:

Main: Cu, Zn

Other: Ag, Au, Pb, Mo, Sn

Ore minerals:

Gangue minerals:

Geologic description:

Ptarmigan I, Ptarmigan II, and R-2290 are small, individual, gossan occurrences in about a 3-square-mile area. The country rocks in the area are Paleozoic to Proterozoic schist and quartzite (Patton and Moll-Stalcup, 2000). Ptarmigan I consists of scattered float of massive gossan and schist in rubble of quartz schist, dolomite, mica schist, and phyllite. Ten rock samples of the gossan material contained up to 290 ppm copper, 99 ppm lead, 1500 ppm zinc, 1.2 ppm silver, 25 ppb gold, 13 ppm molybdenum, and 10 ppm tin. Three soil lines in the vicinity of Ptarmigan I indicate weakly anomalous copper and gold values but no obvious trend (Flanigan, 1998).

Ptarmigan II is a shear zone with gossan breccia that cuts a schistose micaceous quartzite. Twelve rock samples contain up to 595 ppm copper; soil samples are weakly anomalous in copper, silver, and gold (Flanigan, 1998).

R-2290 is a limonitic ankerite-quartz boulder on a game trail near a stream. Although the source of the boulder was not found, gossan fault breccia occurs uphill, in quartz schist rubble. Several rock samples contain up to 500 ppm copper and 494 ppm zinc (Flanigan, 1998).

Also see NL008, 009, and 011.

Alteration:
Iron-oxide alteration (gossan).

Age of mineralization:
Based on similarities to the Paw Print occurrence (NL009) and proximity to the Round Top (NL011) intrusion, the age of the deposit may be the same as the age of Round Top intrusion, about 73 Ma (Flanigan, 1998).

Deposit model:
Plutonic-related Cu-Zn?

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
These occurrences were discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998; Patton and Moll-Stalcup, 2000.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (northwest of hill 1325)

Site type: Occurrence

ARDF no.: NL003

Latitude: 64.178 **Quadrangle:** NL A-2

Longitude: 156.765

Location description and accuracy:

This occurrence is located in the southern Kaiyuh Hills, 36 miles south of Galena. It is in a body of dunite exposed in a 6-square-mile area between the Yuki River and the East Fork Yuki River. The occurrence is at an elevation of approximately 1200 feet, about halfway between VABM 2116 and hill 1325, on the north flank of the southwest end of the dunite body. This occurrence is location 1 of Foley and others (1984). The location is accurate within 500 feet.

Commodities:

Main: Cr

Other:

Ore minerals: Chromite

Gangue minerals:

Geologic description:

Chromite occurrences in the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The U.S. Bureau of Mines examined four of the occurrences in 1982, and published a report in 1984 (Foley and others, 1984). Twenty-one occurrences were located within a northeast-trending, approximately 6-mile-long body of dunite and pyroxene peridotite in the Kaiyuh Hills. The largest 4 occurrences are described in this record and in records NL004, NL005, and NL006. These four occurrences are estimated to contain a combined total of between 17,000 and 37,000 tons of chromic oxide (Foley and others, 1984).

The Kaiyuh Hills are underlain by a portion of the Rampart ophiolite belt that is offset along the Kaltag fault from the remainder of the belt. The belt comprises two tectonic units: an upper unit of ultramafic and gabbroic rocks and a lower unit of mafic volcanic rocks, diabase, and chert (Patton and others, 1977). Ultramafic rocks of the upper unit, which contain the chromite occurrences, are exposed along a 24-mile-long, northeast-striking belt in the Kaiyuh Hills (Foley and others, 1984). At the southwestern end of the belt is a 6-square-mile area underlain mostly by a body of dunite. This dunite contains more than 90% olivine, sparsely disseminated chromite, and locally banded segregations

of disseminated to massive chromite. Nodular chromite was observed at one location. At the northeastern end of this body, the dunite grades into pyroxene peridotite interlayered with dunite. This part of the body also contains chromite bands ranging in thickness from less than 1 inch to 3 feet. The dunite layers range from a few inches to several hundred feet thick. The pyroxene peridotite is mostly harzburgite. Minor amounts of wehrlite and lherzoliteare also present (Foley and others, 1984).

This site is labeled occurrence 1 by the U.S. Bureau of Mines (Foley and others, 1984). The describe it as a 5-by-750-foot area of float containing 3%- 5% banded and massive chromite, and estimate that it contains between 1,000 and 4,000 tons of chromic oxide. Three samples of float contained 10%-13.3% chromite.

Alteration:

Age of mineralization:

Jurassic, the age of the ultramafic hostrocks (Patton and others, 1977).

Deposit model:

Podiform chromite (Cox and Singer, 1986; model 8a)

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

8a

Production Status: No

Site Status: Inactive

Workings/exploration:

Chromite occurrences in the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The Bureau of Mines examined four of the occurrences in 1982 and published a report in 1984 (Foley and others, 1984).

Production notes:

Reserves:

This occurrence is estimated to contain between 1,000 and 4,000 tons of chromic oxide. It and three others nearby (NL004-006) contain a combined resource of 17,000 to 37,000 tons of chromic oxide.

Additional comments:

There are a total of 21 chromite occurrences known along a 6-mile-long, northeast-trending exposure of ultramafic rocks in the Kaiyuh Hills. This occurrence is one of the four largest such occurrences. The other three are described in NL004-006. Foley and others (1984) list the locations of the other 17 occurrences.

References:

Patton and others, 1977; Foley and others, 1984.

Primary reference: Foley and others, 1984

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (northwest of hill 2120)

Site type: Occurrence

ARDF no.: NL004

Latitude: 64.221 **Quadrangle:** NL A-2

Longitude: 156.659

Location description and accuracy:

This occurrence is located in the southern Kaiyuh Hills, 36 miles south of Galena. It is in a body of dunite exposed in a 6-square-mile area between the Yuki River and the East Fork Yuki River. It is at an elevation of about 1700 feet, about 1/2 mile northwest of hill 2120. The site corresponds to occurrence 9 of Foley and others (1984). The location is accurate within 500 feet.

Commodities:

Main: Cr

Other:

Ore minerals: Chromite

Gangue minerals:

Geologic description:

Chromite occurrences in the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The U.S. Bureau of Mines examined four of the occurrences in 1982, and published a report in 1984 (Foley and others, 1984). Twenty-one occurrences were located within a northeast-trending, approximately 6-mile-long body of dunite and pyroxene peridotite in the Kaiyuh Hills. The largest 4 occurrences are described in this record and in records NL003, 005, and 006. These four occurrences are estimated to contain a combined total of between 17,000 and 37,000 tons of chromic oxide (Foley and others, 1984).

The Kaiyuh Hills are underlain by a portion of the Rampart ophiolite belt that is offset along the Kaltag fault from the remainder of the belt. The belt comprises two tectonic units: an upper unit of ultramafic and gabbroic rocks and a lower unit of mafic volcanic rocks, diabase, and chert (Patton and others, 1977). Ultramafic rocks of the upper unit, which contain the chromite occurrences, are exposed along a 24-mile-long, northeast-striking belt in the Kaiyuh Hills (Foley and others, 1984). At the southwestern end of the belt is a 6-square-mile area underlain mostly by a body of dunite. This dunite contains more than 90% olivine, sparsely disseminated chromite, and locally banded segregations of disseminated to massive chromite. Nodular chromite was observed at one location. At

the northeastern end of this body, the dunite grades into pyroxene peridotite interlayered with dunite. This part of the body also contains chromite bands ranging in thickness from less than 1 inch to 3 feet. The dunite layers range from a few inches to several hundred feet thick. The pyroxene peridotite is mostly harzburgite. Minor amounts of wehrlite and lherzoliteare also present (Foley and others, 1984).

At this site, a 30- by 900-foot zone contains approximately 3% chromite in scattered, discontinuous bands in ultramafic rocks (Foley and others, 1984). The bands have a maximum thickness of 2.5 feet. This occurrence is estimated to contain between 11,000 and 22,000 tons of chromic oxide.

Alteration:

Age of mineralization:

Jurassic, the age of the ultramafic hostrocks (Patton and others, 1977).

Deposit model:

Podiform chromite (Cox and Singer, 1986; model 8a)

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

8a

Production Status: No

Site Status: Inactive

Workings/exploration:

Chromite occurrences in the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The U.S. Bureau of Mines examined four of the occurrences in 1982 and published a report in 1984 (Foley and others, 1984).

Production notes:

Reserves:

This occurrence is estimated to contain between 11,000 and 22,000 tons of chromic oxide. The combined resource of this occurrence and the resources at NL003, 005, and 006 is between 17,000 and 37,000 tons of chromic oxide.

Additional comments:

References:

Patton and others, 1977; Foley and others, 1984.

Primary reference: Foley and others, 1984

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (southwest of hill 2120)

Site type: Occurrence

ARDF no.: NL005

Latitude: 64.214 **Quadrangle:** NL A-2

Longitude: 156.665

Location description and accuracy:

This occurrence is located in the southern Kaiyuh Hills, 36 miles south of Galena. It is in a body of dunite exposed in a 6-square-mile area between the Yuki River and the East Fork Yuki River. The occurrence is at an elevation of approximately 1700 feet, about 0.7 mile west-southwest of hill 2120. It corresponds to occurrence 8 of Foley and others (1984). The location is accurate within about 500 feet.

