# Alaska Resource Data File, New and Revised Records No. 1

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**U.S. DEPARTMENT OF THE INTERIOR**
**U.S. GEOLOGICAL SURVEY**

1 Port Ludlow, WA

# Site name(s): Lucky Shot; Willow Creek Mines Inc.

**Site type:** Mine

**ARDF no.:** AN002

**Latitude:** 61.7790 **Quadrangle:** AN D-7

**Longitude:** 149.4078

**Location description and accuracy:**

The portal of the Lucky Shot mine is on the northwest valley wall of Craigie Creek, 1.8 miles northeast of the junction of Craigie Creek and Willow Creek. The mine is marked by symbol labeled 'Lucky Shot Mine' on the Anchorage D-7 1:63,360-scale topographic map. The underground workings extend for a considerable distance northwest from the portal. The adjacent War Baby mine (AN003) and the Lucky Shot mine were long ago consolidated into a single property which now is commonly referred to as the Lucky Shot.

**Commodities:**

**Main:** Au, Cu

**Other:** Pb, Te, Zn

**Ore minerals:** Arsenopyrite, chalcopyrite, galena, gold, pyrite, sphalerite, tellurides, tetrahedrite

**Gangue minerals:** Quartz

**Geologic description:**

Quartz veins cut quartz diorite of the Late Cretaceous Willow Creek Pluton, which is jointed and sheeted near the surface but less so underground. The pluton is zoned; the outer part consists of hornblende quartz diorite and lesser hornblende tonalite; the core consists of hornblende-biotite granodiorite, and lesser hornblende-biotite quartz monzodiorite and biotite quartz monzonite. According to Ray (1933), auriferous quartz veins are in a block about 1,200 ft wide between two major northeastward-dipping transverse faults. Quartz veins are generally 2 to 4 ft wide; they strike about N 80 E, and dip about 40 N . The veins appear to belong to a single system that is displaced by major cross faults. In places the vein system branches in the hanging wall; the footwall is marked by slickensides separating lode from fresh, unaltered country rock . The vein system is cut off to the east by a fault which is estimated to have offset the veins by 600 to 700 feet where they reappear in the workings of the adjacent War Baby mine (AN003). The veins contain two generations of quartz, the earlier generation is crumpled and recemented by the later generation. Some quartz is deposited in fissures and some in open spaces; thick quartz lenses that appear sporadically are probably caused by repeated movement along fissures. The gold mineralization occurs in well-defined ore shoots associated with pyrite, arsenopyrite, chalcopyrite, sphalerite, tetrahedrite, galena, and tellurides (Ray, 1933). Wallrock alteration seldom extends more than 10 to 12 inches beyond the veins. quartz filling. Sericitization and carbonate alteration predominate, but there is some pyritization and chloritization occurs in the outer parts of the alteration zone (Ray, 1954).

In 2005, Full Metal Minerals (2008, Lucky Shot; 2008, Drilling) discovered a high grade extension of the Lucky Shot shear zone and by the end of 2007, they had drilled 146 holes averaging 350 to 450 meters in length. Most were in the Coleman Block but they also discovered a northern extension of the mineralization called the Murphy Block. (Full Metal, 2008, Lucky Shot). Some notable intercepts in the 2007 drilling were 54.6 grams of gold per ton across 0.98 meters in the Murphy block, 17.3 grams of gold per ton across 1.0 meters in the Coleman block, 71.6 grams of gold per ton across 0.5 meters in the Coleman block, 21.3 grams of gold per ton across 0.5 meters in the Coleman block, and 77.2 grams of gold per ton across 0.2 meters in the Lucky Shot zone. From the 2007 drilling, Full Metal has defined a a mineralized area over 2,400 meters along strike and 700 meters down dip. In early 2008, planning was underway to determine whether to proceed with more drilling, drilling and underground work, or development.

Full Metal indicates that the total production from the Lucky Shot and War Baby mines may have been over 620,000 ounces of gold at an average grade of 1.0 ounce per ton but those figures have not been verified.

**Alteration:**

Chalcopyrite, sphalerite, tetrahedrite, galena, and tellurides (Ray, 1933). Wallrock alteration seldom extends more than 10 to 12 inches beyond the veins. quartz filling. Sericitization and carbonate alteration predominate, but there is some pyritization and chloritization occurs in the outer parts of the alteration zone (Ray, 1954).

**Age of mineralization:**

Late Cretaceous or younger; veins cut the Late Cretaceous Willow Creek Pluton.

**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:** Yes; medium

**Site Status:** Active

**Workings/exploration:**

Staked in 1918 or earlier. Taken under option by Willow Creek Mines in 1918. Development commenced in 1918 with open pits and a short tunnel. Considered to be one of the major gold producers of the district from 1923 to 1942, except for 1923 and 1928 when fires damaged the surface plant. Development included several open cuts and probably about a mile of underground drifting plus numerous stopes that averaged about 4 to 6 feet wide. Surface improvements consisted of a mill and power plant, assay shop, bunk houses to hold 100 men, and machine and blacksmith shops. The mill capacity in 1931 was 35 tons per day. The old tailings were cyanided starting around 1936 (Smith, 1938). Only the main crosscuts were accessible in 1950.

In 2005, Full Metal Minerals (2008, Lucky Shot; 2008, Drilling) discovered a high grade extension of the Lucky Shot shear zone and by the end of 2007, they had drilled 146 holes averaging 350 to 450 meters in length, on the property, In early 2008, planning work was underway to determine whether to proceed with more drilling, drilling and underground work, or development.

**Production notes:**

Production records were combined for the Lucky Shot and the adjacent War Baby mine (AN003). Both mines were simultaneously operated by Willow Creek Mines. Stoll (1997) estimated the total amount of gold recovered from the Lucky Shot - War Baby vein on the northwest wall of Craigie Creek valley to be 252,000 ounces. Full Metal Minerals (2008, Lucky Shot) indicates that the total production from the Lucky Shot and War Baby mines may be over 620,000 ounces of gold at an average grade of 1.0 ounce but those figures have not been verified.

**Reserves:**

**Additional comments:**

**References:**

Chapin, 1920; Chapin, 1921; Brooks, 1923; Brooks and Capps, 1924; Brooks, 1925; Moffit, 1927; Smith, 1929; Smith, 1930 (B 810-A); Smith, 1930 (B 813-A); Smith, 1932 (B 824-A); Ray, 1933; Smith, 1933 (B 836); Smith, 1933 (B 844-A); Smith, 1934 (B 857-A); Smith, 1934 (B 864-A); Smith, 1936; Smith, 1937; Smith, 1938; Smith, 1939 (B 910-A); Smith, 1939 (B 917-A); Capps, 1940; Smith, 1941; Smith, 1942 (B 933-A); Ray, 1954; Cobb, 1972 (MF-409); MacKevett and Holloway, 1977; Cobb, 1979 (OFR 79-1095);

Stoll, 1997; Full Metal Minerals, 2008 (Lucky Shot); Full Metal Minerals, 2008 (Drilling).

**Primary reference:** Ray, 1933

**Reporter(s):** D.P. Bickerstaff (USGS); S.W. Huss (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): War Baby; Willow Creek Mines Inc.

**Site type:** Mine

**ARDF no.:** AN003

**Latitude:** 61.7811 **Quadrangle:** AN D-7

**Longitude:** 149.4016

**Location description and accuracy:**

This mine is marked with an adit symbol labeled 'War Baby Mine, on the Anchorage D-7 1:63,360-scale topographic map. It is on the northwest valley wall of Craigie Creek about 5,000 ft east of VABM Box. The adjacent Lucky Shot mine (AN002) and the War Baby mine have long been consolidated into a single property which now is commonly referred to as the Lucky Shot.

**Commodities:**

**Main:** Au

**Other:** Cu

**Ore minerals:** Gold

**Gangue minerals:** Quartz

**Geologic description:**

Chapin (1920) reported that four or five parallel quartz veins cut the Late Cretaceous Willow Creek Pluton. The pluton is zoned; : the outer part consists of hornblende quartz diorite and lesser hornblende tonalite; the core consists of hornblende-biotite granodiorite, and lesser hornblende-biotite quartz monzodiorite and biotite quartz monzonite. Wallrock alteration is intense within a few inches of the veins but seldom extends more than 10 to 12 inches beyond the veins.

The veins generally strike N 80 E, and dip 17 to 62 NW; they are found in a 33-feet-wide zone and vary in thickness from 1 to 15 inches. The veins appear to belong to a single system that locally branches in the hanging wall. The footwall is marked by slickensides that separate the lode from fresh country rock. Sericitization and carbonate alteration predominate, but there is some pyritization and chloritization occurs in the outer parts of the alteration zone (Ray, 1954). The veins are a continuation of those at the Lucky Shot mine ( AN002) although offset by 600 to 700 feet along a prominent fault. The ore mined through 1927 averaged 2.18 oz/ton Au (Ray, 1933).

**Alteration:**

Sericitization and carbonate alteration predominate, but there is some pyritization and chloritization occurs in the outer parts of the alteration zone (Ray, 1954).

**Age of mineralization:**

Late Cretaceous or younger; veins cut the Late Cretaceous Willow Creek Pluton.

**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:** Yes; medium

**Site Status:** Active

**Workings/exploration:**

Located in 1918, development began almost immediately with the erection of a small mill. The first production from the mine occurred in 1919 after two short tunnels and a crosscut were driven. Willow Creek Mines took over the property in 1921. The War Baby was mined, with interruptions, from 1919 until 1940. There were over 2,000 ft of underground workings on 3 levels. Ray (1933) reported that production from 1922 through 1927 was from a single stope measuring 175 by 250 ft with a maximum width of 10 to 12 ft. The ore mined through 1927 averaged 2.18 ounces of gold per ton (Ray, 1933). There may have been some copper production. By 1950, the mine had long since closed and the workings were inaccessible (Ray, 1954).

Full Metal Minerals (2008, Lucky Shot; 2008, Drilling) began exploring the War Baby and the adjacent Lucky Shot mine (AN002) as a single unit and through 2007 they had drilled 146 holes averaging 350 to 450 meters in length on the property, In early 2008, planning work was underway to determine whether to proceed with either more drilling, drilling and underground work, or development.

**Production notes:**

Early in their history, the production records were combined for the War Baby and the adjacent Lucky Shot mine ( AN002) by Willow Creek Mines who operated them as a unit. Stoll (1997) estimated the total amount of gold that was produced from them to be 252,000 ounces. Full Metal Minerals (2008, Lucky Shot) indicates that the total production from the Lucky Shot and War Baby mines may be over 620,000 ounces of gold at an average grade of 1.0 ounce per ton but those figures have not been rigorously verified.

**Reserves:**

**Additional comments:**

**References:**

Chapin, 1920; Martin, 1920; Brooks and Martin, 1921; Chapin, 1921; Brooks and Capps, 1924; Brooks, 1925; Smith, 1926; Moffit, 1927; Smith, 1929; Smith, 1930, B 810-A; Smith, 1930, B 813-A; Smith, 1932 (B 824); Ray, 1933; Smith, 1934, B 864-A; Smith, 1936; Smith, 1937; Smith, 1938; Smith, 1939, B 910-A; Capps, 1940; Smith, 1941; Ray, 1954; Cobb, 1972, MF-409; MacKevett and Holloway, 1977; Cobb, 1979 (OFR 79-1095); Stoll, 1997; Full Metal Minerals, 2008 (Lucky Shot); Full Metal Minerals, 2008 (Drilling).

**Primary reference:** Chapin, 1920

**Reporter(s):** D.P. Bickerstaff (USGS contractor); S.W. Huss (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Arctic

**Site type:** Prospect

**ARDF no.:** AR025

**Latitude:** 67.1740 **Quadrangle:** AR A-1

**Longitude:** 156.3875

**Location description and accuracy:**

This prospect is located east of VABM Riley on ridge above Kogoluktuk River in sec. 34, T. 21 N., R. 11 E., of the Kateel River Meridian. The location is shown as a series of prospects on the 1:63,360-scale map. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:** Sb

**Ore minerals:** Arsenopyrite, barite, bornite, chalcocite, chalcopyrite, galena, pyrite, pyrrhotite, sphalerite, stibnite, tennantite-tetrahedrite

**Gangue minerals:** Calcite, quartz, talc

**Geologic description:**

Arctic is one of several volcanogenic deposits in the Ambler schist belt along the south flank of the Brooks Range. The deposits may be part of a rifted continental margin (Schmidt, 1981, p. 548). Arctic is a syngenetic deposit hosted in a thick sequence of Devonian or Mississippian, low to medium-grade metamorphosed basaltic and rhyolitic rocks, submarine ash flow tuffs, volcaniclastic and minor plutonic rocks, and pelitic, carbonaceous and calcareous sedimentary rocks, known as the Ambler schist belt. These rocks are part of a large fold structure termed the Kalurivik arch. A Devonian or Mississippian age of mineralization is based both on fossil evidence and U-Pb radiometric dating (Hitzman and others, 1986, p.1592-1618).

The Arctic polymetallic, stratabound, volcanogenic deposit consists of tabular masses of banded massive and disseminated sulfides, one foot to more than 55 feet thick, composed of 20 percent to 90 percent pyrite, chalcopyrite and sphalerite, along with lesser amounts of pyrrhotite, chalcocite, bornite, galena, tennantite-tetrahedrite, arsenopyrite and stibnite (Schmidt, 1988). The sulfides are enclosed in calcareous talcose to quartzose lenses within a metavolcanic (rhyolitic) unit. The mineralized area is 3,000 feet by 2,200 feet in area and about 270 feet thick. The massive sulfide occurrences are covered by a small gossan cap 9 to 15 feet deep.

Kennecott completed 70 drill holes in the Arctic deposit in the 1970's and defined an inferred resource of 36.3 million tons grading 4.0 percent copper, 5.5 percent zinc, 0.8 percent lead, 0.7 gram of gold per ton, and 54.9 grams of silver per ton, or 8.0 percent copper equivalent. (Eakins and others, 1985, p. 6).

NovaGold Resources, Inc. (2007, Ambler) reached an earn-in agreement with Kennecott Exploration Company and Kennecott Arctic Company (subsidiaries of Rio Tinto PLC) in March 2004. The agreement covers a 35,000 acre area in the Ambler district. Initial exploration by NovaGold in 2004 focused on the Arctic deposit and included new descriptions of existing core, structural geology studies, and the drilling of 11 infill holes totaling 9,768 feet (2,978 meters). These holes confirmed previous drill results and helped refine the 3-D geologic model for the Arctic deposit. Some 2004 drill intercepts reported by NovaGold include: 1) hole AR04-80 with 6.5 meters (11.5 feet) grading 3.36 percent copper, 0.91 gram of gold per ton, 1.90 percent lead, and 7.93 percent zinc; 2) hole AR04-86 with 12.5 m (41 feet) grading 3.76 percent copper, 0.91 gram of gold per ton, 52.4 grams of silver per ton, 0.58 percent lead, and 6.01 percent zinc, or an 8.0 percent copper equivalent; 3) hole AR04-87 with 7.4 m (24 feet) grading 9.65 percent copper, 0.73 grams of gold per ton, 108.2 grams of silver per ton, 1.64 percent lead, and 10.35 percent zinc, or 16.9 percent copper equivalent.

As of April 2007, NovaGold Resources Inc. is actively exploring the deposit (NovaGold Resources, Inc., 2007, Ambler). In 2005, NovaGold drilled about 3,000 meters of core hole and carried out district-scale surface geology, geochemistry, and geophysical surveys. In 2006, NovaGold drilled 12 holes to test geophysical anomalies near the Arctic deposit and outlined additional mineralization. They also carried out extensive detailed surface geologic mapping and geochemical surveying. NovaGold continues to cite the 1970's resource figures for the size of the deposit but a new resource assessment based on their recent work is underway and should be completed in 2007.