Commodities:

Main: Cr

Other:

Ore minerals: Chromite

Gangue minerals:

Geologic description:

Chromite occurrences in the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The U.S. Bureau of Mines examined four of the occurrences in 1982, and published a report in 1984 (Foley and others, 1984). Twenty-one occurrences were located within a northeast-trending, approximately 6-mile-long body of dunite and pyroxene peridotite in the Kaiyuh Hills. The largest 4 occurrences are described in this record and in records NL003, 004, and 006. These four occurrences are estimated to contain a combined total of between 17,000 and 37,000 tons of chromic oxide (Foley and others, 1984).

The Kaiyuh Hills are underlain by a portion of the Rampart ophiolite belt that is offset along the Kaltag fault from the remainder of the belt. The belt comprises two tectonic units: an upper unit of ultramafic and gabbroic rocks and a lower unit of mafic volcanic rocks, diabase, and chert (Patton and others, 1977). Ultramafic rocks of the upper unit, which contain the chromite occurrences, are exposed along a 24-mile-long, northeast-striking belt in the Kaiyuh Hills (Foley and others, 1984). At the southwestern end of the belt is a 6-square-mile area underlain mostly by a body of dunite. This dunite contains more than 90% olivine, sparsely disseminated chromite, and locally banded segregations of disseminated to massive chromite. Nodular chromite was observed at one location. At

the northeastern end of this body, the dunite grades into pyroxene peridotite interlayered with dunite. This part of the body also contains chromite bands ranging in thickness from less than 1 inch to 3 feet. The dunite layers range from a few inches to several hundred feet thick. The pyroxene peridotite is mostly harzburgite. Minor amounts of wehrlite and lherzoliteare also present (Foley and others, 1984).

This occurrence is a 3-foot-thick band of nearly massive chromite and thin, parallel bands of chromite (Foley and others, 1984). The chromite occurs as masses of subhedral to anhedral grains that contain evenly distributed intergranular serpentine. Kammerite lines some fractures and slickensides. Traces of uvarovite are also present. Float samples and magnetic anomalies indicate that this occurrence is possibly 300 feet long. It is estimated to contain between 2,000 and 5,000 tons of chromic oxide (Foley and others, 1984).

Alteration:

Age of mineralization:

Jurassic, the age of the ultramafic hostrocks (Patton and others, 1977).

Deposit model:

Podiform chromite (Cox and Singer, 1986; model 8a)

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

8a

Production Status: No

Site Status: Inactive

Workings/exploration:

Chromite occurrences within the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The U.S. Bureau of Mines examined four of the occurrences in 1982 and published a report in 1984 (Foley and others, 1984).

Production notes:

Reserves:

This occurrence is estimated to contain between 2,000 and 5,000 tons of chromic oxide. This occurrence and three others nearby (NL003, 004, and 006) contain a combined total of between 17,000 and 37,000 tons of chromic oxide.

Additional comments:

References:

Patton and others, 1977; Foley and others, 1984.

Primary reference: Foley and others, 1984

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (east of hill 2120)

Site type: Occurrence

ARDF no.: NL006

Latitude: 64.220 **Quadrangle:** NL A-2

Longitude: 156.595

Location description and accuracy:

This occurrence is in the southern Kaiyuh Hills, 36 miles south of Galena. It is in a body of dunite exposed in a 6-square-mile area between the Yuki River and the East Fork Yuki River. The occurrence is at an elevation of approximately 1500 feet, about 1.7 miles east of hill 2120. It corresponds to occurrence 21 of Foley and others (1984). The location is accurate within 500 feet.

Commodities:

Main: Cr

Other:

Ore minerals: Chromite

Gangue minerals:

Geologic description:

Chromite occurrences in the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The Bureau of Mines examined four of the occurrences in 1982, and published a report in 1984 (Foley and others, 1984). Twenty-one occurrences were located within a northeast-trending, approximately 6-mile-long body of dunite and pyroxene peridotite in the Kaiyuh Hills. The largest 4 occurrences are described in this record and in records NL003, 004, and 005. These four occurrences are estimated to contain a combined total of between 17,000 and 37,000 tons of chromic oxide (Foley and others, 1984).

The Kaiyuh Hills are underlain by a portion of the Rampart ophiolite belt that is offset along the Kaltag fault from the remainder of the belt. The belt comprises two tectonic units: an upper unit of ultramafic and gabbroic rocks and a lower unit of mafic volcanic rocks, diabase, and chert (Patton and others, 1977). Ultramafic rocks of the upper unit, which contain the chromite occurrences, are exposed along a 24-mile-long, northeast-striking belt in the Kaiyuh Hills (Foley and others, 1984). At the southwestern end of the belt is a 6-square-mile area underlain mostly by a body of dunite. This dunite contains more than 90% olivine, sparsely disseminated chromite, and locally banded segregations of disseminated to massive chromite. Nodular chromite was observed at one location. At

the northeastern end of this body, the dunite grades into pyroxene peridotite interlayered with dunite. This part of the body also contains chromite bands ranging in thickness from less than 1 inch to 3 feet. The dunite layers range from a few inches to several hundred feet thick. The pyroxene peridotite is mostly harzburgite. Minor amounts of wehrlite and lherzoliteare also present (Foley and others, 1984).

This occurrence consists of a 75- by 300-foot zone of discontinuous bands of chromite up to 2.5 inches thick and 1.5 feet long. The chromite occurs as highly fractured, subhedral to anhedral crystals disseminated in serpentinized dunite. Fractures in the chromite are filled with pale green serpentine. Chalky white to pale blue magnesite coats weathered surfaces (Foley and others, 1984). This zone contains approximately 3% chromite, and is estimated to contain between 3,000 and 6,000 tons of chromic oxide (Foley and others, 1984).

Alteration:

Age of mineralization:

Jurassic, the age of the ultramafic hostrocks (Patton and others, 1977).

Deposit model:

Podiform chromite (Cox and Singer, 1986; model 8a)

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

8a

Production Status: No

Site Status: Inactive

Workings/exploration:

Chromite occurrences within the Kaiyuh Hills were first documented in 1980 by C.C. Hawley and Associates, Inc., during their investigations for Armco Mineral Exploration, Ltd. The U.S. Bureau of Mines examined four of the occurrences in 1982 and published a report in 1984 (Foley and others, 1984).

Production notes:

Reserves:

This occurrence is estimated to contain between 3,000 and 6,000 tons of chromic oxide. This occurrence and three others nearby (NL003, 004, and 005) contain a combined total of between 17,000 and 37,000 tons of chromic oxide.

Additional comments:

References:

Patton and others, 1977; Foley and others, 1984.

Primary reference: Foley and others, 1984

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Camp Creek; Fager Gulch; Tlatskokot; Portage Creek

Site type: Mine

ARDF no.: NL007

Latitude: 64.367 **Quadrangle:** NL B-4

Longitude: 157.539

Location description and accuracy:

The Camp Creek placer is located near the headwaters of Camp Creek, which is a north-flowing tributary to Bonanza Creek. The mine is immediately south of the Camp Creek landing strip marked on the U.S. Geological Survey Nulato B-4 quadrangle topographic map (1952). This is location 2 of Cobb (1972 [MF 423]), who mislabeled the location as Kluklaklatna River. Older maps refer to Camp Creek as Portage Creek. The location is accurate.

Commodities:

Main: Au

Other:

Ore minerals: Gold, magnetite, pyrite

Gangue minerals: Garnet

Geologic description:

The country rocks in the area of Camp Creek consist of Paleozoic to Proterozoic schist and quartzite (Patton and Moll-Stalcup, 2000). Placer gold is present in the streambed for at least two claim lengths up Fager Gulch, a locally-named west tributary to Camp Creek, and in Camp Creek for two claim lengths below the junction of Fager Gulch. The width of pay in 1939 was about 200 feet; it was in coarse gravels of volcanic rocks. Black sand consisting of pyrite, magnetite, and garnet, is associated with the gold. The gold-bearing gravel is beneath 8 to 9 feet of black muck and rests on a layer of blue clay that overlies bedrock. The bedrock consists of micaceous, graphitic, and chloritic schists (Roehm, 1939).

Gold was discovered on Fager Gulch and on Camp Creek in 1911 (Roehm, 1939). Recent mining at Camp Creek ceased in 1982 (Brewer and Millholland, unpublished Anaconda Minerals Company report, 1983).

Alteration:

Age of mineralization:

Quaternary.

Deposit model:
Placer Au (Cox and Singer, 1986; model 39a)

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

Production Status: Yes; small

Site Status: Undetermined

Workings/exploration:
Gold was discovered on Fager Gulch (a tributary of Camp Creek) and on Camp Creek in 1911 (Roehm, 1939). Small-scale mining occurred from at least 1911 to 1939, and during 1946; Cobb (1973 [B 1374]) reports some mining activity shortly after World War II (Roehm, 1946). During 1939, between 80,000 and 200,000 bedrock feet were mined using a dragline and washing plant (Roehm, 1939). Recent mining at Camp Creek ceased in 1982 (Brewer and Millholland, unpublished Anaconda Minerals Company report, 1983).

Production notes:
No production figures for Camp Creek are available. Small-scale mining took place from 1911 to 1939, probably for a short while after World War II (Roehm, 1939; Cobb, 1973 [B 1374]), and for some years before 1983.

Reserves:

Additional comments:

References:
Roehm, 1939; Roehm, 1946; Cass, 1959; Cobb, 1972 (MF 423); Cobb, 1976 (OFR 76-866); Patton and Moll-Stalcup, 2000.