**Alteration:**

Chlorite-rich rocks in footwall and surrounding the sulfides form an alteration zone containing a complex assemblage of barium fluorphlogopite, talc, Mg-chlorite, barite, phengite, quartz, and calcite (Schmidt, 1988).

**Age of mineralization:**

Devonian-Mississippian, the age of the host rocks.

**Deposit model:**

Kuroko massive sulfide (Cox and Singer, 1986; model 28a)

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

28a

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**

Kennecott completed 70 drill holes in the Arctic deposit and defined an inferred resource of 36.3 million tons of ore in the 1970s. NovaGold Resources, Inc. reached an earn-in agreement with Kennecott Exploration Company and Kennecott Arctic Company (subsidiaries of Rio Tinto PLC) in March 2004. The agreement covers a 35,000 acre area in the Ambler district. Initial exploration by NovaGold in 2004 focused on the Arctic deposit and included new descriptions of existing core, structural geology studies, and the drilling of 11 infill holes totaling 9,768 feet (2,978 meters). NovaGold's exploration in 2005 included district-scale surface geology, geochemistry, and geophysical surveys and up to about 3,000 meters (9,800 feet) of core drilling on the Arctic deposit. In 2006, NovaGold drilled 12 holes to test geophysical anomalies near the Arctic deposit and outlined additional mineralization. They also carried out extensive detailed surface geologic mapping and geochemical surveying.

**Production notes:**

**Reserves:**

The indicated reserves of 36.3 million tons grading 4.0 percent copper, 5.5 percent zinc, 1 percent lead, 1.6 ounces of silver per ton and 0.03 ounces of gold per ton, have long been documented based on the Kennecott work in the 1970's (Eakins and others, 1985, p. 6). The same 'inferred resources' are currently (April 2007) being reported by NovaGold Gold Resources, Inc. who are now drilling the prospect and carrying out geologic and geochemical studies to define additional resources. A new resource assessment based on their recent work is underway and should be completed in 2007.

**Additional comments:**

**References:**

Bottge, 1975; Wiltse, 1975; Degenhart and others, 1978; Mayfield and Grybeck, 1978; Dillon and others, 1979; Grybeck and Nokleberg, 1979; Schmidt, 1981; Schmidt, 1983; Eakins and others, 1985; Hitzman and others, 1986; Schmidt, 1988; Bundtzen and others, 1996; NovaGold Resoures, Inc., 2007 (Ambler).

**Primary reference:** Hitzman and others, 1986; NovaGold Resources, 2007 (Ambler)

**Reporter(s):** J.M. Schmidt (USGS), S.W. Nelson (USGS retired); Travis Hudson (Applied Geology, Inc.); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/9/2007

# Site name(s): Huff; Spud

**Site type:** Prospect

**ARDF no.:** BC001

**Latitude:** 56.4843 **Quadrangle:** BC B-6

**Longitude:** 131.9864

**Location description and accuracy:**

The mineralization at this prospect occurs for about 300 feet along a north-northwest trending band of gneiss and marble. The center of the mineralization is just east of the toe of the Nelson Glacier about 0.3 mile northeast of the center of section 21, T. 62 S., R. 86 E. The location is accurate. Still and others (2002) include a detailed map of the prospect.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrrhotite, sphalerite

**Gangue minerals:** Fluorite, quartz

**Geologic description:**

This prospect was first located by Bill Huff in 1963 (Race, 1963, Still and others, 2002). From 1965 to 1992 it was optioned to a succession of companies: Bunker Hill Mining Company; Humble Oil and Refining Company; Watts, Griffis, and McQuatt; AMAX Exploration Company, and El Paso National Gas Company who mapped and sampled the prospect, did a geophysical survey, and drilled two holes, 99 and 149 feet long.

The country rocks in the general area of this prospect are Mesozoic or Paleozoic pelitic schist and paragneiss, with subordinate amphibolite and marble (Koch, 1996, 1997, Gault and others, 1953; George and Wyckoff, 1973) The mineralization occurs in a marble bed about 30 feet thick that is mineralized for about 300 feet (Still and others, 2002). Irregular masses and bands of pyrrhotite, galena, sphalerite, and chalcopyrite 0.5 to 15 feet thick replace the marble in the hanging wall. These sulfides and the mineralized marble are cut by thin, cross fractures that pinch and swell and locally contain vuggy fluorite-quartz pods and lenses with some galena and sphalerite. These fractures may be the conduits for the fluids that formed the sulfide replacements in the marble. The mineralization is probably related to a nearby 16.2 Ma biotite granite (see PE040).

Still and others (2002) collected 5 samples across the massive, replacement mineralization. They contained 46.7 parts per million (ppm) to 4.6 ounces of silver per ton, 2.688 to 7,330 ppm copper, 3.28 to 20.08 percent lead, and 6.9 to 22.68 percent zinc. Three, 4- to 6-foot samples collected by El Paso across this mineralization contained 3.09 to 19.69 ounces of silver per ton, 0.7 to 1.2 percent copper,15.9 to 24.9 percent lead, and 7.1 to 9.3 percent zinc (George and Wyckoff, 1973). A geophysical survey by El Paso identified a large conductor over the exposed mineralization that suggests more extensive mineralization at depth. A 149-foot hole into this anomaly cut 7 feet of mineralization at a depth of about 85 feet that contained 1.40 ounce of silver per ton, 0.3 percent copper, 7.40 percent lead, and 4.30 percent zinc. Still and others (2002) also collected several samples of the cross fractures with fluorite with vuggy fluorite and quartz from 150 to 2,400 feet away from the main galena-sphalerite replacement deposits in the marble. The best contained 2,166 ppm gold, 228.40 ounces of silver per ton, 6.24 percent lead, and 4.40 percent zinc.

**Alteration:**

None specifically noted.

**Age of mineralization:**
Probably related to a nearby 16.2 Ma biotite granite pluton as are other deposits in the Groundhog Basin area.

**Deposit model:**
Lead-zinc replacement deposit in marble; cut by fractures with pods and lenses of vuggy fluorite and quartz with minor galena and sphalerite.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
This prospect was first located by Bill Huff in 1963 (Race, 1963; Still and others, 2002). From 1965 to 1992 it was optioned to a succession of companies: Bunker Hill Mining Company; Humble Oil and Refining Company; AMAX Exploration Company; and El Paso National Gas Company--who mapped and sampled the prospect, did geophysical surveys and drilled two holes, 99 and 149 feet long.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Gault and others, 1953; Race, 1963 (DGGS PE 118-3); George and Wyckoff, 1973; U.S. Bureau of Mines, 1979; Elliott and Koch, 1981; Koch, 1996; Koch, 1997; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Copper King

**Site type:** Prospect

**ARDF no.:** BC002

**Latitude:** 56.4404 **Quadrangle:** BC B-6

**Longitude:** 131.9644

**Location description and accuracy:**
The Copper King prospect is 1.5 mile southeast of Berg Mountain at an elevation of about 1,300 feet about 0.6 mile northeast of the center of section 3, T 63 S., R, 80 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Zn

**Other:**

**Ore minerals:** Chalcopyrite, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**
The country rocks in the general area of the Copper King prospect are Mesozoic or Paleozoic pelitic schist and paragneiss and subordinate amphibolite and marble (Koch, 1996, 1997). As mapped by George and Wyckoff (1973), the rocks have been metamorphosed to upper greenschist of lower amphibolite facies quartz-mica schists and hornblende-biotite-pyroxene-feldspar gneiss; rhyolite sills parallel the foliation.
The Copper King prospect was staked in 1906 and restaked in 1951 (Chapin, 1916; Chapin, 1918, Berg and Cobb, 1967) Williams (1957) described the deposit as a 4.5-foot-thick quartz vein with sulfides that is exposed for about 45 feet along a small creek and in a 9-foot-deep shaft. A sample from the dump of the shaft contained 3.3 percent zinc and a trace of copper. Still and others (2002) located a quartz vein in place that contains sphalerite, chalcopyrite, and pyrite. A 0.7-foot sample across the vein contained 18.9 parts per million (ppm) silver, 5,639 ppm copper, and 2.1 percent zinc. A sample from the dump of the shaft contained 12 ppm silver, 4,694 ppm copper, and 1.9 percent zinc. They also located a quartz vein about 750 feet northwest of the shaft along a small creek. A 1.6-foot sample contained 679 parts per billion gold.

**Alteration:**
Not noted.

**Age of mineralization:**

**Deposit model:**
Quartz vein with sulfides.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
The Copper King prospect was staked in 1906 and restaked in 1951 (Chapin, 1916; Chapin, 1918, Berg and Cobb, 1967). Williams (1957) described the deposit as a 4.5-foot-thick quartz vein with sulfides that is

exposed for about 45 feet along a small creek and in a 9-foot-deep shaft. Examined by Still and others (2002) as part of a regional mineral assessment by the Bureau of Land Management.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Chapin, 1916; Chapin, 1918; Williams, 1957; Berg and Cobb, 1967; George and Wyckoff, 1973; Cobb, 1978 (OFR 78-922); Elliott and Koch, 1981; Koch, 1996; Koch, 1997; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Berg

**Site type:** Prospect

**ARDF no.:** BC003

**Latitude:** 56.3967 **Quadrangle:** BC B-6

**Longitude:** 131.9435

**Location description and accuracy:**

This prospect is said to consist of claims that were staked as early as 1907 on the north side of Berg Basin somewhere between the mouths of Berg Creek and Aaron Creeks. The location is poorly known and the propect may easily be a mile or more from the coordinates in section 23, T. 65 S., R. 86 E. However, there is little information about the Berg prospect. Early reports describing it (Chapin, 1916, p. 78; 1918, p. 75) include references to the Copper King prospect (BC002). Parts of some of the early descriptions of the Berg prospect are ambiguous and may actually refer to a deposit in Berg Basin to the west in the adjoining Petersburg quadrangle.

**Commodities:**

**Main:** Au?

**Other:**

**Ore minerals:** Gold?

**Gangue minerals:**

**Geologic description:**

The country rocks in the general area of the Berg prospect (Koch, 1996, 1997) are Mesozoic or Paleozoic pelitic schist and paragneiss, and subordinate amphibolite and marble. Ambiguous early descriptions suggest that the prospect is an auriferous lode deposit. No other geological information about this property has been made public. Still and others (2002) investigated the area and did some sampling but found no evidence of mineralization.

**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:**

There is little evidence of workings in the vicinity other than claim records that date back to before WWI.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Chapin, 1916; Chapin, 1918; Cobb, 1978 (OFR 78-922); Elliott and Koch, 1981; Koch, 1996; Koch, 1997; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Unnamed (near Cone Mountain)

**Site type:** Prospect

**ARDF no.:** BC004

**Latitude:** 56.5140 **Quadrangle:** BC C-6

**Longitude:** 131.7350

**Location description and accuracy:**
This prospect is about 1.0 mile south-southwest of Cone Mountain; it is at an elevation of about 3,000 feet near the northeast corner of T. 62 S., R. 88 E. The location is probably accurate within about a quarter of a mile.

**Commodities:**

**Main:** U?

**Other:** Ce, La, Mo, Nd, Th

**Ore minerals:** Unspecified radioactive minerals

**Gangue minerals:**

**Geologic description:**
The country rocks in the general area of the Cone Mountain prospect are a Miocene(?) alkali feldspar granite stock and associated quartz-porphyritic rhyolite dikes (Koch, 1996, 1997). The prospect is on the western margin of the stock, which intrudes Eocene granodiorite and quartz monzonite plutons and Mesozoic or Paleozoic pelitic schist and paragneiss. A group of 145 claims was staked in 1976, presumably for uranium-bearing and related minerals (Elliott and Koch, 1981, loc. 4; Koch and others, 1981; U. S. Geological Survey, 1979). Geochemical surveys [(Koch and Elliott, 1981 (OFR 81-728C-K)] show high values of silver, beryllium, molybdenum, niobium, lead, tin, yttrium, rare earth elements, and zinc in rock, stream-sediment and heavy-mineral concentrate samples from the immediate area of the stock. Differentiation enrichment of these elements in such a highly-evolved silicic magma may account for most of the values reported, but a few high lead and zinc values suggest local sulfide deposition.
In 1976, Pacific Coastal Minerals staked 176 claims in the area; they held them several years and did some drilling. Still and others (2002) collected samples of granite at two localities between Cone Mountain and Black Crag; they contained up to 140 parts per million (ppm) cerium, 75 ppm lanthanum, 48 ppm neodymium, and 66.9 ppm thorium. They also collected 8 samples of a variety of felsic volcanic and intrusive rocks. The highest values were in a sample of molybdenite-bearing rhyolite breccia that contained 1,740 ppm cerium, 954 ppm lanthanum, 440 ppm neodymium, 60 ppm samarium, 72.6 ppm thorium, and 2,098 ppm molybdenum.

**Alteration:**

**Age of mineralization:**
Miocene?

**Deposit model:**
Felsic plutonic uranium?

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**

In 1976, Pacific Coastal Minerals staked 176 claims in the area; they held them several years and did some drilling.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

U.S. Geological Survey, 1979 (OFR 79-830); Elliott and Koch, 1981; Koch and Elliott, 1981 (OFR 81-728C-K); Koch and others, 1981; Koch, 1996; Koch, 1997; Still and others, 2002.

**Primary reference:** Elliott and Koch, 1981; Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): North Bradfield River; Ptarmigan

**Site type:** Prospect

**ARDF no.:** BC009

**Latitude:** 56.4012 **Quadrangle:** BC B-5

**Longitude:** 131.4084

**Location description and accuracy:**

The coordinates mark the approximate center of a group of pods and lenses of mineralization that are scattered along a northwest-trending belt about 2 miles long and 0.5 mile wide. The center of the prospect is near the northeast corner of section 29, T. 63 S., R. 90 E., about 9 miles southwest of Mount Pounder. Figure 33 of Still and others (2002) is a map of the deposit. The location is accurate.

**Commodities:**

**Main:** Cu, Fe

**Other:** Ag, Au, Mo, Zn

**Ore minerals:** Chalcopyrite, hematite, magnetite, malachite, pyrrhotite

**Gangue minerals:** Calcite, calc-silicate minerals

**Geologic description:**

The North Bradfield Canal prospect was discovered by Ken Eichner in 1955 and by 1958 was covered by 41 claims (Eichner, 2002; Still and other, 2002). Takahashi, C.T., and Co. optioned the property until 1959; they mapped it , flew a aeromagnetic survey over it, and drilled 14 shallow holes. From 1960 to 1962, it was held by Utah Construction who did more surface work and drilled at least 460 feet of hole (Utah Construction, 1962). MacKevett and Blake (1963) of the U.S.G.S. mapped the geology in detail and Still and others (2002) of the U.S. Bureau of Land Management did some additional surface and geochemical sampling. Still and others (2002) revisited the prospect as part of a regional mineral assessment and did some sampling that largely confirmed the earlier work.

The North Bradfield River prospect (MacKevett and Blake, 1963, p. D1-D21) consists chiefly of metasomatic, magnetite-skarn deposits at the northwest end of a large roof pendant of gneiss, granulite, schist, marble, and skarn in quartz monzonite of the Coast Range Batholith, which in turn is cut by dikes of quartz diorite, aplite, and alaskite. The metamorphic bedded rocks are complexly folded. MacKevett and Blake interpret the general structure of the pendant as an overturned syncline that probably extends for many miles to the southeast. Sonnevil (1981, p. B117), on the other hand, interprets the dominant structure in the area as a homocline that dips northwest to northeast. Koch (1997, p. 24) reports that the pendant is marked by an aeromagnetic trough that roughly parallels its outcrop (U. S. Geological Survey, 1979). The deposit is in marble layers of the roof pendant and consists of calc-silicate skarn that is partly replaced by massive magnetite with interstitial pyrrhotite; the magnetite is cut by veinlets of chalcopyrite. This ore contains subordinate amounts of hematite, limonite, and malachite. The orebodies, of which at least 15 are exposed, are crudely stratiform and apparently discontinuous; they range in strike length from 50-350 feet and in thickness from 2-40 feet. They occur in a belt about 2 miles long and 0.5 mile wide. Koch (1997, p. 24-25) suggests that at least some of the metal concentration in these deposits is related to the emplacement of an Eocene quartz monzonite and granodiorite stock, near the contact with the Mesozoic or Paleozoic metamorphic bedded rocks that host the deposits (Elliott and Koch, 1981; Koch, 1996). Koch (1997, p. 24, 25) and Elliott and Koch (1981, p. 8, loc. 9) also report anomalous amounts of silver, gold, molybdenum, and zinc in rock samples collected at and near the North Bradfield River deposits.