Primary reference: Roehm, 1939

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (near head of Camp Creek)

Site type: Occurrences

ARDF no.: NL008

Latitude: 64.3 **Quadrangle:** NL B-3

Longitude: 157.4

Location description and accuracy:

This site consists of two, northeast-alined, geologically similar occurrences, locally called R-2280 and R-2283, on a northeast-trending ridge at the head of Camp Creek. The coordinates are for the southwestern occurrence (R-2280), in the northest corner of sec. 1, T. 14 S., R. 7 E., Kateel River Meridian. The other occurrence is about two miles to the northeast. The location is accurate within 5 miles.

Commodities:

Main: Cu, Zn

Other: Au, Mo

Ore minerals:

Gangue minerals:

Geologic description:

These occurrences are small, northeast-alined gossans two miles apart. The southwestern one (R-2280) consists of scattered float of gossanous breccia in quartz-chlorite schist rubble. One sample contained 400 ppm copper, 400 ppm zinc, 55 ppb gold, and 39 ppm molybdenum. The northeastern one (R-2283) is similar, but the gossanous breccia rubble-crop is gray schistose quartzite, instead of schist. One sample yielded 163 ppm copper and 265 ppm zinc (Flanigan, 1998).

Also see NL002 and NL009-011.

Alteration:

Age of mineralization:

Based on similarities with the Paw Print (NL009) occurrence and proximity to the Round Top (NL011) intrusion, these occurrences may be coeval with Round Top intrusion, which is about 73 Ma (Flanigan, 1998).

Deposit model:

Plutonic-related (?) Pb-Zn deposit

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Paw Print

Site type: Occurrence

ARDF no.: NL009

Latitude: 64.29 **Quadrangle:** NL B-3

Longitude: 157.28

Location description and accuracy:

The approximate location of the Paw Print occurrence is at an elevation of about 1100 feet, approximately 2 miles east of hill 2230, in the SE1/4 sec. 9, T. 14 S., R. 18 E., Kateel River Meridian. The location is accurate within 2 miles.

Commodities:

Main: Cu, Pb, Zn

Other: Ag, Au, Mo

Ore minerals:

Gangue minerals:

Geologic description:

The country rocks in the area of the Paw Print occurrence consist of Paleozoic to Proterozoic (?) schist and quartzite (Patton and Moll-Stalcup, 2000). The Paw Print occurrence is at the northeast end of a 4-kilometer-long, northeast-trending linear feature marked by anomalous metal values in silt and soil associated with iron-stained springs or seeps. The seeps and iron-stained streams mark a probable contact between graphitic quartzite and younger, unmetamorphosed mafic volcanic and intrusive rocks. Stream and soil samples contain up to 300 ppm copper, 420 ppm lead, 1645 ppm zinc, 120 ppm molybdenum, 2.1 ppm silver, 10 ppb gold, and more than 1000 ppm arsenic (Flanigan, 1998).

Flanigan (1998) suggests that the molybdenum content of this occurrence may link it to the Round Top quartz monzonite intrusive complex (NL011), which has been dated at approximately 75 Ma.

Also see NL002, 008, 010, and 011.

Alteration:

Locally conspicuous iron-oxide alteration.

Age of mineralization:

Flanigan (1998) suggests that the molybdenum content of this occurrence may link it to

the Round Top quartz monzonite intrusive complex (NL011), which has been dated at approximately 75 Ma.

Deposit model:
Plutonic-related Cu-Pb-Zn

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This occurrence was discovered by the Anaconda Mineral Company between 1980 and 1982 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998; Patton and Moll-Stalcup, 2000.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (headwaters of theYuki River)

Site type: Occurrence

ARDF no.: NL010

Latitude: 64.22 **Quadrangle:** NL A-3

Longitude: 157.37

Location description and accuracy:

This occurrence, locally called the Yuki River gossan, is near the headwaters of the Yuki River, in the southern Kaiyuh Mountains. For this record, the site is plotted at an elevation of about 800 feet, in the NW1/4 sec. 6, T. 15 S. R. 8 E., Kateel River Meridian. river. The location is accurate within 2 miles.

Commodities:

Main: Cu, Zn

Other: Ag, Mo

Ore minerals:

Gangue minerals:

Geologic description:

This occurrence is a conspicuous ferricrete deposit 700 meters long and 2 to 5 meters thick along the Yuki River (Flanigan, 1998). The gossan is composed of rounded cobbles and pebbles of quartz-graphite schist, chlorite schist, quartzite, and greenstone in a limonite and manganese oxide matrix. The ferricrete rests unconformably on moderately to steeply dipping muscovite-quartz schist. Twenty-five rock samples contain values up to 180 ppm copper, 208 ppm zinc, 0.9 ppm silver, and 20 ppm molybdenum (Flanigan, 1998).

See also NL002, 008, 009, and 011.

Alteration:

Conspicuous iron-oxide alteration.

Age of mineralization:

Flanigan (1998) suggests that the molybdenum content of this occurrence may link it to the Round Top quartz monzonite intrusive complex (NL011), which has been dated at about 75 Ma.

Deposit model:

Plutonic-related Cu-Zn

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Round Top; Tim's Greisen

Site type: Prospects

ARDF no.: NL011

Latitude: 64.177 **Quadrangle:** NL A-4

Longitude: 157.567

Location description and accuracy:

The Round Top prospect is on the south-central flank of the Kaiyuh Hills, in sec. 21, T. 15 S., R. 7 W., approximately 3300 feet southwest of the peak of VABM Round Top. The lobate prospect area, defined by drill holes and sediment sampling, is about 0.6 mile wide and extends northwest for approximately 1.24 mile. The coordinates are for the approximate center of the western lobe of mineralization. The location is accurate within about 300 feet.

Tim's Greisen, a small, nearby occurrence interpreted by Harris (1980) to be part of the Round Top system, is included in this record. Tim's Greisen is located approximately 0.3 mile southwest of the Round Top prospect.

Commodities:

Main: Cu, Mo

Other: Ag, Pb, W, Zn

Ore minerals: Argentojarosite, beudantite, chalcocite, chalcopyrite, covellite, jarosite, molybdenite, native Cu, pyrite, pyrrhotite, sphalerite

Gangue minerals: Actinolite, andalusite, anhydrite, calcite, chalcedonic quartz, chlorite, epidote, garnet, goethite, hematite, hydrothermal white mica, jarosite, kaolinite, limonite, montmorillonite, potassium feldspar, quartz, siderite

Geologic description:

The Round Top porphyry Cu-Mo deposit was discovered in 1980 during a reconnaissance exploration program by Anaconda Minerals Company (Harris, 1985). Harris completed a Masters thesis at the University of Colorado on the Round Top prospect in 1985 and the following information is from that thesis, unless stated otherwise.

The country rocks in the area of the Round Top prospect consist of greenschist and amphibolite, locally accompanied by blueschist-grade pelitic schist and quartzite. Lesser amounts of carbonate rocks and metavolcanic rocks are also present (Gemuts and others, 1983). All have undergone multiple periods of deformation and generally trend northeast.

Outcrop in the prospect area is scarce and the geology is largely defined by rubble. It consists of a large intrusive complex that trends northwest, parallel to a major regional

fault located 0.6 mile southwest of the prospect. The intrusive complex can be divided into two masses: 1) a western lobe exposed for 0.3 mile; and 2) an eastern lobe exposed for 0.25 mile. The two lobes cover an area of approximately 0.8 square mile, although much of the area is obscured by willows.

Harris (1985) identified six types of porphyritic intrusive rock and an intrusive microbreccia in the complex. The two oldest porphyrys, which are quartz monzonite, appear to be the parent lithology for the microbreccia and are associated with the mineralization. They are cross-cut by later porphyritic intrusive rocks. A K/Ar date on a potassium-feldspar phenocryst from the oldest intrusive gave an age of 74 +/- 2.8 Ma.

The microbreccia is composed of lithic and intrusive fragments that are cemented and replaced by biotite, potassium feldspar, and quartz, or by chlorite and quartz, with lesser amounts of chalcedonic quartz and montmorillonite, +/- calcite and actinolite. The biotite-potassium feldspar-quartz replacement indicates potassic alteration and suggests that the microbreccia formed during copper mineralization. The microbreccia comprises coarse-grained breccia that is cut by finer-grained breccia. Gradational contacts between the microbreccia and the older quartz-monzonite porphyry indicate that the microbreccia formed from it. The second-oldest porphyry, which is also quartz-monzonite, is in sharp contact with the microbreccia; textural evidence suggests the microbreccia was emplaced in pulses along shear zones, possibly coincident with explosive degassing during cooling of the intrusive rocks.

The wall rocks of the intrusive complex are mainly fine- to medium-grained pelitic schists. Locally calcareous rocks have been altered to calc-silicate hornfels near the intrusive. Two small outcrops of light-green metavolcanic rocks (possibly meta-andesite) are also present.

Mineralization at Round Top occurs as: 1) veins containing molybdenite, chalcopyrite, pyrite, and pyrrhotite; 2) gossan containing argentojarosite, jarosite, and beudantite; 3) a supergene zone beneath the gossan containing chalcocite, covellite, native copper, and chalcopyrite; and 4) calc-silicate wall rocks near the intrusive that contain pyrite, chalcopyrite, and sphalerite.

Molybdenite occurs primarily in an elliptical area of quartz veins that encloses an intensely veined stockwork zone at the eastern lobe of the intrusive. Chalcopyrite mineralization also occurs in this zone, and in potassically-altered microbreccia. The dominant sulfide in this zone is pyrite, along with traces of pyrrhotite. Chalcopyrite content decreases outward from the zone of intense stockwork veins, and lead, zinc, and silver increase, as determined by rock, soil, and sediment sampling at the western boundary of the intrusive complex.