As a result of their surface work and drilling, Utah Construction (1962) estimated that the 9 magnetite-copper bodies that they identified contain about 1,000,000 tons of proven and probable resources and

4,481,000 tons of possible resources with a estimated grade of 35 to 40 percent iron, 0.2 to 0.3 percent copper, and 3 to 4 percent sulfur.

**Alteration:**
Calc-silicate skarn is developed in marble units adjacent to the orebodies.

**Age of mineralization:**
Probably Eocene based on a nearby intrusive that probably is genetically related to the deposit.

**Deposit model:**
Cu-Fe skarn (Cox and Singer, 1986; model 18d)

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
The Bradfield Canal prospect was discovered by Ken Eichner in 1955 and by 1958 was covered by 41 claims (Eichner, 2002; Still and other, 2002. Takahashi, C.T., and Co. optioned the property until 1959; they mapped it, flew an aeromagnetic survey over it, and drilled 14 shallow holes. From 1960 to 1962, it was held by Utah Construction who did more surface work and drilled at least 460 feet of hole (Utah Construction, 1960). MacKevett and Blake (1963) of the U.S.G.S. mapped the geology in detail and Still and others (2002) of the U.S. Bureau of Land Management did some additional surface and geochemical sampling.

**Production notes:**

**Reserves:**
As a result of their surface work and drilling, Utah Construction (1962) estimated that the 9 magnetite-copper bodies that they identified contain about 1,000,000 tons of proven and probable resources and 4,481,000 tons of possible resources with a estimated grade of 35 to 40 percent iron, 0.2 to 0.3 percent copper, and 3 to 4 percent sulfur.

**Additional comments:**
Elliott and Koch (1981) also apply the name 'Ptarmigan' to the North Bradfield River prospect. Still and others (2002) indicated that there were no active claims on the property at the time of their work.

**References:**
Utah Construction, 1960; Utah Construction, 1962; MacKevett and Blake, 1963; Cobb, 1978 (OFR 78-922); U.S. Geological Survey, 1979 (OFR 79-832); Elliott and Koch, 1981; Sonnevil, 1981; Koch, 1996; Koch, 1997; Eichner, 2002; Still and others, 2002.

**Primary reference:** MacKevett and Blake, 1963; Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Craig

**Site type:** Prospect

**ARDF no.:** BC010

**Latitude:** 56.4652 **Quadrangle:** BC B-4

**Longitude:** 131.2605

**Location description and accuracy:**

This prospect consists of about 60 claims staked in 1977 about 4 miles west-northwest of Mt. Pounder. Their location is not well known and somewhat arbitrarily, the center of the claims is plotted about 0.5 mile east of the center of section 30, T. 62 S., R. 91 E. This location may be a mile or more from the center of the claims.

**Commodities:**

**Main:** Cu

**Other:**

**Ore minerals:** Chalcopyrite, magnetite, pyrite, pyrrhotite

**Gangue minerals:**

**Geologic description:**

Sixty 'Craig' claims were staked here in 1977 but were allowed to lapse after two years; there apparently has been no activity since.

The country rocks in the general area of the Craig occurrence are Mesozoic or Paleozoic metasedimentary rocks, locally including marble, and subordinate metavolcanic rocks (Elliott and Koch, 1981; Koch, 1996).

As described by Elliott and Koch (1981), the mineralization consists of of chalcopyrite, pyrite, and pyrrhotite disseminated in the metasedimentary rocks; the chalcopyrite also occurs in thin veinlets. Skarn float at or near the prospect contains magnetite and minor chalcopyrite. Still and others (2002) sampled rubble-crop from talus in the area. Several samples contained layered and disseminated sulfides, mainly pyrite; with disseminated chalcopyrite. A sample of hornblendite (skarn?) with 25 percent sulfides, mainly pyrite and pyrrhotite, contained 5,706 parts per million (ppm) copper and 3.1 percent zinc. Sample with layered and disseminated pyrite contained negligible base metal values and the highest gold value in the 7 samples that were selected for analysis was only 30 parts per billion gold.

**Alteration:**

**Age of mineralization:**

Mesozoic or Paleozoic(?).

**Deposit model:**

Layered and disseminated sulfides in metamorphic rocks and skarn.

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**

Sixty 'Craig' claims were staked here in 1977 but were allowed to lapse after two years; there apparently has been no activity since. Limited sampling by the U.S.G.S. and Bureau of Land Management.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
U.S. Bureau of Mines, 1979; Elliott and Koch, 1981; Koch, 1996; Koch, 1997; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (near Black Crag)

**Site type:** Prospect

**ARDF no.:** BC090

**Latitude:** 56.5367 **Quadrangle:** BC C-6

**Longitude:** 131.6992

**Location description and accuracy:**

This unnamed site is about a mile southeast of Black Crag near the Alaska-British Columbia boundary in section 36, T. 61 S., R. 88 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Mo, Zn

**Other:** Ce, La, Nd, Sm, Th, U

**Ore minerals:** Chalcopyrite, molybdenite, pyrite

**Gangue minerals:**

**Geologic description:**

Still and others (2002) found possible evidence of claim staking here and were told of drilling for molybdenum in the 50's but there is no information about exploration here prior to their work. They briefly examined the area and collected several mineralized samples as part of a regional mineral assessment for the Bureau of Land Management. The site might be part of the prospect several miles to the southwest (BC004) that was explored in the 1970's.

The country rocks in the general area of Black Crag are a Miocene(?) alkali-feldspar granite stock and associated quartz-porphyritic rhyolite dikes (Koch, 1996). The prospect is near the margin of the stock, which intrudes Eocene granodiorite and quartz monzonite plutons and Mesozoic or Paleozoic pelitic schist and paragneiss.

On the east side of the valley, Still and others (2002) collected several samples of float that consisted of: 1) quartz porphyry with molybdenite along fractures; 2) fine-grained silicified felsite cut by a 0.1-foot-thick seam of molybdenite; and 3) silicified granite with pyrite and chalcopyrite. Samples of the molybdenite-bearing rocks contained 735 and 1,348 parts per million (ppm) molybdenum and the copper-bearing sample contained 1,508 ppm copper. A sample of silicified breccia cemented by pyrrhotite contained 93 parts per billion gold, 43.5 ppm silver, and 558 ppm zinc. At the head of the valley under a hanging glacier, volcanic rock with molybdenite along fractures is abundant. Samples contained 23 to 2,529 ppm molybdenum, 119 to 713 ppm zinc, and up to 1,740 ppm cerium, 954 ppm lanthanum, 440 ppm neodymium, 60 ppm samarium, 72.6 ppb thorium, and 16 ppm uranium.

**Alteration:**

Mineralized rocks are silicified.

**Age of mineralization:**

Tertiary or younger based on the age of the host rocks.

**Deposit model:**

Porphyry Cu-Mo (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:**

Still and others (2002) found possible evidence of claim staking here and were told of drilling for molybdenum in the 50's but there is no information about exploration here prior to their work. They briefly examined the area and collected several mineralized samples as part of a regional mineral assessment for the Bureau of Land Management. The site might be part of the prospect several miles to the southwest (BC004) that was explored in the 1970's.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Koch, 1996; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (west of the terminus of Nelson Glacier)

**Site type:** Occurrence

**ARDF no.:** BC091

**Latitude:** 56.4788 **Quadrangle:** BC B-6

**Longitude:** 131.9990

**Location description and accuracy:**
This occurrence is just west of the terminus of the Nelson Glacier near the center of section 21, T. 62 S. R. 86 E. The location is accurate.

**Commodities:**

**Main:** Ag, As, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**
This occurrence is in an area that was covered by a large blocks of claims that were variously held from 1965 to 1981 by Bunker Hill Mining Company, Humble Oil and Refining Company, El Paso Natural Gas Company, and AMAX Exploration (Still and others, 2002) . There apparently was no exploration of these particular occurrences by these companies beyond areal mapping and sampling, or at least there is no notable record of any.

The country rocks in the area of the prospects include Tertiary to Cretaceous biotite schist, biotite-garnet-quartz schist, quartzofeldspathic gneiss, and minor marble and calc-silicate gneiss metamorphosed from Mesozoic to Paleozoic protoliths (George and Wyckoff, 1973; Brew, 1997). The metamorphic rocks near the prospect are cut by several large Tertiary felsic dikes and sills that have been dated nearby at about 16.2 Ma (see PE043), and by a large Cretaceous tonalite pluton that intrudes the metamorphic section just to the east.

Still and others (2002) briefly examined the ridge west of the terminus of the Nelson Glacier and identified a 2-foot-wide vuggy, silicified zone that cuts gneiss. The silicified zone extends for about 80 feet and locally contains pyrite, chalcopyrite, galena, and sphalerite. A 0.2-foot-thick chip sample across what appeared to be the most mineralized section of the zone contained 4.39 ounces of silver per ton, 2.70 percent lead, 9, 577 parts per million (ppm) zinc, and 8.63 ppm arsenic. (The mineralization is similar to or an extension of the mineralization in the prospect about 0.3 mile to the northeast across the terminus of the Nelson Glacier (BC001)).

**Alteration:**

**Age of mineralization:**
Probably related to a nearby 16.2 Ma biotite granite as are other deposits in the Groundhog Basin area.

**Deposit model:**
Vuggy silicified zone in gneiss.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**

This occurrence is on a large block of claims that were variously held from 1965 to 1981 by Bunker Hill Mining Company, Humble Oil and Refining Company, El Paso Natural Gas Company, and AMAX Exploration (Still and others, 2002) . There apparently was no exploration of these occurrences by these companies beyond areal mapping and sampling. Still and others (2002) examined these occurrences as part of a regional mineral assessment by the Bureau of Land Management.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

George and Wyckoff, 1973; Brew, 1997 (OF 97-156-C); Still and others, 2002.

**Primary reference:** Still and others, 1992

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Unnamed (Near Mt. Lewis Cass)

**Site type:** Occurrence

**ARDF no.:** BC092

**Latitude:** 56.3895 **Quadrangle:** BC B-4

**Longitude:** 131.1119

**Location description and accuracy:**
This occurrence is about 1.5 miles southwest of Mt. Lewis Cass; the mineralization appears to extend from about 2,400 to 4,100 feet in elevation and was sampled in outcrop at about 2,500 feet. It is about 0.2 mile southeast of the center of section 19, T 63 S., R. 92 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Mo

**Other:**

**Ore minerals:** Chalcopyrite, magnetite, molybdenite, pyrite, pyrrhotite

**Gangue minerals:** Quartz

**Geologic description:**
The Mount Lewis Cass occurrence was discovered by Still and others (2002). The mineralization is near the contact of Eocene granodiorite and Mesozoic and/or Paleozoic metasedimentary and metavolcanic rocks and marble. The granodiorite contains molybdenite in narrow quartz stringers, in knots, and as disseminations. Several samples contained 1,240 and 1,558 parts per million (ppm) molybdenum. Iron-stained silicified metasedimentary and metavolcanic rocks in float on the south side of the valley contain pyrrhotite, pyrite, and chalcopyrite. Chalcopyrite-bearing samples contained 1.832 ppm to 1.35 percent copper, 289 parts per billion gold, and 17.6 ppm silver.

**Alteration:**
Silicification.

**Age of mineralization:**
At least some is Eocene or younger based on the age of the granodiorite host rock.

**Deposit model:**

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
Discovered by Still and others (2002) during a regional mineral assessment for the Bureau of Land Management.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**
Elliott and Koch, 1981; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (east of Upper Marten Lake)

**Site type:** Occurrence

**ARDF no.:** BC093

**Latitude:** 56.2889 **Quadrangle:** BC B-6

**Longitude:** 131.7921

**Location description and accuracy:**
This occurrence is in a saddle at an elevation of 2,600 feet; it is about 1.1 mile east-southeast of the southeast end of Upper Marten Lake near the center of section 26, T. 64 S., R. 86 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Pb

**Other:**

**Ore minerals:** Pyrite, pyrrhotite

**Gangue minerals:** Quartz

**Geologic description:**
This occurrence was first described by Still and others (2002) in an area with little previous indication of mineralization. It is along a fault zone that strikes 330 degrees and dips 75 degrees to the northeast. The fault cuts Mesozoic and/or Paleozoic schist and paragneiss near the contact with Cretaceous diorite (Elliot and Koch, 1981). The occurrence is about 2 miles west of the Coast Range megalineament (Brew and Ford, 1978), and the 'Great Tonalite Sill' (Brew and Morrell, 1983). Quartz stringers and clay gouge are common in the fault zone. Some of the quartz stringers contain pyrite, pyrrhotite, and other sulfides. Four samples of iron-stained quartz were collected along the fault; one contained 475 parts per billion gold, 86.9 part per million (ppm) silver, and 1,218 ppm lead.
Another quartz vein about 0.2 to 1 foot thick about 2 miles north of the main occurrence contains only minor pyrite and assayed 517 ppb gold.

**Alteration:**
No information other than along a fault zone with clay gouge.

**Age of mineralization:**

**Deposit model:**
Gold-quartz veinlets along a regional fault.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
Only a few samples collected by Still and others (2002) during a regional mineral assessment by the Bureau of Land Management.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Brew and Ford, 1978; Elliott and Koch, 1981; Brew and Morrell, 1983; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (near mouth of Harding River)

**Site type:** Prospect

**ARDF no.:** BC094

**Latitude:** 56.2025 **Quadrangle:** BC A-5

**Longitude:** 131.6379

**Location description and accuracy:**

This prospect is at an elevation of about 40 feet on the west side of a small bight about 0.7 mile west-southwest of the mouth of the Harding River on Bradfield Canal. It is about 0.3 mile southwest of the center of section 27, T. 69 S., R. 89 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Zn

**Other:**

**Ore minerals:** Chalcopyrite, pyrite, pyrrhotite

**Gangue minerals:** Quartz

**Geologic description:**

As first described by Roehm (1942) and sampled by Still and others (2002), this prospect is an old opencut and probably the best mineralization in the several shear zones along Bradfield Canal in this area. The prospect is near the contact zone between the Eocene Coast Mountains batholith and metamorphic rocks . As described by Roehm (1942), the shear zone at this open cut has a hanging wall of mica schist or gneiss and a footwall of marble. A quartz vein about 0.5 to 1 foot thick occurs along the shear for about 20 feet of the opencut. The vein contains 1 to 2 percent sulfides, mainly pyrrhotite with pyrite and chalcopyrite. Still and others (2002) collected several samples; the highest values were 17 parts per billion gold, 1.8 part per million (ppm) silver, 197 ppm copper, and 235 ppm zinc.

**Alteration:**

**Age of mineralization:**

**Deposit model:**

Quartz vein with low values of gold, silver, copper, and zinc.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**

A short opencut was dug before 1942 and there was limited sampling by government geologists about 2000.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Roehm, J.C., 1942; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Rainbow; Aurora; Indian

**Site type:** Prospects

**ARDF no.:** BD054

**Latitude:** 64.4784 **Quadrangle:** BD B-2

**Longitude:** 145.0087

**Location description and accuracy:**

This property consists of three blocks of State of Alaska claims-the Indian, Aurora, and Rainbow blocks - which are contiguous or close by; they cover much of sections 8-10, 16-17, 19-20, and 29-30 of T. 5 S., R. 14 E. The coordinates are at about the center of the largest claim block. The outlines of the claim boundaries are shown on figure 1 of Schaefer (2006). The claims are about 3 miles northwest of the Pogo Mine (BD033) and about 3 miles west of the junction of Indian Creek and the Goodpaster River. The location is accurate.