Within the wall rock schists, iron enrichment is is marked by iron sulfides in calc-silicate hornfels. The average copper grade in calcareous schist in the 1400 East Gossan horizon is 0.78%.

Alteration consists of early potassic and propylitic alteration in the microbreccia and earlier porphyritic intrusions, and later sericite-quartz-pyrite alteration throughout the intrusive complex. The deposit also has undergone supergene enrichment, and calcareous schists near the complex have undergone calc-silicate hornfelsing and iron metasomatism.

The early potassic and propylitic alteration centers around an approximately 330-foot-diameter zone of stockwork quartz veins. Potassic alteration extends west for about 3600 feet, and gradually transitions to propylitic alteration. Quartz veins in the stockwork zone

make up to 90% of the rock. Older, smaller 'A'- type veins containing potassium-feldspar margins locally contain molybdenum, pyrite, and chalcopyrite. Younger, larger, 'B'- type veins usually contain molybdenum in their cores or along selvages. Sericite, anhydrite, and andalusite occur along some vein margins.

The propylitic alteration consists of chlorite, epidote, calcite, actinolite, montmorillonite, and chalcedonic quartz. The later sericite-quartz-pyrite alteration is fracture controlled and pervasive through the intrusive complex.

A zone of supergene enrichment underlies the oxide (gossan) zone, which typically is about 300-400 feet deep. The supergene zone contains chalcocite and sparse covellite and native Cu, as well as pyrite and chalcopyrite. Within the oxide zone, goethite, hematite, jarosite, and limonite are common. The oxidation of these rocks results in the formation of a kaolinite-sericite-quartz assemblage that is leached of all sulfides.

Tim's Greisen, a nearby polymetallic occurrence, is interpreted by Harris (1980) to be part of the Round Top system (Flanigan, 1998). At this occurrence, the greisen contains locally brecciated quartz-chlorite-muscovite schist and gossan. The brecciated schist is mildly bleached, iron-stained, and altered to clay. The gossan is black or gray, massive, and extends over an approximately 250- by 820-foot area. Sooty, amorphous, yellow, black or gray, and red-orange supergene oxides fill 0.6- to 1.2-cubic-inch voids in the gossan. Lithified gossan is composed of a thick, dark, iron and manganese coating on small, foliated siliceous structures. Assays of grab samples at Tim's Greisen show values of up to 4.52% lead, 1.3% zinc, 6.15 ounces of silver per ton, 1700 ppm tin, 415 ppb gold, 1255 ppm copper, >1000 ppm arsenic, >2% manganese, 65 ppm tungsten, and 8 ppm molybdenum (Flanigan, 1998).

Also see NL002, 008, 009, and 010.

Alteration:

Alteration consists of early potassic and propylitic alteration in the microbreccia and earlier porphyritic intrusions, and later sericite-quartz-pyrite alteration throughout the intrusive complex. The deposit also has undergone supergene enrichment, and calcareous schists near the complex have undergone calc-silicate hornfelsing and iron metasomatism.

The early potassic and propylitic alteration centers around a 330-foot- diameter zone of stockwork quartz veins. Potassic alteration extends west for about 3600 feet, and gradually transitions to propylitic alteration. Quartz veins in the stockwork zone make up to 90% of the rock. Older, smaller 'A'- type veins containing potassium-feldspar margins locally contain molybdenum, pyrite, and chalcopyrite. Younger, larger, 'B'- type veins usually contain molybdenum in their cores or along selvages. Sericite, anhydrite, and andalusite occur along some vein margins.

The propylitic alteration consists of chlorite, epidote, calcite, actinolite, montmorillonite, and chalcedonic quartz. The later sericite-quartz-pyrite alteration is fracture controlled and pervasive through the intrusive complex.

A zone of supergene enrichment underlies the oxide (gossan) zone, which typically is 300-400 feet deep. The supergene zone contains chalcocite and sparse covellite and native Cu, as well as pyrite and chalcopyrite. Within the oxide zone, goethite, hematite, jarosite, and limonite are common. The oxidation of these rocks results in the formation of a kaolinite-sericite-quartz assemblage that is leached of all sulfides.

Age of mineralization:

A K/Ar date on potassium feldspar from the oldest porphyry at Round Top is 74 +/- 2.8 Ma, corresponding to the age of cooling and mineralization (Harris, 1985). Although K/Ar dating is suspect, a Late Cretaceous or Early Tertiary age is probable.

Deposit model:

Porphyry Cu-Mo, and skarn with stockworks and gossans, disseminated (Cox and Singer, 1986; model 21a)

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

21a

Production Status: None

Site Status: Undetermined

Workings/exploration:

This prospect was discovered by Anaconda Minerals Company in 1980. From 1980 to 1984, they drilled seven diamond-drill holes, dug numerous trenches, completed extensive geologic mapping and geophysical surveys, and conducted an extensive sediment and soil sampling program. To assist exploration, a large base camp and an airstrip were constructed (Harris, 1985).

Production notes:

Reserves:

Additional comments:

References:

Gemuts and others, 1983; Harris, 1985; Flanigan, 1998.

Primary reference: Harris, 1985

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (south of VABM Eddy)

Site type: Occurrence

ARDF no.: NL012

Latitude: 64.25 **Quadrangle:** NL A-4

Longitude: 157.73

Location description and accuracy:

The approximate location of this occurrence, informally called VABM Eddy Gossan, is at an elevation of 2600 feet, 0.75 mile south of VABM Eddy. For this record, the site is plotted in the SW1/4 sec. 29, T. 14 S., R. 6 E., Kateel River Meridian. The location is accurate within 2 miles.

Commodities:

Main: Cu

Other: Au

Ore minerals:

Gangue minerals: Limonite

Geologic description:

This occurrence consists of a large gossan of iron-stained quartz-muscovite-chlorite schist. Limonite is present as stringers and disseminations along foliation. Rock samples collected in 1980 contain weakly anomalous values of up to 600 ppm copper and 80 ppb gold (Flanigan, 1998). Flanigan interprets this gossan to be related to magmatic fluids from the Khotol pluton, based on its proximity to the Khotol pluton and to its low molybdenum content. The Khotol pluton has been dated at approximately 110 Ma by K/Ar and Ar/Ar methods (Flanigan, 1998).

Also see NL013-016 and NL019-022.

Alteration:

Age of mineralization:

Flanigan (1998) interprets this gossan to be related to magmatic fluids from the Khotol pluton, based on its proximity to the Khotol pluton and to its low molybdenum content. The Khotol pluton has been dated at approximately 110 Ma by K/Ar and Ar/Ar methods (Flanigan, 1998).

Deposit model:

Plutonic-related Cu-Au

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (northwest of VABM Kluklaklatna)

Site type: Occurrence

ARDF no.: NL013

Latitude: 64.2 **Quadrangle:** NL A-4

Longitude: 158.0

Location description and accuracy:

This occurrence is located approximately 2 miles west-northwest of VABM Kluklaklatna (spelled Kluklakatna on Nulato 1:250,000-scale quadrangle map), in the southern Kaiyuh Mountains. It is in the NW1/4 sec. 36, T. 14 S., R. 4 E., Kateel River Meridian. The location is accurate within 5 miles.

Commodities:

Main: Cu, W

Other: Au

Ore minerals: Pyrrhotite, scheelite

Gangue minerals: Quartz, tourmaline

Geologic description:

This float occurrence consists of limonitic quartz and tourmaline veins in schist, enclosed in pyrrhotite-andalusite hornfels near the Khotol Pluton. The veins(?) also contain sparse, large euhedral crystals of scheelite. Nine rock samples contained up to 238 ppm copper, 45 ppb gold, and 315 ppm tungsten (Flanigan, 1998). Flanigan interprets this gossan to be related to magmatic fluids from the Khotol pluton, based on its proximity to the Khotol pluton and to its low molybdenum content. The Khotol pluton has been dated at approximately 110 Ma by K/Ar and Ar/Ar methods (Flanigan, 1998).

Also see NL012, NL014-016, and NL019-022.

Alteration:

Quartz-tourmaline veins occur in hornfelsed schist near the Khotol Pluton.

Age of mineralization:

Flanigan (1998) interprets this gossan to be related to magmatic fluids from the Khotol pluton, based on its proximity to the Khotol pluton and to its low molybdenum content. The Khotol pluton has been dated at approximately 110 Ma by K/Ar and Ar/Ar methods (Flanigan, 1998).

Deposit model:
Plutonic-related Cu-Au-W

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Aladdin

Site type: Prospect

ARDF no.: NL014

Latitude: 64.20 **Quadrangle:** NL A-4

Longitude: 157.20

Location description and accuracy:

The Aladdin prospect is in the southern Kaiyuh Mountains, on a ridge approximately 1 mile east of VABM Kluklaklatna. For this record, the site is plotted in the southwest corner of sec. 33, T. 14 S., R. 5 E., Kateel River Meridian. The location is accurate within 2 miles.

Commodities:

Main: Cu, Pb, Zn

Other: Ag, Au, Sn

Ore minerals: Arsenopyrite, scorodite

Gangue minerals: Quartz

Geologic description:

The Aladdin prospect consists of quartz-arsenopyrite-scorodite veins up to 0.2 meter thick, and of breccia comprising centimeter-scale, rounded fragments of massive arsenopyrite in a siliceous matrix. The deposit is associated with biotite granite of the Khotol Pluton and with quartz-muscovite-chlorite schist; the mineralization is exposed in a 4- by 7- meter frost boil in the schist. The deposit is similar to the one at the nearby Honker prospect (NL018) (Flanigan, 1998).

Eight grab samples contained up to 755 ppm copper, 430 ppm lead, 11 ppm zinc, 19.66% arsenic, 8.5 ppm silver, and 1285 ppb gold (Flanigan, 1998). The discovery samples also contained up to 185 ppm tin (M. Millholland, written commun., 2001).

Flanigan (1998) interprets the Aladdin deposit to be related to magmatic fluids from the Khotol pluton, based on its proximity to the pluton and its low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Also see NL012, 013, 015, 016, and 019-022.

Alteration:

Age of mineralization:

Flanigan (1998) interprets the Aladdin deposit to be related to magmatic fluids from the

Khotol pluton, based on its proximity to the pluton and its low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Deposit model:
Plutonic-related Cu-Pb-Zn vein (Cox and Singer, 1986; model 22c?)

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This prospect was discovered by Anaconda Minerals Company in 1982 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (on hill 1677)

Site type: Occurrence

ARDF no.: NL015

Latitude: 64.21 **Quadrangle:** NL A-4

Longitude: 157.83

Location description and accuracy:

This occurrence is on hill 1677 in the southern Kaiyuh Mountains, approximately 4.5 kilometers north-northeast of the top of Khotol Mountain. The location is accurate within 1.5 kilometers.

Commodities:

Main: Cu

Other: Ag, Pb

Ore minerals: Chalcopyrite, pyrite

Gangue minerals:

Geologic description:

This occurrence is in garnet-quartz-chlorite-muscovite schist and consists of sparse gossan float, disseminated pyrite in the schist, and chalcopyrite in siliceous hornfels (skarn?). Six rock samples contained up to 1510 ppm copper, 85 ppm lead, 1.1 ppm silver, and 210 ppm arsenic (Flanigan, 1998). Flanigan interprets the Aladdin deposit to be related to magmatic fluids from the Khotol pluton, based on its proximity to the pluton and its low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Also see NL012-014, 016, and 019-022.

Alteration:

Hornfels and skarn (?) are present at this occurrence.

Age of mineralization:

Flanigan (1998) interprets the Aladdin deposit to be related to magmatic fluids from the Khotol pluton, based on its proximity to the pluton and its low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Deposit model:

Cu-Au skarn? (Cox and Singer, 1986; model 18b)

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 or 1982 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Khotol Ridge; Sunny Day; Honkette

Site type: Occurrences

ARDF no.: NL016

Latitude: 64.20 **Quadrangle:** NL A-4

Longitude: 157.80

Location description and accuracy:

This site consists of three small occurrences of gossan in the vicinity of Khotol Mountain. They are informally called Khotol Ridge, Sunny Day, and Honkette. They share similar geologic characteristics and are a mile or so apart. The coordinates are for the approximate location of the Khotol Ridge gossan, at an elevation of 1900 feet on the northwest flank of hill 2047, a northeast-trending ridge of Khotol Mountain. It is in the NW1/4 sec. 23, T. 15 S., R. 5 E., Kateel River Meridian. This location is accurate within 2 miles. The Sunny Day gossan is 1.65 miles south-southwest of the Khotol Ridge gossan, and the Honkette gossan is 1.15 miles west-southwest of it.

Commodities:

Main: Pb, Zn

Other: Ag, Au, Cu

Ore minerals:

Gangue minerals: Limonite

Geologic description:

The Khotol Ridge gossan is associated with biotite granite of the Khotol pluton, quartz-mica schist, quartzite, and minor graphitic schist. A transitional phase of quartz-eye biotite schist occurs along the contact between the Khotol pluton and the quartz-mica schist. This quartz-mica schist overlies the quartzite, strikes northeast, and dips approximately 40 degrees southeast. The quartzite resembles that at the nearby Illinois Creek mine (NL023) and commonly contains euhedral limonite pits after pyrite. The quartzite unit can be traced nearly continuously for over 10 km from hill 1677 (NL015) southwest through the Sunny Day gossan to just south of the Honker prospect (NL018). Grab and soil samples at Khotol Ridge contain up to 231 ppm copper, 6750 ppm lead, 1190 ppm zinc, 16 ppm silver, 3600 ppm manganese, 850 ppm arsenic, and 40 ppb gold (Flanigan, 1998).

The Sunny Day gossan consists of scattered limonite-quartzite breccia and minor massive, vuggy, gossan float. It is in an east-west trending gully coincident with an airphoto lineament. Quartzite in this area is similar to quartzite at Illinois Creek (NL023) and

Khotol Ridge. Several soil, rock, and stream samples are only weakly mineralized, with values up to 3.0 ppm silver, and less than 1000 ppm arsenic (Flanigan, 1998). The Honkette gossan consists of a linear zone of millimeter- to centimeter-scale limonite veinlets in dark-gray andalusite hornfels. These veinlets are similar to veinlets in the wall rocks at the Honker prospect (NL018) (Flanigan, 1998).

Flanigan (1998) interprets these gossans to be related to magmatic fluids from the Khotol pluton, based on their proximity to the pluton and their low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Also see NL012-014, 016, and 019-022.

Alteration:

Locally conspicuous iron-oxide alteration.

Age of mineralization:

Flanigan (1998) interprets these gossans to be related to magmatic fluids from the Khotol pluton, based on their proximity to the pluton and their low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Deposit model:

Pb-Zn gossan; pluton-related epigenetic (?)

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

These occurrences were discovered by Anaconda Minerals Company in 1982 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:

Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Colorado Creek; Kluklaklatna River; Little Mud

Site type: Prospect

ARDF no.: NL017

Latitude: 64.14 **Quadrangle:** NL A-4

Longitude: 157.76

Location description and accuracy:
This placer prospect is located along Colorado Creek, a southeast-flowing tributary to California creek. It is in sec. 31, T. 15 S., R. 6 E, Kateel River Meridian. The location is accurate within 1 mile. This prospect is locality 3 of Cobb (1972 [MF 423]), who mistakenly identified it as Camp Creek.

Commodities:

Main: Au

Other:

Ore minerals: Gold

Gangue minerals:

Geologic description:
The area of Colorado Creek is underlain mainly by pelitic schist, phyllite, slate, sheared chert, quartzite, and some areas of recrystallized limestone (Mertie, 1937; Cass, 1959; Patton and Moll-Stalcup, 2000). Colorado Creek drains the granite or granodiorite Khotol pluton (Cass, 1959; Patton and Moll-Stalcup, 2000). That pluton has been dated by K-Ar and Ar/Ar techniques at 108-112 Ma (Flanigan, 1998).

Placer prospecting on Colorado Creek took place before and during 1909 (Maddren, 1910). In 1934, Mertie (1937) panned gold at this site. There is no record of any further prospecting or mining.

Alteration:

Age of mineralization:
Quaternary.

Deposit model:
Placer gold (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 prospecting on Colorado Creek took place before and during 1909 (Maddren, 1910). In 1934, Mertie (1937) panned gold at this site. There is no record of any further prospecting or mining.

Production notes:

Reserves:

Additional comments:

References:

Maddren, 1910; Mertie, 1937; Cass, 1959; Cobb, 1972 (MF 423); Cobb, 1973 (B 1374); Cobb, 1976 (OFR 76-866); Flanigan, 1998; Patton and Moll-Stalcup, 2000.

Primary reference: Mertie, 1937

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Honker

Site type: Prospect

ARDF no.: NL018

Latitude: 64.107 **Quadrangle:** NL A-5

Longitude: 158.051

Location description and accuracy:

The Honker prospect is about 7.2 miles southwest of the summit of Khotol Mountain (VABM 2844). It is about at the center of the N1/2 sec. 15, T. 16 S., R. 4 E., Kateel River Meridian. The prospect area trends north-northeast for approximately 600 meters. The coordinates are for the the main discovery site at the top of Hill 1280. The location is accurate within 500 feet.

Commodities:

Main: Ag, Au

Other: Cu, Pb, W

Ore minerals: Arsenopyrite, bismuth, bismuthinite, chalcocite, chalcopyrite, electrum, galena, gold, limonite, malachite, marcasite, pyrite, pyrrhotite, scheelite, scorodite, selenides, stibnite, sulfosalts, tellurides

Gangue minerals: Quartz

Geologic description:

The Honker prospect consists mainly of two subparallel, gold-bearing quartz-arsenopyrite veins that trend N20-25E. It also includes gossan; banded and massive sulfides in calcareous chlorite schist; and disseminations, blebs, and clots of sulfides in hornfelsed sedimentary rocks (Flanigan, 1998).

The country rocks at the Honker prospect include chlorite schist, quartz-chlorite-muscovite schist, variably hornfelsed, banded, light and dark gray metasedimentary rocks, and minor graphitic schist rubble. Medium-grained granodiorite float also occurs at the prospect. The metamorphic rocks generally strike east-west and dip 20 to 40 degrees south. High-temperature contact metamorphism is indicated by the presence of andalusite crystals and garnet porphyroblasts. The metasedimentary rocks are very resistant and cap the top of hill 1280. Hornfelsing and silicification of these rocks are probably due to the intrusion of the nearby Khotol Mountain pluton. A schistose quartzite unit overlies the metasedimentary rocks (Flanigan, 1998).

Two steep, gold- and silver-bearing quartz-arsenpyrite veins cross-cut the schists at the Honker prospect. These principal veins are brecciated and oxidized. The larger vein

(Honker East) may be as long as 950 meters, has a true thickness (identified by drilling) of 1-5 meters, and a vertical extent of 150 meters. The smaller vein (Honker West) is up to 3 meters thick and is traceable at the surface intermittently along strike for up to 300 meters (Flanigan, 1998).