**Commodities:**

**Main:** As, Au

**Other:** Bi, Te

**Ore minerals:** Arsenopyrite

**Gangue minerals:** Quartz

**Geologic description:**

The Rainbow, Aurora, and Indian claim blocks were first located by three prospectors, beginning in 1999. In 2002, they were leased to the Anglo-Gold Corporation who did only limited work, mainly soil sampling on the ridges, as part of a larger effort in the area. In 2006, the claims were leased to Tonogold Resources Inc. (2008).

The rocks in the area consists primarily of pre-Mississippian paragneiss and orthogneiss with lesser schist and quartzite; the metamorphic rocks are intruded by several Cretaceous granitic plutons (Werdon and others, 2004). The Aurora Block is underlain by paragneiss, schist, quartzite and minor orthogneiss that are cut by several Tertiary basaltic dikes. The Indian block is mainly underlain by orthogneiss similar to that at the nearby Pogo mine (BD033) with Cretaceous granodiorite of the Goodpaster Batholith to the north. The Rainbow Block is mainly paragneiss in contact with Cretaceous (96.6-99 Ma) tonalite; hornfels is developed at the contact. The Rainbow block also includes a small Cretaceous(?) granodiorite/quartz monzonite dike that is moderately altered to sericite and carbonate. The gneiss locally is moderately to strongly silicified with the development of sericite+/-carbonate. Airborne geophysical surveys (Burns and others, 2000 and 2005) show a marked magnetic anomaly over the hornfels adjacent to the Cretaceous tonalite at the Rainbow claims; a similar highly magnetic anomaly over the north half of the Aurora block suggests hornfels adjacent to a buried intrusive.

Quartz veins with disseminated arsenopyrite have been found in float on the Rainbow claims near the contact between gneiss and the Cretaceous tonalite (Schaefer, 2006). Samples contain up to 2.4 grams of gold per ton with more than 10,000 parts per million (ppm) arsenic and anomalous bismuth. The scattered soil samples from the area are also anomalous in gold and arsenic and locally in bismuth and tellurium.

**Alteration:**

At the Rainbow Block, the paragneiss at the contact with Cretaceous (96.6-99 Ma) tonalite is altered to hornfels. The Rainbow block also includes a small Cretaceous(?) granodiorite/quartz monzonite dike that is moderately altered to sericite and carbonate. The gneiss locally is moderately to strongly silicified with the development of sericite +/- carbonate.

**Age of mineralization:**
Insufficient data; may be related to nearby Cretaceous plutons.

**Deposit model:**
Arsenopyrite-gold-quartz veins.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
The Rainbow, Aurora, and Indian claim blocks were first located by three prospectors, beginning in 1999. In 2002, they were leased by the Anglo-Gold Corporation who did only limited work, mainly soil sampling on the ridges, as part of a larger effort in the area. In 2006, the claims were leased to Tonogold Resources Inc.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Burns and others, 2000; Werdon and others, 2004; Burns and others, 2005; Schaefer, 2006; Tonogold Resources, Inc., 2008.

**Primary reference:** This report

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): West Pogo; ER

**Site type:** Prospect

**ARDF no.:** BD055

**Latitude:** 64.4486 **Quadrangle:** BD B-3

**Longitude:** 145.0867

**Location description and accuracy:**
The West Pogo prospect consists of 17 square kilometers of State of Alaska claims. The coordinates are at about the center of the claims, about 5.1 miles west-southwest of the junction of the Goodpaster River and Indian Creek. The prospect adjoins the claims of the Rainbow prospect (BD054).

**Commodities:**

**Main:** Au, Bi, Te

**Other:**

**Ore minerals:** Gold

**Gangue minerals:** Quartz

**Geologic description:**
The West Pogo prospect is held by International Tower Hill Mines, Inc. (2008, Pogo); they acquired it from from AngloGold Ashanti (USA) Exploration, Inc. The rocks in the area are similar to those at the Pogo Mine (BD033) about 5 miles to the east. That is biotite-quartz feldspar orthogneiss intruded by plutons and the center of the prospect is a 100-ma-old, Cretaceous diorite. The prospect is marked by aneast-west trending gold anomaly in the soils which is also the strike of the fault zone, the dominant structure. One hole was drilled near the western margin of the pluton. The hole missed its intended target and remained in the pluton for its entire length; the best interval in the hole was 2 meters that contained 0.3 gram of gold per ton. The geochemistry suggests that the best mineralization is west of the hole. As at the Pogo mine, the mineralization consists of high temperature quartz veins. The best sample collected at the surface contained 11 grams of gold per ton with high bismuth and tellurium.

**Alteration:**
No data.

**Age of mineralization:**
Probably related to the 100-ma-old intrusion at the center of the prospect.

**Deposit model:**
Similar to the Pogo mine just to the east, high temperature gold-quartz veins that contain bismuth and tellurium.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
Surface sampling, geologic mapping, and soil geochemistry; one drill hole.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**

International Tower Hill Mines, Ltc., 2008 (Pogo).

**Primary reference:** International Tower Hill Mines, Ltd., 2008 (Pogo)

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): LMS

**Site type:** Prospect

**ARDF no.:** BD056

**Latitude:** 64.2036 **Quadrangle:** BD A-4

**Longitude:** 145.5353

**Location description and accuracy:**

The LMS prospect is on a large block of 92 State of Alaska claims that cover about 25 square miles. The drilling on the prospect has been spread for about 2 miles along a north-northeast trending ridge that is south of the head of Progressive Creek in sections 22 and 27, T. 8 S., R. 11 E. The center of the drilling is near VABM Liscum. The location is accurate.

**Commodities:**

**Main:** Au

**Other:** As, Pb

**Ore minerals:** Arsenopyrite, gold, pyrite

**Gangue minerals:** Quartz

**Geologic description:**

The LMS prospect was discovered by AngloGold Ashanti (USA) Exploration Company by following up stream sediment sampling with soil geochemistry. In 2005, they drilled 3200 meters of hole at 17 locations with encouraging results. International Tower Hill Mines Ltd. is now exploring the property in a joint venture with AngloGold (International Tower Hill, 2008a) In 2006, ITH drilled another 6,329 meters in 20 holes. and in 2008,. ITH published a comprehensive NI 43-101 report on the property (International Tower Hills, Ltd., 2008, Report).

The gold mineralization is in a large accretionary complex of igneous and sedimentary rocks that have been metamorphosed to greenschist and amplibolite-facies grade. There is little outcrop in the area and what rocks are exposed on the high ridges consist of middle to early Paleozoic and(or) Late? Proterozoic quartz and pelitic schist of the Yukon-Tanana Upland and Mississippian and(or) Devonian? augen gneiss (Wilson and others, 1998).

The gold mineralization usually is in strongly silicified and brecciated zones that are associated with low-angle faults marginal to schist units (International Tower Hill Mines, Inc., 2008, Cross Section). The ore contains abundant pyrite and minor galena, arsenopyrite, and graphite. The mineralization is associated with a silicified zone about 30 meters thick that dips west. The low-angle mineralized zones are cut by a series of high-angle, possibly mesothermal veins along an east-west trend of foot- and hanging-wall stockworks. Some of the notable intercepts in the 2005 drill holes are: 1) 30.48 meters that contain 1.10 part per million (ppm) gold, 2) 3.04 meters that contain 1.51 ppm gold, 3) 4.57 meters that contain 1.12 ppm gold, 4) 25.91 meters that contain 1.18 ppm gold, 5) 15.39 meters that contain 3.43 ppm gold, 6) 3.38 meters that contain 21.52 ppm gold, 7) 4.58 meters that contain 4.00 ppm gold, 8) 1.53 meters that contain 1.81 ppm gold, 9) 0.8 meters that contain 1.95 ppm gold, and 10) 4.17 meters that contain 1.95 ppm gold.

In early 2008, International Tower Hill Mines (2008, Report) announced that at a cut-off grade of 0.3 gram of gold per tone, the deposit contained 5.86 million tones of material with average grade of 0.89 grams of gold per tone, or 167,000 ounces of gold. There is considerable potential to extend these resources into the surrounding area.

**Alteration:**

Associated with a silicified zone about 30 meters thick that dips west in metamorphic rocks.

**Age of mineralization:**
Paleozoic or younger based on the age of the host rocks.

**Deposit model:**
Gold-quartz mineralization in a thick silicified zone.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
The LMS prospect was discovered by AngloGold Ashanti (USA) Exploration Company by following up stream sediment sampling with soil geochemistry. In 2005, they diamond drilled a total of 3200 meters of hole at 17 locations with encouraging results. International Tower Hill Mines Ltd. is now exploring the property in a joint venture with AngloGold (International Tower Hill, 2008, LMS).

**Production notes:**

**Reserves:**
In early 2008, International Tower Hill Mines (2008, Report) announced that at a cut-off grade of 0.3 gram of gold per tone, the deposit contained 5.86 million tones of material with average grade of 0.89 grams of gold per tone, or 167,000 ounces of gold. There is considerable potential to extend these resources into the surrounding area.

**Additional comments:**

**References:**
Wilson and others, 1998; International Tower Hill Mines, Inc. 2008 (LMS); International Tower Hill Mines, Inc., 2008 (Cross Section); International Tower Hill Mines, Inc., 2008 (Report).

**Primary reference:** This record

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Tuluksak River (below Granite Creek)

**Site type:** Prospect

**ARDF no.:** BH016

**Latitude:** 60.9690 **Quadrangle:** BH D-4

**Longitude:** 160.1994

**Location description and accuracy:**
Maddren (1915) located this placer prospect near the Tuluksak River about 5 miles downstream from the mouth of Granite Creek (BH015). The coordinates given here are at about this location, about 0.6 mile southwest of the center of section 12, T. 10 N., R. 62 W. However, there is no other reference to this prospect and its exact location is uncertain. This is locality 9 of Cobb (1972 [MF 455]) and of Hoare and Cobb (1977).

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
Maddren (1915) reported that fine gold was found in a 50-foot prospect shaft through frozen ground near the Tuluksak River about 5 miles below the mouth of Granite Creek (BH015). The prospect is on the lower part of the river, where the gradient decreases as it enters onto the lowlands of the lower Kuskokwim River. The low elevation and proximity to the Kuskokwim River lowlands suggest that Quaternary sea level fluctuations could have influenced placer development on the lower Tuluksak River. There apparently has been no other work on the Tuluksak River below the mouth of Granite Creek.

**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:** None

**Site Status:** Inactive

**Workings/exploration:**
A 50-foot prospecting shaft was dug before 1915 through frozen ground.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Maddren, 1915; Cobb, 1972 (MF 455); Hoare and Cobb, 1977.

**Primary reference:** Maddren, 1915

**Reporter(s):** Travis L. Hudson (Applied Geology); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Boulder Creek; Death Valley

**Site type:** Prospect

**ARDF no.:** BN089

**Latitude:** 65.0509 **Quadrangle:** BN A-1

**Longitude:** 162.2542

**Location description and accuracy:**

The Boulder Creek or Death Valley (in the early literature) uranium deposit is located in the headwaters of Boulder Creek, a north tributary to the middle Tubutulik River. It is 3.5 miles south of the point where the Tubutulik River leaves Death Valley. The deposit has been explored on the east side of Boulder Creek and the discovery pits are 1.0 mile southeast of Hill 990 and 1.0 mile east of Tubutulik River. This is locality 60 of Gamble (1988).

**Commodities:**

**Main:** U

**Other:**

**Ore minerals:** Coffinite, meta-autunite, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

The Boulder Creek or Death Valley (in the early literature) sandstone-type uranium deposit (Dickinson and others, 1987) was discovered in 1977 and soon explored and drilled by Houston International Minerals Corporation.

The Death Valley deposit is in lower Eocene continental sedimentary rocks that unconformably overlie deeply weathered granitic rocks of the Darby pluton (Miller and Bunker, 1976; Johnson and others, 1979). The Eocene sediments were deposited in a graben between the uplifted Darby pluton to the west and lower Paleozoic metamorphic rocks to the east This is probably an onshore, exposed equivalent of the deeper parts of the offshore Norton basin. The proximity to the slightly uraniferous Darby pluton seems to be an important control on the development of this deposit. The continental sedimentary rocks are conglomerate, arkosic sandstone, mudstone, and coal. The unconformable contact between the coarse, poorly sorted basal sedimentary strata and the granitic pluton is gradational and some strata in this part of the section are interpreted as mud flows in alluvial systems. The upper part of the sedimentary section contains mudstones deposited in a lucustrine environment. Eocene basalt is interbedded with and caps the sedimentary section in this area. These basalts may have created a dam that led to lucustrine sedimentation. The lacustrine mudstones contain laminated siderite but all the sediments compositionally reflect the nearby granitic provenance of the Darby pluton; granitic clasts, quartz, and k-feldspar are common detrital components. Carbonized wood fragments are also common in the section which contains bituminous coal beds up to 100 feet thick.

Uranium mineralization is both epigenetic and supergene. Epigenetic mineralization consists of coffinite, small amounts of pyrite, and trace amounts of sphalerite; it extends vertically over a stratigraphic interval of 300 feet both above and below basalt layers. This primary mineralization, interpreted to be early Eocene in age, is formed by the reduction of oxidized groundwaters derived from areas of granitic bedrock by carbonized wood in conglomerate and arkosic sandstone. The principal mineralized zone defined by drilling covers an area of 395 by 9,850 feet and averages 10 feet thick. With an average grade of 0.27 % U3O8, this deposit has a calculated resource of 1,000,000 pounds of U3O8 (Dickinson and others, 1987). The supergene mineralization, related to the present surface, consists of several varieties of meta-autunite in soil and weathered bedrock intervals less than 20 feet thick. The mineralized surficial materials include three zones:

(1) a one-foot thick zone of organic-rich mudstone and sandstone containing basalt cobbles that may be a debris flow; (2) a zone up to 10-feet thick of arkosic sandstone containing carbonized wood fragments; and (3) a zone of granitic grus or semi-consolidated arkosic sandstone and mudstone. Some arkosic sandstone fragments contain 11 percent U3O8 and some basalt fragments have uraniferous weathering rinds. Epigenetic mineralization is considered to be early Eocene in age, a time when the climate was temperate or subtropical (Dickinson and others, 1987). This is the age of the host rocks and mineralization must have occurred before later Tertiary faulting disrupted groundwater flow eastward from the Darby pluton. The supergene mineralization is Recent in age and may be ongoing today. The Death Valley sandstone-type uranium deposit is the farthest north deposit of its type in the world. At the time of its formation, it was probably at an even higher latitude than it is today, 64 degrees north.

The Boulder Creek deposit is currently a joint venture between Full Metals Minerals (2007, Boulder Creek) and Triex Minerals (2007) with Triex as the operator. Triex completed a four-week reconnaissance program in 2005 and identified several geochemical anomalies in the surrounding area. In 2006, they drilled 14 core holes totaling 1,237 meters. Twelve of the holes were on the Boulder Creek deposit; they did not change the known dimensions of the deposit. They drilled two additional holes on geochemical anomalies about 6 kilometers north-northwest of the Boulder Creek deposit; they did not intersect significant mineralization but they did cut rocks favorable for uranium mineralization.

Triex also staked a large block of claims about 25 kilometers to the southwest in the southeast portion of McCarthy Marsh based on airborne geophysical anomalies. They followed up these anomalies in 2006 by considerable soil sampling and biogeochemical surveys.

**Alteration:**

Various clays are developed in the sedimentary host rocks of the epigenetic deposit that may reflect alteration processes. The supergene enrichment accompanies alteration associated with weathering processes.

**Age of mineralization:**

Epigenetic mineralization is considered to be early Eocene in age, a time when the climate was temperate or subtropical (Dickinson and others, 1987). This is the age of the sedimentary host rocks and mineralization must have occurred before Tertiary faulting disrupted groundwater flowing eastward from the Darby pluton. The supergene mineralization is Recent in age and may be ongoing today.

**Deposit model:**

Sandstone U (Cox and Singer, 1986; model 30c)

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

30c

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**

The Death Valley sandstone-type uranium deposit (Dickinson and others, 1987) was discovered in 1977 and soon explored and drilled by the Houston International Minerals Corporation. Houston Oil and Minerals completed 3,300 m of core drilling in 52 holes and about 60 m of near-surface split-tube sampling in 21 holes, focused on the Discovery Zone area. Surface grab samples reported by previous operators returned up to 34 percent U3O8, with intercepts up to 3.3 meters, averaging 0.58% U3O8.

The Boulder Creek deposit is currently a joint venture between Full Metals Minerals and Triex Minerals with Triex as the operator. Triex completed a four-week reconnaissance program in 2005 and identified several geochemical anomalies in the surrounding area. In 2006, they drilled 14 core holes totaling 1,237 meters. Twelve of the holes were on the Boulder Creek deposit; they did not change the known dimensions of the deposit. They drilled two additional holes on geochemical anomalies about 6 kilometers north-northwest of the Boulder Creek deposit; they did not intersect significant mineralization but they did cut rocks favorable for uranium mineralization.

Triex also staked a large block of claims about 25 kilometers to the southwest in the southeast portion of

McCarthy Marsh based on airborne geophysical anomalies. They followed up these anomalies in 2006 by considerable soil sampling and biogeochemical surveys.

**Production notes:**

**Reserves:**

The principal mineralized zone that has been defined by drilling covers an area of 395 by 9,850 feet and averages 10 feet in thickness. This deposit has a calculated resource of 1,000,000 pounds of $U_3O_8$ at an average grade of 0.27 % $U_3O_8$ (Dickinson and others, 1987). This is the largest presently known uranium deposit in Alaska.

**Additional comments:**

**References:**

Miller and Bunker, 1976; Johnson and others, 1979; Fisher and others, 1982; Dickinson and others, 1987; Gamble, 1988; Worrall, 1991; Full Metal Minerals, 2007 (Boulder Creek); Triex Minerals, 2007.

**Primary reference:** Dickinson and others, 1987

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/9/2007

# Site name(s): RWM

**Site type:** Prospect

**ARDF no.:** BN143

**Latitude:** 65.8572 **Quadrangle:** BN D-3

**Longitude:** 163.2146

**Location description and accuracy:**
This prospect is on the ridge between the headwaters of the Inmachuk River and Old Glory Creek in the SW1/4 of section 1, T. 6 N., R. 22 W. It is at an elevation of about 1,000 feet and about 0.8 mile northwest of the Nelson Creek lode gold occurrence (BN059).

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:** Quartz (?)

**Geologic description:**
In the Fall of 2004, Royal Pretoria Gold Ltd. staked 2 State of Alaska mining claims and did a soil survey on this prospect. Altar Resources developed the prospect concept, conducted the field work, and held the property in 2004. Soil samples were collected on a 2,200 by 2,400 meter soil grid; the samples were taken 100 meters apart on nine, east-west sample lines, 300 m apart. The samples defined a northwest-trending gold anomaly. The gold content of the soil was as high as 735 parts per billion; anomalous gold values were obtained on 7 of the 9 soil sample lines. Other anomalous elements include arsenic and antimony. On April 7, 2006, Full Metal Minerals (2006, ID=53) announced that it had entered an agreement to acquire 100 percent of this property.
The rocks in the area of this prospect are Paleozoic metasedimentary schist and marble (Till and others, 1986). A northwest-trending fault zone may localize gold mineralization in this area.

**Alteration:**
Silicification?

**Age of mineralization:**
Probably mid-Cretaceous.

**Deposit model:**
Probably quartz veins and segregations in metasedimentary rocks (Cox and Singer, 1986, model 36a?)

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

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**
In the Fall of 2004, Royal Pretoria Gold Ltd. staked 2 State of Alaska mining claims and did a soil survey

on this prospect. Altar Resources developed the prospect concept, conducted the field work, and held the property in 2004. Soil samples were collected on a 2,200- by 2,400-meter soil grid; the samples were taken 100 meters apart on 9 east-west sample lines, 300 meters apart. On April 7, 2006, Full Metal Minerals announced that it had entered an agreement to acquire 100 percent of this property.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Till and others, 1986; Full Metal Minerals, 2006 (ID=53).

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/12/05

# Site name(s): Dime Creek; Haycock; Dime Creek Dredging Co.; Dime Creek Mining Co.; Haycock Mining Co.; Moon and Ryan; Smith

**Site type:** Mine

**ARDF no.:** CA002

**Latitude:** 65.2082 **Quadrangle:** CA A-5

**Longitude:** 161.1642

**Location description and accuracy:**

The Dime Creek gold placer is just east of the village of Haycock. It is in section 20, T. 3 S., R. 12 W., of the Kateel River Meridian. At various times, this site has been referred to as Haycock, Dime Creek Dredging Company, Dime Creek Mining Company, Haycock Mining Company, Moon and Ryan, and Smith according to Cobb, (1972, location 45).

**Commodities:**

**Main:** Au

**Other:** Cr, Pt

**Ore minerals:** Chromite, gold, platinum

**Gangue minerals:**

**Geologic description:**

Dime Creek flows near a fault (?) contact between Paleozoic metamorphosed limestone and Jurassic-Cretaceous andesite flows. The flows are intruded by small, mafic and ultramafic plutons. At this old placer mine, the gold is mainly on metamorphosed andesite bedrock; some gold also is in the overlying 2 to 3 feet of gravel. In the stream bed the paystreak is well defined, while on the benches there are several, linear concentrations of gold. These bench concentrations were thought to be caused by wave action. Assays of gold from Dime Creek returned as high as 961 parts gold and 32 parts silver. The placers also contained platinum in approximate ratio to gold of 1:200. Analysis of platinum-group minerals from concentrate gave the following results: 88.8 percent platinum, I4.7 percent iridium, 4.3 percent osmium and iridium, 1.1 percent rhenium, and 1.1 percent palladium (Mertie, 1969). The placer deposits in the upper portion of the creek produced almost twice as much platinum as the lower claims. On both creek and bench claims the overburden thickness ranges from 10 to 30 feet; all of the ground was frozen. Heavy minerals in the concentrate from a second tier bench claim include iron-oxides, abundant chrome spinel, olivine, pyroxene, rare garnet, and rutile (Harrington, 1919).

Linux Gold Corp. located 12 mining claims on Dime Creek in March 2005, and initiated surface geology studies and sampling in August 2005. Linux (2007, Results) collected samples at 6 sites and analyzed them for gold and platinum-group metals with encouraging results.

**Alteration:**

**Age of mineralization:**

Quaternary.

**Deposit model:**

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

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

39a

**Production Status:** Yes; small

**Site Status:** Active

**Workings/exploration:**

The Dime Creek placers were mined intermittently from 1915 through at least the early 1990's. The deposits were worked mostly by drift and open-cut mining. A small dredge operated from 1931 to 1940. Linux Gold Corp. located (2007, Results) 12 mining claims on Dime Creek in March 2005, and initiated surface geology studies and sampling in August 2005. In 2006, Linux collected samples at 6 sites and analyzed them for gold and platinum-group metals with encouraging results.

**Production notes:**

On the lower end of Dime Creek, one ounce of platinum was produced for every 250 ounces of gold. On the upper claims there may have been as much as one ounce of platinum produced for every per 100 ounces of gold. A total of 35 ounces of platinum was recovered from placers at Dime Creek in 1917 (Harrington, 1919). Most of the 56 ounces of platinum reported from the Seward Peninsula in 1918 came from Dime Creek (Cathcart, 1920). Brooks and Martin (1921) report 32 ounces of platinum from the Dime Creek area. Linus Gold Corporation (2007, Results) reported that the total production was about 40,000 ounces of gold and 250 ounces of platinum-group metals.

**Reserves:**

**Additional comments:**

**References:**

Brooks, 1916 (B 642); Smith, 1917 (BMB 142); Smith, 1917 (BMB 153); Brooks, 1918; Mertie, 1918; Harrington, 1919; Martin, 1919; Cathcart, 1920; Martin, 1920; Brooks, 1921; Brooks and Martin, 1921; Harrington, 1921; Brooks, 1922; Cathcart, 1922; Brooks, 1923; Mertie, 1923; Brooks, 1925; Smith, 1926; Moffit, 1927; Smith, 1929; Smith, 1930 (B 810); Smith, 1930 (B 813); Smith, 1932 (B 824); Smith, 1933 (B 836); Smith, 1933 (B 844-A); Smith, 1934 (B 857-A); Smith, 1934 (B 864-A); Smith, 1936; Smith, 1937; Smith, 1938; Smith, 1939 (B 910-A); Smith, 1939 (B 917-A); Smith, 1941; Smith, 1942; Anderson, 1947; Gault and others, 1953; Cass, 1959; Mertie, 1969; Cobb, 1972 (MF 389); Cobb, 1973 (B 1374); Cobb, 1976 (OFR 76-866); Bundtzen and others, 1991; Linus Gold Corporation, 2007 (Results).

**Primary reference:** Harrington, 1919; Mertie, 1969

**Reporter(s):** Anita Williams (Anchorage, AK); Travis L. Hudson (Applied Geology, Inc.); D.J. Grybeck

**Last report date:** 4/9/2007

## Site name(s): Unnamed (upper Peace River)

**Site type:** Prospect

**ARDF no.:** CA013

**Latitude:** 65.4544 **Quadrangle:** CA B-5

**Longitude:** 161.0809

**Location description and accuracy:**

This prospect is at an elevation of about 750 feet in the headwaters of Peace River; it is in the SW1/4 of section 25, T. 1 N., R. 12 W., of the Kateel River Meridian. It is location 3, figure 7 of Miller and Elliot (1969), and locations 16 and 34 of Cobb, 1972 (MF-389).

**Commodities:**

**Main:** Ag, Au, Cu, Mo, Pb, W

**Other:** Bi, Cr, radioactive minerals, Zn

**Ore minerals:** Argentiferous bornite, galena, chalcopyrite, chromite, ferromolybdenite, gold, gummite, molybdenite, pyrite, pyrrhotite, scheelite, sphalerite, tetradymite, uranothorianite

**Gangue minerals:** Fluorite, hematite, magnetite, quartz

**Geologic description:**

The upper Peace River area is underlain by a small satellitic stock of the Late Cretaceous Granite Mountain pluton. The stock is composed of several varieties of syenite. Locally, the syenite is cut by quartz veins and contains abundant disseminated pyrite cubes, some fine-grained molybdenite, and abundant magnetite and purple fluorite. A canary-yellow alteration product found both in the veins and in the syenites was identified as ferromolybdenite. The syenite is bleached, oxidized and contains disseminated pyrite, and where it is cut by quartz-pyrite veins, occasional molybdenite. The syenite and associated quartz veins locally contain anomalous amounts of molybdenum, bismuth, silver, copper and lead. Numerous rock and soil samples were collected from this area by Miller and Elliott (1969). One rock sample contained: 150 parts per million (ppm) silver, 30 ppm molybdenum, 3,000 ppm lead, 700 ppm copper, and 0.04 ppm gold. Another rock sample contained: 1.5 ppm silver, greater than 2,000 ppm molybdenum, 500 ppm copper, and 300 ppm lead. Both were grab samples of oxidized syenite.

Gault and others (1953) collected pan-concentrate stream-sediment samples from this area in their search for uranium. Their samples contained anomalously high concentrations of uranothorianite and other metallic minerals, including galena, chalcopyrite, bornite, tetradymite, sphalerite, pyrite, and pyrrhotite. Intergrowths of galena, sphalerite, chalcopyrite, pyrite, and gummite were observed in some mineral grains. The mineral associations suggest that the uranium minerals are derived from a sulfide-bearing lode (or vein), rather than occurring as accessory minerals in in granitic rocks.

Linux Gold Corp. (2007) located 16 mining claims on this prospect in March 2005. They initiated surface geology studies and sampling in August, 2005. Rock grab samples contained up to 0.20 ppm gold, 83.5 grams of silver per ton, 0.12 percent molybdenum, 6.327 ppm copper, 1,232 ppm antimony, and high lead, bismuth, and tungsten. Surface and geochemical work continued in 2006 (Linux Gold Corporation 2007) Samples from silicified syenite contained 587 to 632 ppm molybdenum, 65.8 to 132 ppm uranium, and up to 4.0 ppm silver.

**Alteration:**

Syenite is oxidized where cut by pyrite-quartz veins.

**Age of mineralization:**

Late Cretaceous.

**Deposit model:**
Polymetallic sulfides associated with small syenite stocks.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
The area has been mapped by the U.S. Geological Survey and examined by various exploration companies. Linux Gold Corp. located 16 mining claims on this prospect in March 2005 and initiated surface geology studies and sampling in August, 2005. Surface and geochemical work continued in 2006.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Wedow and others, 1952; White and others, 1952; Gault and others, 1953; Jones, 1953; Cass, 1959; Berg and Cobb, 1967; Miller and Elliott, 1969; Cobb, 1972 (MF 389); Cobb, 1973 (B 1374); Cobb, 1975 (MR-66); Cobb, 1976 (OFR 76-866); Linux Gold Corporation, 2007.

**Primary reference:** Miller and Elliott, 1969

**Reporter(s):** Anita Williams (Anchorage, AK); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 4/9/2007

## Site name(s): Unnamed (at head of Quartz Creek); Saddle

**Site type:** Prospects

**ARDF no.:** CA016

**Latitude:** 65.4723 **Quadrangle:** CA B-5

**Longitude:** 161.3395

**Location description and accuracy:**

These prospects are at an elevation of about 1,250 feet on a ridge between the headwaters of Kiwalik River and Quartz Creek. The site is in section 22, T. 1 N., R. 13 W., of the Kateel River Meridian. It is location 32, figure 2 of Miller and Elliot (1969).

**Commodities:**

**Main:** Ag, Au, Pb, Zn

**Other:** As, B, Cd, Co, Cu, Mn, W

**Ore minerals:** Argentiferous galena, arsenopyrite, chalcopyrite, pyrite, pyrrhotite, sphalerite

**Gangue minerals:** Calcite, quartz, tourmaline

**Geologic description:**

This area is on the eastern Seward Peninsula where base metal, silver, and some gold-bearing mineralization occurs in a 4 x 16 kilometer belt of hydrothermally altered, hornfelsed andesite and intrusive rocks. The Cretaceous andesitic volcanic rocks are locally intruded by andesitic dikes and elongate stocks of monzonite, syenite, and quartz monzonite. A swarm of subparallel aplite and monzonite dikes and a small rhyolite stock locally intrude the mineralized belt. Mineralization and alteration are localized in structurally down-dropped blocks adjacent to coarse-grained intrusions that include the large, composite Granite Mountain pluton about 3 kilometers to the southeast.

The mineralization was originally discovered by the U.S. Geological Survey in the 1960s (Miller and Elliott, 1969). Greatland Exploration Ltd. explored this prospect in the 1970s and still holds mining claims in the area (Ron Sheardown, oral communication, 2005). This exploration included geologic mapping, stream-sediment surveys, grab sampling of rocks and soils, two local soil geochemical surveys, and four short diamond drill holes. The four drill holes are in one area, total 449 meters in length, and reached vertical depths of 50 to 126 meters. Attempts to obtain geophysical data were inconclusive.

Argentiferous galena, sphalerite, pyrite, arsenopyrite, and minor chalcopyrite occur in veins and disseminations both in volcanic hornfels and intrusive rocks (Miller and Elliott, 1969). The sulfide minerals commonly are in quartz-tourmaline veins and replacements. Massive pyrrhotite with some chalcopyrite locally replaces volcanic hornfels. Sphalerite-, galena-, and chalcopyrite-bearing calcite veins are widely scattered through the mineralized belt. Sulfide mineralization commonly is structurally controlled along fractures, faults, and shear zones that cut all bedrock units. Placer gold was recovered from Quartz Creek for many years.