Large, resistant, boulders up to 0.5 meters in diameter of dark reddish-brown, massive, ropy and siliceous, vuggy gossan are more prominent than boxwork gossan and fracture-veined limonitic material. Gossan at the Honker prospect is not as abundant as at Waterpump Creek (NL020) or Illinois Creek (NL023), but is also due to the oxidation of sulfides (Flanigan, 1998). The most abundant vein material at Honker is milky-white or pale green quartz and scorodite, and siliceous breccia that locally contains limonite. Disseminated arsenopyrite and traces of malachite are present locally. The arsenopyrite is generally euhedral and coated with chalcocite (Flanigan, 1998). Brecciated material is matrix supported and composed of rounded and angular fragments of schist, quartz, arsenopyrite, and minor gossan, cemented by quartz, scorodite, iron oxide, and small amounts of arsenopyrite. Additional sulfides occur as disseminated grains, blebs, and pods in the metasedimentary rocks, generally without gold (Flanigan, 1998). Electron microprobe analysis and polished section petrography also identified gold and silver tellurides, selenides, and sulfosalt minerals, chalcopyrite, marcasite, bismuth-bismuthinite solid solution, stibnite, galena, electrum, and native gold (Flanigan, 1998).

Drill holes intersected three narrow zones of banded and massive pyrrhotite and pyrite, with traces of chalcopyrite, arsenopyrite, and scheelite. These zones appear to be conformable with the quartz-chlorite-muscovite schist. Sparse, disseminated, very-fine-grained arsenopyrite and pyrite occur between the intercepts (Flanigan, 1998).

Mineralized rock samples from the Honker prospect average 0.13 ounce of gold per ton and 0.17 ounce of silver per ton. Copper ranges up to 5400 ppm, lead to 935 ppm, and several samples contained anomalous tungsten (25-270 ppm). The mineralization includes little or no zinc, manganese, antimony, or mercury, but arsenic values range higher than 5% in the richest drill hole intercepts. Samples of drill core assay up to 1.12 ounces of gold per ton and 2.33 ounces of silver per ton, and average 0.13 ounce of gold per ton and 0.27 ounce of silver per ton. The banded and massive sulfide intercepts assay up to 0.078 ounce of gold per ton and 0.08 ounce of silver per ton (Flanigan, 1998).

Arsenopyrite thermometry indicates that ore mineralization temperatures at the Honker prospect were between 300 and 350 degrees Celsius (Flanigan, 1998). These temperatures make it unlikely that metamorphism is responsible for mineralization (Flanigan, 1998).

K-Ar and Ar/Ar dating of sericite near the ore and white mica from the Khotol pluton demonstrate that mineralization and Khotol plutonism were coeval at about 113 Ma (Flanigan, 1998). The presence of anomalous Sb, Sn, and native Bi suggests that mineralization at Honker was related to magmatic fluids derived from the pluton, and the distribution of Au, Ag, As, and Bi among the Honker, Waterpump Creek (NL020), and the Illinois Creek (NL023) deposits indicates zoning peripheral to it (Flanigan, 1998).

The Honker prospect was first located by the Anaconda Minerals Company in 1980. Since then, the deposit has been explored by trenching, drilling, geologic mapping, and soil and rock sampling.

Also see Waterpump Creek (NL020) and Illinois Creek (NL023).

Alteration:

Metasedimentary rocks are hornfelsed and silicified. Locally, the schist is altered to clay and iron-stained. Oxidation of sulfides has produced gossan.

Age of mineralization:

K-Ar and Ar/Ar ages date the intrusion of the Khotol pluton at 108-113 Ma (Flanigan, 1998). Flanigan suggests that the Honker deposit may be related to it.

Deposit model:

Plutonic-related, epigenetic lode Au-Ag; Polymetallic veins? (Cox and Singer, 1986, model 22c)

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

22c?

Production Status: None

Site Status: Undetermined

Workings/exploration:

The Honker prospect was first located by Anaconda Minerals Company in 1980. Since then, the deposit has been explored by trenching, drilling, geologic mapping, and soil and rock sampling.

Production notes:

Reserves:

Inferred resources for the Honker prospect are estimated to be greater than 250,000 ounces of gold in ore averaging 1.0 ounce of gold per ton (Flanigan, 1998).

Additional comments:

References:

Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (on Kaiyuh Hill)

Site type: Occurrence

ARDF no.: NL019

Latitude: 64.11 **Quadrangle:** NL A-4

Longitude: 157.93

Location description and accuracy:
This occurrence, informally called the Kaiyuh Ridge gossan, is in the southern Kaiyuh Mountains. It is at an elevation of about 2500 feet, 0.9 mile due west of VABM Kalyuh Hill. VABM Kalyuh Hill is approximately 5 miles south-southwest of the summit of Khotol Mountain. The location is accurate within 2 miles.

Commodities:

Main: Ag, Pb

Other:

Ore minerals:

Gangue minerals: Limonite

Geologic description:
This occurrence is a weakly mineralized limonite gossan in garnet-chlorite-quartz schist and quartz-amphibole schist. The gossan occurs along a north-south-trending shear zone. Samples contain up to 10.0 ppm silver and 550 ppm lead (Flanigan, 1998).
Also see NL012-016 and NL020-022.

Alteration:

Age of mineralization:
Flanigan (1998) interprets this gossan to be related to magmatic fluids from the Khotol pluton, based on its proximity to the pluton and its low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Deposit model:
Gossan with Ag and Pb values

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Waterpump Creek; Last Hurrah

Site type: Prospects

ARDF no.: NL020

Latitude: 64.070 **Quadrangle:** NL A-4

Longitude: 157.800

Location description and accuracy:

The Waterpump Creek prospect is in the southern Kaiyuh Mountians, approximately 7 miles southeast of the summit of Khotol Mountain. The coordinates are for the approximate center of mineralization at Waterpump Creek, just south of the center of sec. 26, T. 16 S., R. 5 E., Kateel River Meridian. The location is accurate within 500 feet.

This site also includes the Last Hurrah prospect, which is on the same mineral trend as the Waterpump Creek prospect. The Last Hurrah prospect is centered about 1.4 miles southwest of the Waterpump Creek prospect.

Commodities:

Main: Ag, Pb, Zn

Other:

Ore minerals: Acanthite, anglesite, argentojarosite, beudantite, bornite, boulangerite, carminite, cerussite, chalcopyrite, fraiponite, hopeite, galena, hemimorphite, hydrozincite, limonite, massicot, mimetite, platternite, plumbjarosite, pyrite, pyrolusite, schultenite, scorodite, sphalerite, stannite

Gangue minerals: Calcite, dolomite, fluorite, gypsum, manganosiderite, quartz, siderite

Geologic description:

The Waterpump Creek deposit is in dolomitic quartzite and metadolostone. There are two ore zones: 1) a body about 200 meters long and 9 by 30 meters in section that consists of oxidized ore (gossan); and 2) a body of sulfide-siderite ore about 120 meters below the gossan that is about 120 meters long and 20 by 15 meters in section (Flanigan, 1998).

Initially, the Waterpump Creek deposit was considered to be syngenetic. However, Flanigan (1998) demonstrates that it probably is a plutonic-related, epigenetic deposit, based on its relationship to the 113 Ma Khotol pluton, the presence of stannite and boulangerite, and a depositional temperature of 300-350 degrees C.

The oxide (gossan) zone and the deeper, unoxidized sulfide-siderite zone strike S40E and dip 30SE. The mineralization pinches, swells, and bifurcates, suggesting that it comprises several different zones. Most of the mineralization is in quartzite with minor

dolostone layers. The ore zones cross-cut quartzite-dolostone contacts (Flanigan, 1998).

The gossan consists of soft masses and veins with many voids and masses of loose breccia. Breccia clasts range from clay size to small cobbles, and include rare, unoxidized mineral grains that range up to sand size. The minerals in the gossan zone include anglesite, argentojarosite, beudantite, carminite, cerussite, gypsum, fraipontite, hemimorphite, hopeite, jarosite, massicot, mimetite, platternite, plumbjarosite, pyrolusite, schultenite, and scorodite (Flanigan, 1998). The oxidized zone also contains galena that occurs as remnants rimmed with lead oxide or carbonate minerals, including anglesite or cerussite. Zinc-rich areas of the gossan consist primarily of limonite, along with hemimorphite and hydrozincite (Flanigan, 1998).

In the unoxidized, sulfide-siderite zone, siderite gangue replaces dolostone along irregular contacts. Major sulfide minerals include sphalerite, galena, and pyrite, within manganosiderite gangue. Radiating clusters of acicular calcite crystals coat fracture surfaces and line vugs near mineralization. Calcite and dolomite veins also occur. Sphalerite and galena commonly are intergrown and may form large pods, veins, bands, and rare vug fillings. Minor disseminated galena, pyrite, and manganosiderite occur throughout massive sphalerite. Pyrite commonly is subordinate, but it locally may form as much as 70% of the sulfide body (Flanigan, 1998). Boulangerite occurs as small, wire-like grains in siderite or as inclusions in pyrite. Stannite forms inclusions in pyrite. Teller and Wilson (in Flanigan, 1998) also identified acanthite, bornite, chalcopyrite, diopside, rosenhahnite, and tremolite in the sulfide zones, suggesting a possible skarn affinity (Flanigan, 1998). Alteration consists of calcite and dolomite veining, manganosiderite alteration of wallrock, and replacement of dolostone wallrock by siderite.

Estimated reserves at the Waterpump Creek prospect are 166,000 metric tons of ore averaging 9.5 ounces of silver per ton, 16.1% lead, and 5.5% zinc (Flanigan, 1998).

The Waterpump Creek deposit lies along a lineament that also crosses the Illinois Creek (NL023) and Round Top (NL011) deposits. This lineament is parallel to the Kaltag fault.

The Last Hurrah occurrence is marked by elevated concentrations of lead and zinc along two perpendicular soil lines. Soil-sample assays range up to 525 ppm lead and 903 ppm zinc. This soil anomaly is along an air-photo lineament (fault) that also crosses the Waterpump Creek (NL023) and Illinois Creek (NL023) deposits.

Alteration:

Calcite and dolomite veining, manganosiderite alteration of wallrock, and replacement of dolostone wallrock by siderite.

Age of mineralization:

The nearby Khotol pluton has been dated by K/Ar and Ar/Ar methods at 108-112 Ma (Flanigan, 1998). Flanigan (1998) links the mineralization at this deposit to magmatic fluids from this pluton. His interpretation is supported by a K/Ar date of about 113 Ma on sericite from a mineralized vein at the Waterpump Creek prospect (Flanigan, 1998).

Deposit model:

Plutonic-related, epigenetic, lode Ag-Pb-Zn; 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: Active

Workings/exploration:
The Waterpump Creek prospect was first located by Anaconda Minerals Company in 1980. Since then, the prospect has been trenched, drilled, geologically mapped, and soil and rock sampled.

Production notes:

Reserves:
The estimated reserves at the Waterpump Creek prospect are 166,000 metric tons of ore averaging 9.5 ounces of silver per ton, 16.1% lead, and 5.5% zinc (Flanigan, 1998).

Additional comments:

References:
Gillerman and others, 1986; Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (east of upper Illinois Creek)

Site type: Occurrence

ARDF no.: NL021

Latitude: 64.0 **Quadrangle:** NL A-4

Longitude: 157.8

Location description and accuracy:

This occurrence, locally called 'Airstrip Sinter,' is located near the north end of the Illinois Creek airstrip (not shown on the 1953/1966 Ophir A-4 topographic map). The site is 0.4 mile north-northeast of the top of hill 988, in the NE1/4 sec. 2, T. 17 S., R. 5 E., Kateel River Meridian. The location is accurate within 5 miles.

Commodities:

Main: Pb, Zn

Other: Cu

Ore minerals: Galena, hemimorphite(?), malachite

Gangue minerals: Quartz

Geologic description:

This occurrence is a 1-meter-thick quartz vein that trends northeast across the northern end of the Illinois Creek mine airstrip. The vein cuts silty gray limestone and contains blebs and pockets of crystalline galena and possibly hemimorphite, locally accompanied by malachite staining. Soil sampling shows anomalous lead values coincident with the trend of vein float. A vein sample contained 0.3-1.0% lead, 1.0-3.0% zinc, and 30-100 ppm copper (Flanigan, 1998).

Alteration:

Oxidation of copper mineral.

Age of mineralization:

Flanigan (1998) interprets this occurrence to be related to magmatic fluids from the Khotol pluton, based on its proximity to the pluton and its low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Deposit model:

Pb-Zn vein (Cox and Singer, 1986; model 22c?)

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

Production Status: None

Site Status: Undetermined

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998). The vein was exposed by bulldozer work on the Illinois Creek airstrip.

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (west of lower California Creek)

Site type: Occurrence

ARDF no.: NL022

Latitude: 64.00 **Quadrangle:** NL A-4

Longitude: 157.80

Location description and accuracy:

This occurrence, informally called 'Dee's Warm Springs,' is near the warm springs on the southern end of locally-named 'Camp Ridge,' a relatively level, north-south hill west of lower California Creek. For this record, the site is plotted 0.4 mile due north of the center of sec. 14, T. 17 S., R. 5 E., Kateel River Meridian. The location is accurate within 2 miles.

Commodities:

Main: Ag, Pb, Zn

Other: As, Au, W

Ore minerals:

Gangue minerals:

Geologic description:

This occurrence is at a warm springs and consists of ferricrete, iron-stained travertine, and graphitic quartzite float (Flanigan, 1998). The temperature of the springs is about 30 degrees C. Samples of silt from the spring are anomalous in lead, zinc, silver, gold, and arsenic. Iron-stained rocks and gossan float nearby contain up to 725 ppm lead, 550 ppm zinc, 1.8 ppm silver, 45 ppb gold, and 45 ppm tungsten.

Alteration:

Age of mineralization:

Flanigan (1998) interprets this occurrence to be related to magmatic fluids from the Khotol pluton, based on its proximity to the pluton and its low molybdenum content . K-Ar and Ar/Ar dates for the Khotol pluton are approximately 110 Ma (Flanigan, 1998).

Deposit model:

Pb and Zn at a warm springs probably related to a nearby pluton

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

Production Status: None

Site Status: Undetermined

Workings/exploration:
This occurrence was discovered by Anaconda Minerals Company in 1980 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Illinois Creek

Site type: Mine

ARDF no.: NL023

Latitude: 64.040 **Quadrangle:** NL A-4

Longitude: 157.910

Location description and accuracy:

The Illinois Creek mine is in the southern Kaiyuh Mountains, about 9 miles south of the top of Khotol Mountain. It is on hill 810, in the SW1/4 sec. 4, T. 17 S., R 5 E., Kateel River Meridian. The coordinates are for the approximate midpoint of a 6000-foot-long mineralized shear zone that trends east-west. The location is accurate within 500 feet.

Commodities:

Main: Ag, Au

Other: Cu, Pb, Zn

Ore minerals: Acanthite, argentojarosite, arsenobrakenbushite, arsenopyrite, azurite, bismuthinite, boulangerite, chalcopyrite, cornwallite, covellite, delafossite, electrum, galena, malachite, native bismuth, native gold, native silver, plumbjarosite, pyrite, sphalerite, stannite, stibnite, tetrahedrite, todorokite

Gangue minerals: Goethite, limonite, quartz

Geologic description:

The Illinois Creek deposit is in the southwestern part of the Ruby Geanticline in the Kaiyuh Mountains. The Kaiyuh Mountians are composed of highly deformed Paleozoic (or older?) pelitic schist, along with lesser amounts of quartzite, metacarbonate, and greenstone. K-Ar ages of schist in the Illinois Creek region date the regional deformation and metamorphism of these rocks at about 150 Ma. The Cretaceous Khotol pluton is exposed approximately 12 km north of the Illinois Creek mine; it is composed of granite and granodiorite (Flanigan, 1998).

The Illinois Creek deposit is an oxidized shear zone hosted in metasedimentary rocks. This shear zone trends east-west for at least 6000 feet and dips about 60 degrees south. The deposit is thoroughly oxidized, and contains anomalous to ore-grade concentrations of gold, bismuth, silver, copper, lead, zinc, arsenic, antimony, iron, and manganese (Flanigan, 1998). The eastern part of the deposit contains most of the supergene pyrolusite, hematite psuedomorphs of pyrite, goethite, and rhombohedral limonite. Limestone and dolomite are prominent in this part of the deposit. Gold is concentrated in the central part of the deposit, in association with hydrothermal quartz containing pyrite casts. This

quartz is heavily oxidized. The western margin of the deposit contains lesser amounts of iron-stained quartz but greater amounts of massive, supergene iron minerals. Supergene copper mineralization also increases to the west. A secondary gold anomaly is in the western part of the deposit (Flanigan, 1998).

Although the Illinois Creek deposit is deeply oxidized and very few primary sulfides remain, microscopic sulfides can be identified. Pyrite is the most abundant sulfide, and most of the other primary ore minerals occur either as inclusions in pyrite or on pyrite grain boundaries. Other ore minerals include sphalerite, chalcopyrite, arsenopyrite, tetrahedrite, electrum, native bismuth, bismuthinite, stannite, tetrahedrite, stibnite, boulangerite, and galena. Some trench samples revealed zones of relatively unaltered sulfides, including pyrite, chalcopyrite, arsenopyrite, and covellite, as well as some probably supergene minerals such as acanthite and native copper (Flanigan, 1998). Anaconda Minerals Company also reports native silver, argentojarosite, plumbjarosite, arsenobrakenbushite, cornwallite, delafossite, and todorokite (Flanigan, 1998).

The fineness of gold and electrum at Illinois Creek is highly variable and ranges from 800 to greater than 980. The richer electrum grains typically are subrounded and relatively homogenous, while the electrum grains of medium fineness are usually irregularly shaped and inhomogenous, and have gold-enriched rims. Gold grains are porous, spongy, irregularly shaped, and have only been identified using secondary electron imaging. These gold grains occur in supergene iron oxides, iron hydroxides, malachite, and azurite. The within-grain variations in fineness and the gold-enriched rims of electrum grains suggest silver leaching and gold-enrichment during weathering and supergene processes (Flanigan, 1998).

Although syngenetic origins for the deposit have been proposed, Flanigan (1998) conclusively demonstrates that a plutonic-related epigenetic model best fits its characteristics. K-Ar and Ar/Ar dates show that the mineralization and the intrusion of the Khotol pluton are contemporaneous (~ 113 Ma), supporting Flanigan's interpretation that the Khotol pluton is probably the source of mineralizing hydrothermal fluids at Illinois Creek.