Highly anomalous lead, zinc, silver, copper and boron are common in stream sediments of upper Quartz Creek and its tributaries. Rock and soil samples from the area contain up to 300 parts per million (ppm) silver, 1 ppm gold, more than 10,000 ppm arsenic, more that 10,000 ppm boron, more than 500 ppm cadmium, 2,000 ppm cobalt, 2,000 ppm copper, more than 5,000 ppm manganese, more than 19 percent lead, 100 ppm scandium, and more than 5 percent zinc. One sample contained more than 10,000 ppm tungsten. Soil surveys identified several highly anomalous zones including one 1.3 x 1.4 kilometer area, open on one side, where lead values exceed 200 ppm and zinc values exceed 300 ppm; many lead and zinc values exceed 1,000 ppm in this area. Gold was commonly not determined in the early geochemical investigations.

In 2005, Linus Gold Corporation (2007, Anomalies) began work in the area by staking about 30 square miles of claims, followed by a geologic reconnaissance, rock sampling and a geochemical soil survey that defined several anomalous areas in base and precious metals. Linus carried out considerable work in the area in the summer of 2006, including 4 diamond drill holes that totaled 2,970 feet. All the drill holes intersected altered, mineralized volcanic rocks that were cut by dikes or sills of syenite and granodiorite that were in turn cut by thin rhyolite to dacite dikes. A new gold prospect in intensely altered plutonic rocks was found at the surface near Quartz Creek; grab samples contained 114 to 325 parts per billion (ppb) gold, 10.6 to 35.4 ppm silver, up to 872 ppm copper, and 2.1 percent combined lead and zinc. Surface samples at the Saddle prospect contained up to 2.58 grams of gold per ton, 250 grams of silver per ton, and 3.0 percent lead and zinc.

**Alteration:**

Volcanic hornfels and intrusive rocks are variably altered and are cut by sulfide, calcite, and quartz-tourmaline veins. Volcanic hornfels and intrusive rocks are locally intensely replaced by sericite, pyrite, quartz, and tourmaline. Late carbonate veins and replacements cut intrusive rocks and scapolite is a common alteration mineral in volcanic rocks. Oxidation is extensive and gossan zones characterize the 4 x 16-kilometer mineralized belt.

**Age of mineralization:**

Late Cretaceous.

**Deposit model:**

Sulfides with gold values in altered andesite.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The mineralization was originally discovered by the U.S. Geological Survey in the 1960s. Greatland Exploration Ltd. explored this prospect in the 1970s and still holds mining claims in the area. This exploration included geologic mapping, stream-sediment surveys, grab sampling of rocks and soils, two local soil geochemical surveys, and four short diamond drill holes. The four drill holes are in one area, total 449 meters in length, and reached vertical depths of 50 to 126 meters. Attempts to obtain geophysical data were inconclusive.

In 2005, Linus Gold Corporation (2000 began work in the area by staking about 30 square miles of claims, followed by a geologic reconnaissance, rock sampling and a geochemical soil survey that defined several anomalous areas in base and precious metals. Linus carried out considerable work in the area in the summer of 2006, including 4 diamond drill holes that totaled 2,970 feet, and considerable surface work and sampling.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Miller and Elliott, 1969; Linus Gold Corporation, 2007 (Anomalies).

**Primary reference:** Miller and Elliott, 1969; this record

**Reporter(s):** Anita Williams (Anchorage, Alaska); Travis Hudson, (Applied Geology, Inc.); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Bee Creek; Dry Creek

**Site type:** Prospect

**ARDF no.:** CG007

**Latitude:** 56.5117

**Quadrangle:** CG C-2

**Longitude:** 158.3846

**Location description and accuracy:**

This prospect is in T. 42 S., R. 58 W., of the Seward Meridian, near the headwaters of an unnamed creek entering Dry Creek approximately 1 mile north of Chignik Bay. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Mo

**Other:** Pb, Zn

**Ore minerals:** Chalcopyrite, chrysocolla, galena, gold, magnetite, malachite, molybdenite, pyrite, pyrrhotite, sphalerite

**Gangue minerals:** Gypsum, quartz

**Geologic description:**

At this prospect sandstone, siltstone, argillite, and conglomerate of the Jurassic Naknek Formation have been intruded by a small dacite stock, which is surrounded by a sulfide system and alteration halo covering approximately 2 square miles (Fields, 1977). The intrusive is mainly dacite, but quartz diorite, andesite, and quartz porphyry have also been reported. The intrusive is part of a nearly east-west trending linear belt extending from Weasel Mountain (CG008) on the east to Cathedral Creek (CG001) on the west. The Bee Creek prospect was explored by Bear Creek Mining Company in 1975 and 1976 and by Resource Associates of Alaska in 1979 and 1981.

The prospect is marked by a geochemical and color anomalies. Clusters of arsenic, copper, gold, lead, silver, and zinc anomalies surround the deposit. The main mineralized area is in a steep cirque basin that varies from 500 to 1,500 feet in elevation. Work by Resource Associates of Alaska (Anderson and others, 1979) suggest that mineralization may extend southwest into the McKinsey Valley.

The mineralization is mainly at the border of the dacite stock in arkose, conglomerate, and quartzite. Resource Associates of Alaska (Anderson and others, 1979) claim that the hornfelsed sediments near the contact contain the best mineralization and that the mineralization decreases towards the core of the intrusive. The age of the mineralization is between 3.2 and 3.8 million years (Wilson, 1980).

The deposit is a porphyry copper. Chalcopyrite and pyrite occur in a stockwork of hairline fractures containing quartz-sulfide veinlets throughout an area about 2,000 feet in diameter. Disseminated chalcopyrite and pyrite occur in biotitized hornfels and these sulfides replace mafic minerals in the dacite. Molybdenite is finely disseminated in quartz veinlets, in gypsum veinlets, and in clots of chalcopyrite. Pyrite forms a halo on the periphery of the system. Some magnetite veins have been reported; they appear to be early in the mineralization sequence and contain no sulfides. Veins containing lead and zinc values are peripheral to the copper zone. Within the copper zone, richer surface samples contained 500 to 2,000 parts per million (ppm) copper, 0.04 to 0.18 ppm gold, 20 to 220 ppm molybdenum, and 0.4 to 0.18 ppm silver (Fields, 1977).

Secondary biotite is widely distributed both within and beyond the chalcopyrite zone. It replaces mafic minerals and forms fine-grained aggregates both in the pluton and in the surrounding sediments. The biotite zone centers on the stock and extends irregularly southward over an area of 1,500 by 3,400 feet. Discontinuous zones of sericitic alteration are peripheral to the biotite zone and are locally superimposed on the potassic and propylitic alteration. Propylitic alteration of chlorite and epidote forms an outer alteration zone. A strong zone of argillic alteration located between the phyllic and propylitic zones also has been reported (Butherus and others, 1981).

Bear Creek drilled 5 holes in the copper zone in 1975-76. Four holes averaged 500-1200 ppm copper and 5-28 ppm molybdenum. The best hole averaged 0.25 percent copper, 0.01 percent molybdenum, and 0.06 ppm gold over 500 feet. In 1979 Resource Associates of Alaska discovered two areas of polymetallic quartz veins. Samples of this material contained up to 5700 ppm copper, 4.4 ppm gold, 1.18 percent lead, 530 ppm molybdenum, 4.2 ounces silver per ton, and 1.62 percent zinc (Anderson and others, 1979). A resource of 4.5 to 9 million tonnes grading 0.25 percent copper and 0.01 percent molybdenum has been estimated (Young and others, 1997).

Full Metal Minerals and Metallica Resources drilled 2 holes on the Bee Creek porphyry in 2006 that totaled 1,000 meters (Full Metal Minerals, 2008, Alaska Peninsula; Metallica Resources, 2008) They interpret the deposit as a multiphase dioritic intrusion within a coincident copper-gold-molybdenum anomaly centered on a magnetic high about 2 kilometers in diameter. Notable intercepts in the two holes were: 1) 34 meters that contained 0.26 percent copper and 0.085 gram of gold per ton, 2) ll8 meters that contained 0.32 percent copper and 0.212 gram of gold per ton, and 3) 40 meters that contained 0.51 percent copper and 0.212 gram of gold per ton. The holes were mostly in sedimentary rocks cut by numerous intermediate to felsic dikes. The copper mineralization is mostly in hornfelsed sedimentary rocks; some is in altered diorite as stockworks of quartz-magnetite-chalcopyrite veinlets.

**Alteration:**

The alteration at this prospect appears to be the classic porphyry type with a potassic core grading outward through phyllic, argillic, and propylitic alteration zones although these may not all be developed fully. The best copper mineralization is in the potassic zone.

**Age of mineralization:**

Pliocene.

**Deposit model:**

Porphyry copper; porphyry copper-molybdenum (Cox and Singer, 1986; models 17, 21a).

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

17, 21a

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**

In 1975-76 Bear Creek Mining Company did detailed mapping and sampling and drilled 5 holes totaling 1,865 feet. Resource Associates of Alaska explored the deposit in 1979 and 1981. Additional mapping and sampling was done by the U.S. Geological Survey in 1980 and 1981. Full Metal Minerals and Metallica Resources drilled 2 holes on the Bee Creek porphyry in 2006 that totaled 1,000 meters (Full Metal Minerals, 2008, Alaska Peninsula; Metallica Resources, 2008).

**Production notes:**

**Reserves:**

The prospect contains an estimated resource of 4.5 to 9 million tonnes grading 0.25 percent copper, 0.01 percent molybdenum, and trace gold.

**Additional comments:**

This prospect is located on land conveyed to or patented by the Bristol Bay Native Corporation.

**References:**

Fields, 1977; Anderson and others, 1979; Wilson, 1980; Cox and others, 1981; Butherus and others, 1981;

Wilson and Cox, 1983; Nokleberg and others, 1987; Young and others, 1997; Full Metal Minerals, 2008 (Alaska Peninsula); Metallica Resources Inc., 2008.

**Primary reference:** Fields, 1977; this record

**Reporter(s):** S.H. Pilcher (Anchorage); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Little Squaw Creek

**Site type:** Mine

**ARDF no.:** CH039

**Latitude:** 67.5702 **Quadrangle:** CH C-3

**Longitude:** 148.1602

**Location description and accuracy:**
The Little Squaw Creek placer mine is approximately 2 miles southeast of the southeast end of Squaw Lake. Placer mining has taken place on the lower portion of the creek, generally in the NW1/4 sec. 26, T. 32 N., R. 3 W., of the Fairbanks Meridian, and as shown on fig. 2 in Chipp (1970). The location is accurate.

**Commodities:**

**Main:** Au

**Other:** As, Pb, W

**Ore minerals:** Arsenopyrite, galena, gold, hematite, monazite, scheelite

**Gangue minerals:**

**Geologic description:**
Little Squaw Creek has been placer mined by surface and underground workings, mostly by small-scale drift mining in the old channels. Gold was discovered on Little Squaw Creek in 1905, and mining was reported in most years through 1940, with further activity noted as late as the mid-1980s. In 1983, bulk sampling indicated average grades of $11 to $16 per cubic yard (gold at $400 per ounce) (Alaska Construction and Oil, 1984). Average fineness of the gold was reported as 848 (Mertie, 1925, p. 258).
Little Squaw Creek drains an area of auriferous quartz veins of the Chandalar district (CH040 through CH042) that are the presumed source of the placer gold. Mertie (1925, p. 254-259, 263) described the complex glacial history for the creek. The creek was dammed by ice in the North Fork Chandalar River valley during part of Pleistocene, and this damming resulted in both pre- and post-glacial channel and bench deposits along Little Squaw Creek. The creek and bench gravels are mixed with no distinct boundaries. The upper part of the drainage is described as having gold on bedrock, while farther downstream the pay streak runs onto false bedrock in glacial gravels (Mertie, 1925). Post-glacial deposits, mainly along the lower course of the stream, are composed of 25 to 50 feet of glacial till overlain by 55 to 100 feet of gravel. The pre-glacial deposits, mainly along the upper stream course, are about 35 feet thick, with coarse gold in the upper 2 to 3 feet of bedrock. The placer concentrates contain, in addition to gold, a variety of other minerals, including pyrite, hematite, arsenopyrite, scheelite, galena, and monazite.
In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which may include all or part of Little Squaw Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**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:** Active

**Workings/exploration:**

Little Squaw Creek has been placer mined by surface and underground workings, mostly by small-scale drift mining in the old channels. Gold was discovered on Little Squaw Creek in 1905, and mining was reported in most years through 1940, with further activity noted as late as the mid-1980s.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which may include all or part of Little Squaw Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**

Significant production but exact figures are unavailable.

**Reserves:**

Alaska Construction and Oil (1984) reported that Canadian Barranca Ltd., Inc., the operator in 1984, considered placer reserves in Tobin Creek, Little Squaw Creek, and two additional unnamed creeks in the area to be at least 100,000 ounces of gold, with potential for as much as 500,000 ounces.

**Additional comments:**

**References:**

Brooks, 1915; Brooks, 1916 (B642-A); Brooks, 1918; Brooks, 1922; Brooks, 1923; Brooks and Capps, 1924; Mertie, 1925; Thompson, 1925; Wimmler, 1925; Smith, 1926; Reed, 1929; Smith, 1929; Reed, 1930 (MR 31-4); Reed, 1930 (MR 195-13); Smith, 1930 (B813-A); Smith, 1932 (B 824); Smith, 1933 (B836); Smith, 1933 (B844-A); Smith, 1934 (B857-A); Smith, 1934 (B864-A); Smith, 1936; Smith, 1937; Smith, 1938; Smith, 1939 (B910-A); Smith, 1939 (B917-A); Smith, 1941; Smith, 1942; Roehm, 1949 (RI 31-2); Glover, 1950 (MR 195-1); White, 1952; Nelson and others, 1954; Overstreet, 1967; Heiner and Wolff, 1968; Chipp, 1970; Brosg and Reiser, 1972; Cobb, 1972 (MF 457); Cobb, 1973 (B 1374); Eakins and Forbes, 1976; Cobb, 1976 (OFR 76-340); Cobb, 1977 (OFR 77-168B); Grybeck, 1977; DeYoung, 1978; Grybeck and DeYoung, 1978; Dillon, 1982; Alaska Construction and Oil, 1984; Eakins and others, 1985; Bundtzen and others, 1987; Swainbank and others, 1991; Swainbank and others, 1993; Nokleberg and others, 1996; Swainbank and others, 1997; Barker and Bundtzen, 2004.

**Primary reference:** Mertie, 1925

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

# Site name(s): Little Squaw; Cosine; Sine; Crystal; Big Squaw Quartz; Parabola; Engineers Exploration Syndicate; Idaho-Alaska Corp.

**Site type:** Mine

**ARDF no.:** CH040

**Latitude:** 67.5554 **Quadrangle:** CH C-3

**Longitude:** 148.1908

**Location description and accuracy:**

The Little Squaw mine is approximately 3 miles south of the southeast end of Squaw Lake on the ridge between Little Squaw and Squaw Creeks; it is approximately 3 miles above Little Squaw Lake (in section 34, T. 32 N., R. 3 W., of the Fairbanks Meridian). The mine location is shown by a mine symbol on the current USGS topographic map and the location is also shown on fig. 2 in Chipp (1970). The location is accurate.

**Commodities:**

**Main:** Au

**Other:** Ag, Pb, Zn

**Ore minerals:** Arsenopyrite, galena, gold, pyrite, scorodite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The Little Squaw mine was worked by a 185-foot adit with a raise to the surface at 160 feet and a 60-foot winze at 135 feet that were completed between 1910 and 1933 (Cobb, 1983 (OFR 83-278); Stanford, 1931). A road from the Little Squaw to a mill site on Spring Creek was built in 1909-10. Twenty-seven tons of ore from the Little Squaw mine that were processed at a mill on the property recovered an average recovery of $22 per ton (at $20 per ounce of gold); the recovery probably was only the free gold. In 1912, a 3-stamp mill was brought to Big Creek to test the Little Squaw ore and used until 1915. Considerable development work was conducted in the area beginning in 1960 and has been reported to include 1,500 feet of underground workings, surface trenching, and installation of a 100-ton-per-day mill. While most of this work probably focused on the nearby Mikado property, some of the work was probably performed on the Little Squaw mine as well.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which include the Little Squaw mine. The company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004). Little Squaw Gold Mining Company is currently (2005) soliciting funds to undertake placer and lode gold exploration activities recommended in that report.

The vein on the Little Squaw property is one of several auriferous quartz veins in an area trending northeast from the heads of Tobin and Big creeks to Squaw and Little Squaw creeks. In general, most of the gold-bearing quartz veins in this area are in or near steeply-dipping, northwest-trending normal faults in Devonian quartz-muscovite schist, phyllite, and quartzite intruded by Devonian mafic sills and dikes (Chipp, 1970). The mafic intrusions have been metamorphosed to greenstone or greenschist. Major structural features include large-scale northeast-trending anticlines and synclines, northeast-trending thrusts, and the northwest-trending, high-angle cross faults. Most of the veins are less than 10 feet thick and are discontinuous, pinching out within a few hundred feet or less. The veins are composed principally of white crystalline to microcrystalline quartz, and their sulfide content is generally less than 5 percent. The principal sulfides (in relative order of abundance) are arsenopyrite, galena, sphalerite, and pyrite. Scorodite and limonite are commonly oxidation products. The quartz veins exhibit evidence of post-depositional shearing, indicating that the veins were emplaced before or during fault movement. The genesis of these gold deposits is still in question; various authors have hypothesized genetic links to a variety of felsic and mafic igneous rocks from which the gold was remobilized during metamorphism (Mertie, 1925; Boadway, 1933; Chipp, 1970; Dillon, 1982).

The Little Squaw vein is generally described as brecciated and recrystallized quartz containing free gold, pyrite, arsenopyrite, galena, and sphalerite. Ashworth (1983) described two generations of quartz: (1) 'barren' massive, white, coarsely crystalline quartz on the hanging wall that is generally devoid of sulfides; and (2) 'main stage' quartz in the footwall that contains smeared arsenopyrite and scorodite, and gold that forms blebs in the quartz and wires in the vugs. At the surface, the vein is 4 feet wide and dips approximately 80 degrees south. At the bottom of a 60-foot winze the dip flattens to 60 degrees south, and the vein reportedly consists of several quartz stringers with abundant arsenopyrite. The vein averages 67 inches wide and consists mostly of barren quartz except for an 8- to 12-inch-wide footwall zone which appears streaked and ribbony due to abundant pyrite and arsenopyrite. Native gold, as flakes or wires, is common at the Little Squaw. In 1933, the vein was described as having a proven length of 200 feet and a depth of 130 feet with a grade of $38.50 per ton over a 4-foot width ($20 per ounce of gold) (Boadway, 1933). In 1934, a weighted average value of 0.505 ounce of gold per ton was determined by using the lower of duplicate assays.

**Alteration:**

Veins are generally oxidized to a depth of about 75 feet; the principal oxidation products include scorodite and limonite.

**Age of mineralization:**

Middle Cretaceous(?) based on arguments by Dillon (1982) that the age of emplacement of the gold-bearing quartz veins of the Koyukuk and Chandalar districts was between the Neocomian metamorphism of the Devonian host rocks and their erosional unroofing and cooling in Albian time.

**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:** Yes; small

**Site Status:** Active

**Workings/exploration:**

The property was worked by a 185-foot adit with a raise to the surface at 160 feet and a 60-foot winze at 135 feet that were completed between 1910 and 1933 (Cobb, 1983 (OFR 83-278); Stanford, 1931). A road from the Little Squaw to a mill site on Spring Creek was built in 1909-10. Twenty-seven tons of ore from the Little Squaw mine that were processed at a mill on the property recovered an average recovery of $22 per ton (at $20 per ounce of gold); the recovery probably was only the free gold. In 1912, a 3-stamp mill was brought to Big Creek to test the Little Squaw ore and used until 1915. Considerable development work was conducted in the area beginning in 1960 and has been reported to include 1,500 feet of underground workings, surface trenching, and installation of a 100-ton-per-day mill. While most of this work probably focused on the nearby Mikado property, some of the work was probably performed on the Little Squaw mine as well.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which include the Little Squaw mine. The company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**

Early production figures for the district probably combined placer and lode production and indicate that approximately 65,000 ounces of gold were produced from lode and placer through 1995. Goldfarb and others (1997) reported that lode production was 17,000 ounces of gold and the placer production was 46,000 oz. A small part of this came from the Little Squaw mine.

**Reserves:**

Various reserve figures have been published for the Chandalar area lode properties; these typically do not differentiate reserves for specific properties. Some of these figures are as follows: 12,000 tonnes grading 75 grams of gold per ton at the Mikado and Little Squaw (Nokleberg and others, 1996); an inferred lode reserve for the Chandalar district lodes of 45,000 tons with a grade of 2 ounces of gold per ton was reported as late as 1997 (Swainbank and others, 1998). Baggs and others (1988) reported measured reserves of 9,100 metric tons grading 58.70 grams of gold per metric ton as of 1980. Some of this may have been mined.

**Additional comments:**

See also: Mikado Mine (CH045). There may be some confusion in the literature between the Little Squaw and Mikado mines because for a considerable time in recent years, the Little Squaw Mining Company which includes both properties was prominent in the press and the literature. The names Idaho-Alaska Corp. and Engineers Exploration Syndicate which are also associated with this property refer to a transaction in 1932 in which the Idaho-Alaska Corp. took over the leases and options on various properties in the Chandalar district formerly held by the Engineers Exploration Syndicate. Other site names are names of claims on or near the mine.

**References:**

Brooks, 1911; Brooks, 1912; Maddren, 1913; Brooks, 1914; Mertie, 1925; Thompson, 1925; Reed, 1927; Reed, 1930 (MR 31-4); Stanford, 1931; Boadway, 1932; Boadway, 1933; Anderson, 1944; Brosg and Reiser, 1964; Berg and Cobb, 1967; Heiner and Wolff, 1968; Koschmann and Bergendahl, 1968; Chipp, 1970; Brosg and Reiser, 1972; Cobb, 1972 (MF 457); Cobb, 1973 (B 1374); Cobb, 1976 (OFR 76-340); Grybeck, 1977; DeYoung, 1978; Grybeck and DeYoung, 1978; Reiser and others, 1979; Arctic Environmental Information and Data Center, 1982; Bundtzen and others, 1982; Dillon, 1982; Ashworth, 1983; Cobb and Cruz, 1983; Eakins and others, 1983; Mosier and others, 1987; Baggs and others, 1988; Dillon and others, 1989; Nokleberg and others, 1993; Nokleberg and others, 1996; Goldfarb and others, 1997; Swainbank and others, 1998; Barker and Bundtzen, 2004.

**Primary reference:** Chipp, 1970

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

## Site name(s): Summit

**Site type:** Prospect

**ARDF no.:** CH041

**Latitude:** 67.5387 **Quadrangle:** CH C-3

**Longitude:** 148.1853

**Location description and accuracy:**

The Summit lode is at an elevation of about 4,800 feet, approximately 1/2 mile south of Little Squaw Peak, between Little Squaw Peak and peak 5072 (St. Marys Peak as labeled on fig. 2 in Chipp, 1970) in SW1/4 sec. 3, T. 31 N., R. 3 W., of the Fairbanks Meridian. The location is accurate.

**Commodities:**

**Main:** Ag, Au

**Other:** Cu, Pb, Sb

**Ore minerals:** Arsenopyrite, gold, scorodite

**Gangue minerals:** Quartz

**Geologic description:**

Maddren (1913) reported a 54-foot-deep shaft and a 72-foot drift along the vein. Prospect pits have been dug along the Summit fault/vein system as far east as the pass between Big Creek and McClellan Creek and west along the spur going into Big Squaw Creek. Heiner and Wolff (1968) report that there was some development work in the 1950s and a small mill was established for the ore in the headwaters of Big Creek. It may not have milled any ore.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes the Summit prospect. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

The Summit lode is one of the four principal auriferous quartz vein systems in the Chandalar area. The Summit vein system, like the others in the area, is localized along steeply-dipping, northwest-trending normal faults in Devonian quartz-muscovite schist, phyllite, and quartzite, intruded by Devonian mafic sills and dikes (Chipp, 1970). In general, the veins in the Chandalar area are less than 10 feet thick and are discontinuous, pinching out within a few hundred feet or less. The veins are composed principally of white crystalline to microcrystalline quartz, and their sulfide content is generally less than 5 percent. The principal sulfides (in relative order of abundance) are arsenopyrite, galena, sphalerite, and pyrite. Scorodite and limonite occur commonly as oxidation products. The quartz veins exhibit evidence of shearing, indicating that the veins were emplaced before or during fault movement. Major structural features in the area include large-scale northeast-trending anticlines and synclines, northeast-trending thrusts, and the northwest-trending, high-angle cross faults.

The Summit lode follows the Summit fault, strikes N80W, and dips 75 to 80 degrees south. Early workings on the property exposed a vein 1.5 to 2 feet wide. A sample from these workings was reported to have assayed $54 of gold per ton (Maddren,1913). Dump samples of vein material collected by Chipp (1970) contained abundant arsenopyrite and scorodite in sheared and brecciated quartz; assays of these samples returned values of 0.5 to 6.6 parts per million gold. Ashworth (1983) described two generations of quartz at the Summit lode. The older generation is coarsely crystalline, massive, white quartz. It is in the hanging wall and is as much as 4 feet wide. It contains less than 5 percent sulfides and little gold. The younger generation pinches and swells; it adjoins the older veins, but typically follows in the footwall. It is generally finer grained and contains bands accentuated by smeared graphite and arsenopyrite. Scorodite is common, and free gold occurs as blebs and occasional wires.

The genesis of the gold deposits in the Chandalar district is still in question. Various authors have hypothesized genetic links to a variety of felsic and mafic igneous rocks from which the gold was remobilized during metamorphism (Mertie, 1925; Boadway, 1933; Chipp, 1970; Dillon, 1982).

**Alteration:**

Oxidation of vein material produces scorodite and limonite.

**Age of mineralization:**

Middle Cretaceous(?) based on arguments by Dillon (1982) that the age of emplacement of the gold-bearing quartz veins of the Koyukuk and Chandalar districts was between the Neocomian metamorphism of the Devonian host rocks and their erosional unroofing and cooling in Albian time.

**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:** Undetermined

**Site Status:** Active

**Workings/exploration:**

Maddren (1913) reported a 54-foot-deep shaft and a 72-foot drift along the vein. Prospect pits have been dug along the Summit fault/vein system as far east as the pass between Big Creek and McClellan Creek and west along the spur going into Big Squaw Creek. Heiner and Wolff (1968) report that there was some development work in the 1950s and a small mill was established for the ore in the headwaters of Big Creek. It may not have milled any ore.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes the Summit prospect. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**

**Reserves:**

**Additional comments:**

See also: Mikado (CH045), Little Squaw(CH040), Star(CH042).

**References:**

Maddren, 1913; Mertie, 1925; Boadway, 1932; Boadway, 1933; Anderson, 1944; Holdsworth, 1952; Holdsworth, 1955; Saunders, 1959; Heiner and Wolff, 1968; Chipp, 1970; Cobb, 1972 (MF 457); Cobb, 1976 (OFR 76-340); Grybeck, 1977; DeYoung, 1978; Reiser and others, 1979; Bundtzen and others, 1982; Dillon, 1982; Ashworth, 1983; Cobb and Cruz, 1983; Barker and Bundtzen, 2004.

**Primary reference:** Chipp, 1970

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

## Site name(s): Big Creek

**Site type:** Mine

**ARDF no.:** CH043

**Latitude:** 67.5201 **Quadrangle:** CH C-3

**Longitude:** 148.2076

**Location description and accuracy:**

This gold placer is approximately 5 1/2 miles south of the south end of Squaw Lake. The coordinates are at the mine symbol shown on the topographic map; this is the last camp that was used for placer mining on Big Creek. It is near the junction of sections 9, 10, 15, and 16, T. 31 N., R. 3 W., of the Fairbanks Meridian. Chipp (1970) showed that the stream has been placer mined at least a mile upstream from the camp and about 1/4 miles below it. The location is accurate.

**Commodities:**

**Main:** Au

**Other:** Ag, As, Cu, Mo, Pb, REE, Sb, Th, Ti, U, W

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**

Big Creek is one of the major placer gold producers in the Chandalar district. The placers along the creek were worked only by small-scale methods until the 1950s, when bulldozers were brought in. In the early days, some drift mining was done in the frozen gravel. Mining continued sporadically through at least the mid-1990s.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes all or part of the auriferous portion of Big Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

Big Creek drains the area where several of the Chandalar gold quartz properties are located (CH040-042). The gravels in the stream are relatively shallow, averaging about 12 feet deep on the uppermost portion of the creek and deepening to about 20 to 22 feet on the lower portion of the mined ground (Reed, 1930A, Reed 1930B). The gold occurs in the lower 3 to 5 feet, and there is very little gold on bedrock. The gravel is fairly coarse with numerous greenstone boulders as much as 3 feet in diameter. There is only one generation of placers in the drainage. (They are not separable into pre- and post-glacial deposits). The gold is reported to be bright yellow, generally irregular, and shot-like to flattened, but some occurs as crystals. The gold averages 1 millimeter with many 2- to 3-millimeter nuggets. A few nuggets contain included quartz crystals, limonite, and goethite. It is also reported that the concentrates contain a large suite of heavy minerals in addition to the gold (Mertie, 1925; White, 1952). These heavy minerals include monazite, magnetite, hematite, rutile, pyrite, arsenopyrite, chalcopyrite, galena, stibnite, molybdenite, scheelite, and uranothorianite. A panned-concentrate sample had eU of 0.05 percent (White, 1952, p. 11).

Coarse gold was reported several miles downstream from the mined area, but there is no evidence that mining has occurred in this lower area.

There are at least two reports of a quartz vein in the creek bed on the upper reaches of Big Creek (Chipp, 1970; Heiner and Wolff, 1968). Heiner and Wolff (1968) described it as a gold-bearing mineralized zone that may extend from Big Creek to upper Tobin Creek.

**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; medium

**Site Status:** Active

**Workings/exploration:**
The placers along Big Creek were worked only by small-scale methods until the 1950s, when bulldozers were brought in. Some drift mining was done in the frozen gravel. Mining continued sporadically through at least the mid-1990s.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes all or part of the auriferous portion of Big Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**
Big Creek has been a major producer in the Chandalar district. Chipp (1970) reported production from Big Creek to be about 15,000 ounces of gold and Dillon (1982) stated that two-thirds of that total was produced after 1950. There are no reliable figures for later years.

**Reserves:**

**Additional comments:**
See also: St. Marys Gulch (Creek) (CH044). The first recorded occurrence of monazite in Alaska was from Big Creek (Mertie, 1925, p. 260).