The Illinois Creek mine began production in 1997. Currently (2001), the American Reclamation Group, LLC, is conducting minor mining while reclaiming the site.

Alteration:

The sulfides of the Illinois Creek deposit have been highly oxidized, with supergene enrichment of several metals.

Age of mineralization:

An Ar/Ar date on sericite from a mineralized vein in the Illinois Creek deposit yielded a mineralization age of 113 Ma, roughly coeval with the 108-133 Ma Khotol pluton (Flanigan, 1998).

Deposit model:

Plutonic-related, epigenetic Au-Ag

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

Production Status: No

Site Status: Active

Workings/exploration:

The Illinois Creek mine was discovered by Anaconda Minerals Company in 1980. By 1989, Goldmor had completed exploration of the area (Bundtzen and others, 1990). From 1991 through 1992, North Pacific Mining Company leased the area and completed over 3000 meters of drilling and extensive trenching (Bundtzen and others, 1992; Swainbank and others, 1993). During 1993, Echo Bay Alaska explored Illinois Creek using ground-based geophysical methods, trenching, and reverse-circulation drilling (Bundtzen and others, 1994). In 1994, USMX began permitting for the Illinois Creek mine and completed a mine feasibility study (Swainbank and others, 1995). The first gold was poured by Dakota Mining Corporation (the parent company of USMX) in June of 1997 (Swainbank and others, 1998). Gold production in 1998 was less than anticipated, and USMX filed for bankruptcy (Szumigala and Swainbank, 1999). There was no production in 1999, although Viceroy Resources drilled 23 drill holes as part of a due-diligence program (Swainbank and others, 2000). Currently, the American Reclamation Group, LLC, is conducting small-scale mining while reclaiming the Illinois Creek mine (Ken Pohle, oral commun., 2001).

Production notes:

In June of 1997, Dakota Mining Corporation poured the first gold from the Illinois Creek mine. Total gold production for 1997 was 20,111 ounces (Swainbank and others, 1998). Production for 1998 was 29,998 ounces of gold and 155,235 ounces of silver. In 1998, the operating company, USMX filed for bankruptcy (Szumigala and Swainbank, 1999). There was no production in 1999 (Swainbank and others, 2000). Currently (2001), the American Reclamation Group, LLC, is conducting small-scale mining while reclaiming the Illinois Creek mine (Ken Pohle, oral communication, 2001).

Reserves:

In 1997, the geologic resource was estimated to be 7,761,000 tons of ore grading 0.063 ounce of gold per ton and 1.38 ounces of silver per ton (Lamborn, 1997).

Additional comments:

References:

Bundtzen and others, 1990; Bundtzen and others, 1992; Swainbank and others, 1993; Bundtzen and others, 1994; Swainbank and others, 1995; Lamborn, 1997; Flanigan, 1998; Swainbank and others, 1998; Szumigala and Swainbank, 1999; Swainbank and others, 2000.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Kaiyah

Site type: Prospect

ARDF no.: NL024

Latitude: 64.083 **Quadrangle:** NL A-6

Longitude: 158.768

Location description and accuracy:

The Kaiyah prospect is about 1 mile west of the Yukon River, and 3 miles east of Poison Creek. The coordinates are for the approximate center of the prospect, near VABM Kaiyah in sec. 24, T. 16 S., R. 1 W., Kateel River Meridian. This prospect is on Doyon, Ltd. selected land. The location is accurate.

Commodities:

Main: Ag, Au

Other:

Ore minerals:

Gangue minerals: Quartz

Geologic description:

The country rocks in the area of the Kaiyah prospect consist of deltaic sandstone, shale, and conglomerate adjacent to the Poison Creek caldera. The caldera is expressed topographically as a curvilinear fault contact between the volcanic rocks inside the caldera and Koyukuk sedimentary rocks around it. Landsat and magnetic data suggest that the caldera system may be over 20 kilometers in diameter. The volcanic rocks include intermediate to felsic ash flow tuffs, massive basaltic andesite, and a small area of siliceous sinter (North Star Exploration, Inc., 2001).

Anomalous values of gold and silver occur in surface samples of silicified sedimentary rocks east of the caldera rim, in an area of radial faulting. The silicified rocks are cut by chalcedonic quartz veinlets, vuggy druse coatings, and blue-gray quartz veinlets. In addition to the silicification, the hostrocks locally are argillized (clay altered). Core holes drilled in 2000 intersected extensive zones of polyphase quartz veining, advanced argillic alteration, polymetallic sulfides, and mineralized dikes. Drill holes were targeted at two east-west-trending vein systems, the Main and South veins, which are approximately 250 feet apart (Avalon Development newsletter, Jan., 2001).

Bundtzen and Miller (1997) first reported gold in epithermal quartz veins at the prospect in 1997. Subsequent fieldwork by North Star Exploration Inc. in 1999 resulted in the definition of more widespread mineralization. In 250 rock samples, gold averages 110

ppb, and silver averages 20 ppm. Gold ranges up to 10.4 ppm and silver up to 13.6 ounces per ton. Samples also contain anomalous values of arsenic, bismuth, and mercury (North Star Exploration, Inc., 2001).

Alteration:
Silicification and argillization.

Age of mineralization:

Deposit model:
Epithermal Au-Ag (Cox and Singer, 1986; model 25c)

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
25c

Production Status: None

Site Status: Active

Workings/exploration:
During 1999 and 2000, North Star Exploration Ltd. explored the Kaiyah prospect with geologic mapping, geophysics, and Landsat image analysis. In 2000, 2,776 feet of core drilling were completed.

Production notes:

Reserves:

Additional comments:

References:
Bundtzen and Miller, 1997; North Star Exploration, Inc., 2001.

Primary reference: North Star Exploration, Inc., 2001

Reporter(s): C.E. Cameron (Northern Associates Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (west of upper Illinois Creek)

Site type: Occurrences

ARDF no.: NL025

Latitude: 64.05 **Quadrangle:** NL A-4

Longitude: 157.94

Location description and accuracy:

This site consists of two occurrences, informally called Madelyn's gossan and Nate's gossan. Madelyn's gossan is located near the summit of locally-named 'Survey Ridge,' a prominent, east-west-trending ridge about a mile west of upper Illinois Creek. For this record, the site is plotted at an elevation of 1000 feet, near the center of the N1/2 of sec. 5, T. 17 S., R. 5 E., Kateel River Meridian. The location is accurate within 2 miles. Nate's gossan is approximately 1.2 miles east-northeast of Madelyn's gossan.

Commodities:

Main: Ag, Zn

Other: Au

Ore minerals: Malachite, pyrite

Gangue minerals: Limonite

Geologic description:

Madelyn's gossan consists of sparse, limonitic, quartzite float. Samples contain 10-20% banded limonite after pyrite. Analyses of four rock samples show only slightly anomalous values, including up to 226 ppm zinc, 2.3 ppm silver, and 30 ppb gold (Flanigan, 1998).

Nate's gossan is a small outcrop (10 by 50 meters) of limonitic, brecciated quartzite. The limonite replaces banded and veined sulfides (pyrite?). Traces of malachite occur in nearby graphitic schist. Four rock samples contained up to 80 ppm copper, 308 ppm zinc, 1.0 ppm silver, and 25 ppb gold (Flanigan, 1998).

Alteration:

Sulfides are oxidized to limonite, and, locally, to malachite (Flanigan, 1998).

Age of mineralization:

The nearby Khotol pluton has been dated by K-Ar and Ar/Ar methods at 108-112 Ma (Flanigan, 1998). Flanigan links these occurrences to magmatic fluids from that pluton.

Deposit model:

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
These occurrences were discovered by Anaconda Minerals Company in 1980; geologic mapping and sampling followed (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates, Inc.)

Last report date: 8/7/01

Site name(s): Unnamed (northeast of upper Eddy Creek)

Site type: Occurrence

ARDF no.: NL026

Latitude: 64.3 **Quadrangle:** NL A-4

Longitude: 157.5

Location description and accuracy:

The approximate location of this occurrence, informally called 'R-0582 gossan,' is about 2 miles northeast of upper Eddy Creek. For this record, the site is plotted in the southwest corner of sec. 28, T. 14 S., R. 7 E., Kateel River Meridian. The location is accurate within 5 miles.

Commodities:

Main: Cu, Zn

Other: Ag, Mo

Ore minerals:

Gangue minerals:

Geologic description:

This occurrence consists of scattered gossan in variably graphitic quartz schist adjacent to a greenstone(?) dike (Flanigan, 1998). Seven rock samples contained up to 191 ppm copper, 373 ppm zinc, 1.1 ppm silver, and 62 ppm molybdenum. Flanigan (1998) suggests that this occurrence is probably related to the Round Top (NL011) quartz monzonite intrusive complex, for which K-Ar and Ar/Ar dates indicate cooling at approximately 75 Ma.

Also see NL002, 008, 010, and 011.

Alteration:

Age of mineralization:

Flanigan (1998) suggests that this occurrence is probably related to the Round Top (NL011) quartz monzonite intrusive complex, for which K-Ar and Ar/Ar dates indicate cooling at approximately 75 Ma.

Deposit model:

Plutonic-related Cu-Zn

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

Production Status: None

Site Status: Inactive

Workings/exploration:
This occurrence was discovered by the Anaconda Mineral Company between 1980 and 1982 (Flanigan, 1998).

Production notes:

Reserves:

Additional comments:

References:
Flanigan, 1998.

Primary reference: Flanigan, 1998

Reporter(s): C.E. Cameron (Northern Associates, Inc.)

Last report date: 8/7/01

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