**References:**
Brooks, 1907; Brooks, 1908; Brooks, 1909; Maddren, 1910; Brooks, 1911; Brooks, 1912; Maddren, 1913; Brooks, 1915; Brooks, 1916 (B642-A); Brooks, 1922; Brooks, 1923; Wimmler, 1924; Brooks and Capps, 1924; Mertie, 1925; Thompson, 1925; Wimmler, 1925; Smith, 1926; Reed, 1929; Smith, 1929; Reed, 1930 (MR 31-4); Reed, 1930 (MR 195-13); Smith, 1930 (B813-A); Smith, 1932 (B 824); Smith, 1933 (B836-A); Smith, 1933 (B844-A); Smith, 1934 (B857-A); Smith, 1934 (B864-A); Smith, 1936; Smith, 1937; Smith, 1938; Smith, 1939 (B910-A); Smith, 1939 (B917-A); Smith, 1941; Smith, 1942; Stewart, 1949; Glover, 1950 (MR 195-1); Saarela, 1951; Williams, 1951; Wedow and others, 1952; White, 1952; Nelson and others, 1954; Holdsworth, 1952; Holdsworth, 1955; Anderson, 1956; Brosg and Reiser, 1964; Overstreet, 1967; Heiner and Wolff, 1968; Eakins, 1969; Chipp, 1970; Brosg and Reiser, 1972; Cobb, 1972 (MF 457); Cobb, 1973 (B 1374); Cobb, 1976 (OFR 76-340); Eakins and Forbes, 1976; Cobb, 1977 (OFR 77-168B); Grybeck, 1977; Grybeck and DeYoung, 1978; DeYoung, 1978; Reiser and others, 1979; Dillon, 1982; Cobb and Cruz, 1983; Dillon and others, 1989; Swainbank and others, 1995; Bundtzen and others, 1996; Swainbank and others, 1997; Barker and Bundtzen, 2004.

**Primary reference:** Mertie, 1925

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

# Site name(s): Mikado; Little Mikado; Tobin; Carter; Eclipse; Overlook; Engineers Exploration Syndicate; Idaho-Alaska Corp.

**Site type:** Mine

**ARDF no.:** CH045

**Latitude:** 67.5390 **Quadrangle:** CH C-3

**Longitude:** 148.2547

**Location description and accuracy:**

The portal of the Mikado mine is on the north side of the upper end of the east branch of Tobin Creek. It is at an elevation of about 4,600 feet, approximately 1 1/2 miles southwest of Little Squaw Peak and 4 1/2 miles south-southwest of the south end of Squaw Lake, in the SE1/4 section 5, T. 31 N., R. 3 W., of the Fairbanks Meridian. The location is accurate.

**Commodities:**

**Main:** Au

**Other:** Ag, As, Pb, Sb, Zn

**Ore minerals:** Arsenopyrite, galena, gold, pyrite, siderite, sphalerite, stibnite

**Gangue minerals:** Quartz

**Geologic description:**

The Mikado is the most productive lode deposit in the Chandalar area. Maddren (1913) reported open cuts that exposed auriferous quartz in six places over a strike length of 3,000 feet. Underground workings, including a 100-foot shaft and 160-foot adit, reportedly were completed by 1913. The underground workings were reopened in 1960, and an additional 600 feet of new workings were driven. An additional 800 feet was driven in 1962-63. An unknown amount of work was done in late 1960s, and again in the late 1970s and early 1980s (Bundtzen and others, 1982). Some bulldozer trenching was completed on veins in the area in 1962.

The amount of gold produced from the Mikado vein prior to 1960 is unknown; however, a small stamp mill was constructed on Spring Creek by 1913 to process ore from the Mikado and Little Squaw mines. Production between 1960 and 1979 was reported to be approximately 1,000 ounces of gold and 200 ounces of silver (Cobb and Cruz, 1983). In 1979 the Little Squaw Gold Mining Co. resumed development and seasonal production; the ore was processed through a cyanide leach-flotation plant on Tobin Creek at a rate of 100 to 125 tons per day (Bundtzen and others, 1984). Production during 1981 was reported as 4,000 tons of ore worth $1.6 million (Bundtzen and others, 1982). In 1983 it was estimated that 10,000 ounces of gold had been recovered during the previous several years (1979-1982?) (Bundtzen and others, 1984). Lode production apparently ceased in 1983 due to lack of reserves and the high cost of the remote operations.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes the Mikado mine. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

Discovered in 1909, the Mikado vein is one of several auriferous quartz veins in an area approximately 1 mile wide and 2 1/2 miles long between the heads of Tobin and Big creeks to the south and Squaw and Little Squaw creeks to the north. In general, most of the gold-bearing quartz veins in this area are in or near steeply dipping, northwest-trending normal faults in Devonian quartz-muscovite schist, phyllite, and quartzite intruded by Devonian mafic sills and dikes (Chipp, 1970). The intrusions have been metamorphosed to greenstone or greenschist. Major structural features include large-scale northeast-trending anticlines and synclines, northeast-trending thrusts, and the northwest-trending, high-angle cross faults.

The Mikado vein/fault system is described as a shear zone about 50 feet wide which contains sub-parallel, highly faulted and brecciated, steeply dipping (generally 80N), auriferous quartz veins up to 6 feet thick which have been exposed for over 3,000 feet along the Mikado fault (Maddren, 1913). Although the Mikado vein is said to average 6 feet in thickness over a 500-foot strike length, most of the ore shoots are discontinuous and generally are a few tens or hundreds of feet long. According to Boadway (1933), the Mikado vein in the underground workings consists of lenses of auriferous quartz, mostly on the hanging wall side of a gouge-filled fault. The vein appears to be approximately 35 inches or less in width in the upper levels and narrows to 16 inches at a depth of 99 feet. Ore shoots in the vein reportedly assayed from $37 per ton to as high as $439 per ton (at $20 per ounce of gold), and one ore shoot averaged $49.50 per ton over a 35-inch width (Chipp, 1970). Drilling has intersected additional quartz in both the hanging wall and footwall of the fault.

In a general description of the Chandalar gold-quartz lodes, Chipp (1970) indicated that white, crystalline to microcrystalline quartz is the dominant gangue mineral and that crystals of quartz are commonly found in small vugs. Banding in the quartz veins is produced by shearing and by elongate cavities in the veins parallel to the walls. Siderite occurs in minor amounts. Ashworth (1983) described three generations of quartz in the Mikado deposit: (1) lenses and pods of quartz plus or minus pyrite plus or minus dolomite, these are possibly pre-faulting metamorphic segregations; (2) massive, white, coarsely crystalline quartz with less than 5 percent sulfides and trace gold; and (3) 'main stage' quartz, which is fine grained, white, and in places vuggy. The sulfide assemblage in main stage quartz consists in decreasing order of abundance of arsenopyrite, galena, sphalerite, stibnite, and pyrite. Native gold, as flakes or wires, is common in the Mikado and typically is along the borders of sulfide grains or in quartz near sulfides. Sulfides generally form less than 5 percent of the veins.

Early workers postulated the source of the gold-quartz mineralization to be small granitic intrusives, based largely on the presence of monazite and rutile in the placers (Mertie, 1925). Chipp (1970) suggested that there may be a genetic relationship with the the larger greenstone bodies as well. The genesis of these gold deposits is still in question, although various workers have hypothesized some genetic link to a variety of felsic and mafic igneous rocks from which the gold was remobilized during metamorphism (Mertie, 1925; Boadway, 1933; Chipp, 1970; Dillon, 1982).

**Alteration:**

Oxidation of vein material produces scorodite and limonite.

**Age of mineralization:**

Middle Cretaceous(?) based on arguments by Dillon (1982) that the age of emplacement of the gold-bearing quartz veins of the Koyukuk and Chandalar districts was between the Neocomian metamorphism of the Devonian host rocks and their erosional unroofing and cooling in Albian time.

**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:** Yes; small

**Site Status:** Active

**Workings/exploration:**

Maddren (1913) reported open cuts that exposed auriferous quartz in six places over a strike length of 3,000 feet. Underground workings, including a 100-foot shaft and 160-foot adit, reportedly were completed by 1913. The underground workings were reopened in 1960, and an additional 600 feet of new workings were driven. An additional 800 feet was driven in 1962-63. An unknown amount of work was done in late 1960s, and again in the late 1970s and early 1980s (Bundtzen and others, 1982). Some bulldozer trenching was completed on veins in the area in 1962.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes the Mikado mine. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**

The amount of gold produced from the Mikado vein prior to 1960 is unknown; however, a small stamp mill was constructed on Spring Creek by 1913 to process ore from the Mikado and Little Squaw mines. Production between 1960 and 1979 was reported to be approximately 1,000 ounces of gold and 200 ounces of silver (Cobb and Cruz, 1983). In 1979 the Little Squaw Gold Mining Co. resumed development and seasonal production; the ore was processed through a cyanide leach-flotation plant on Tobin Creek at a rate of 100 to 125 tons per day (Bundtzen and others, 1984). Production during 1981 was reported as 4,000 tons of ore worth $1.6 million (Bundtzen and others, 1982). In 1983 it was estimated that 10,000 ounces of gold had been recovered during the previous several years (1979-1982?) (Bundtzen and others, 1984). Lode production apparently ceased in 1983 due to lack of reserves and the high cost of the remote operations.

**Reserves:**

Various reserve figures, which generally do not define reserves for specific deposits, have been published for the Chandalar area lode properties. Some of these figures are as follows: Bundtzen and others (1982) reported that in 1979 the Mikado property had proven reserves of 30,000 tons of ore with a grade of 1 ounce of gold per ton. Nokleberg and others (1987) reported 12,000 tonnes grading 75 grams of gold per tonne at the Mikado and Little Squaw mines. An inferred lode reserve for the Chandalar district lodes (as a whole) of 45,000 tons with a grade of 2 oz of gold per ton was reported as late as 1997 (Swainbank and others, 1998). Heiner and Wolff (1968) reported proved reserves estimated to be $2,000,000 with the ore valued at $85 per ton. Baggs and others (1988) reported that as of 1980, the district had 13,600 metric tons of measured resources, 4,500 metric tons of indicated resources. and 18,200 metric tons of inferred resources at a grade of 85.2 grams of gold per metric ton.

**Additional comments:**

Recent literature, and especially news notes, may confuse the Little Squaw and Mikado mines because the Mikado is owned by Little Squaw Mining Co. References to the Little Squaw property thus may refer to either the Little Squaw Mine, the Mikado Mine, or both. The names Idaho-Alaska Corp. and Engineers Exploration Syndicate associated with this property refer to the transaction in 1932 in which the Idaho-Alaska Corp. took over the leases and options formerly held by the Engineers Exploration Syndicate on various properties in the Chandalar district.

**References:**

Maddren, 1913; Brooks, 1914; Mertie, 1925; Thompson, 1925; Reed, 1927; Reed, 1930 (MR 31-4); Stanford, 1931; Boadway, 1932; Boadway, 1933; Smith, 1934 (B857-A); Anderson, 1944; Saunders, 1959; Williams, 1960; Saunders, 1962; Heiner and Wolff, 1968; Chipp, 1970; Brosg and Reiser, 1972; Cobb, 1972 (MF 457); Cobb, 1973 (B 1374); Cobb, 1976 (OFR 76-340); Grybeck, 1977; DeYoung, 1978; Reiser and others, 1979; Bundtzen and others, 1982 (ADGGS Ann. Rept. 1981); Dillon, 1982; Bundtzen and others, 1982 (ADGGS Ann. Rept. 1981-82); Cobb and Cruz, 1983; Ashworth, 1983; Eakins and others, 1983; Bundtzen and others, 1984; Eakins and others, 1985; Bundtzen and others, 1987; Nokleberg and others, 1987; Baggs and others, 1988; Nokleberg and others, 1988; Bundtzen and others, 1988; Bundtzen and others, 1991; Nokleberg and others, 1993; Nokleberg and others, 1996; Swainbank and others, 1998; Barker and Bundtzen, 2004.

**Primary reference:** Chipp, 1970; Ashworth, 1983

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

## Site name(s): Eneveloe (Bonanza; Jupiter; Woodchuck; Venus; Golden Eagle; First Chance; Last Chance; Envelope)

**Site type:** Prospect

**ARDF no.:** CH046

**Latitude:** 67.5390 **Quadrangle:** CH C-3

**Longitude:** 148.2040

**Location description and accuracy:**

The Eneveloe prospect is at an elevation of about 4,700 feet, approximately 3 1/2 miles south of Squaw Lake and 1/4 mile south of Little Squaw Peak. in the SE1/4 section 4, T. 31 N., R. 3 W., of the Fairbanks Meridian. Chipp (1970) described the location of the Eneveloe and Bonanza claims as being north of the Summit mine area (which is on the south side of the saddle just south of Little Squaw Peak) and south of Little Squaw Peak. Mineral surveys show six patented claims (Eneveloe, Bonanza, Golden Eagle, Jupiter, Woodchuck, and Venus), and these, along with the presumably unpatented First Chance and Last Chance claims which are not shown on the mineral survey, constitute the Eneveloe property. The location is accurate.

**Commodities:**

**Main:** Au

**Other:** Ag, Cu, Pb, Sb, Zn

**Ore minerals:** Arsenopyrite, galena, gold, scorodite

**Gangue minerals:** Quartz

**Geologic description:**

The surface and underground workings on the Eneveloe prospect extend along the vein to a depth of 40 feet; they include an adit 165 feet in length driven before 1913 between the First Chance and Last Chance claims (Maddren, 1913). Another adit was opened on the Woodchuck claim, but there is no description of its extent. The property has also been explored for 1,000 feet along strike by open cuts and other shallow workings.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes the Eneveloe prospect. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

The Eneveloe lode consists of discontinuous quartz veins 4 to 6 feet wide, at least one of which carries free gold. According to Maddren (1913) a sample from a surface outcrop on the Last Chance claim assayed $198 (approximately 9.6 ounces of gold per ton). Prospect pits on the Jupiter claim, located along the Summit fault west of the Summit mine, exposed quartz containing minor arsenopyrite and scorodite. In the area of the Eneveloe and Bonanza claims, minor quartz veins crop out and prospect pits expose small and discontinuous quartz veins containing minor galena and scorodite. The veins are traceable for 1,500 feet and generally dip steeply south.

The Eneveloe lode is one of several gold-bearing quartz veins in the Chandalar district, an area approximately 1 mile wide and 2 1/2 miles long between the heads of Big, Tobin, Squaw and Little Squaw creeks. The principal deposits in this area are localized along three steeply dipping, northwest-trending normal faults in Devonian quartz-muscovite schist, phyllite and quartzite, intruded by Devonian mafic sills and dikes (Chipp, 1970). The mafic intrusions have been metamorphosed to greenstone or greenschist. From north to south these normal faults are the Little Squaw, Summit, and Mikado.

The Eneveloe property is along the Summit fault a short distance west of the Summit mine (CH041). Most of the quartz veins in the district are discontinuous along the structures, generally pinching out within a few hundred feet or less. Widths vary from a few inches to several feet but are generally less than 10 feet. The quartz veins exhibit evidence of shearing, which indicates that the veins were emplaced before or during fault movement. Sulfide content of the veins is typically less than 5 percent, with the primary sulfides being, in relative order of abundance, arsenopyrite, galena, sphalerite, and pyrite. Much of the gold occurs as native gold. Weathering near the surface has oxidized and leached the sulfides to produce scorodite and limonite. The genesis of these gold deposits is still in question, although various authors have hypothesized genetic links to a variety of felsic and mafic igneous rocks from which the gold was remobilized during metamorphism (Mertie, 1925; Boadway, 1933; Chipp, 1970; Dillon, 1982).

**Alteration:**

**Age of mineralization:**

Middle Cretaceous(?) based on arguments by Dillon (1982) that the age of emplacement of the gold-bearing quartz veins of the Koyukuk and Chandalar districts was between the Neocomian metamorphism of the Devonian host rocks and their erosional unroofing and cooling in Albian time.

**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:** Undetermined

**Site Status:** Active

**Workings/exploration:**

The surface and underground workings on the Eneveloe prospect extend along the vein to a depth of 40 feet; they include an adit 165 feet in length driven before 1913 between the First Chance and Last Chance claims (Maddren, 1913). Another adit was opened on the Woodchuck claim, but there is no description of its extent. The property has also been explored for 1,000 feet along strike by open cuts and other shallow workings.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes the Eneveloe prospect. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**

**Reserves:**

**Additional comments:**

See also: Summit (CH041), Star (CH042), Mikado (CH045), Little Squaw (CH040). The Eneveloe claim, along with the Bonanza and Golden Eagle, are shown on U.S. Mineral Survey 1995. The Jupiter and Woodchuck claims are shown on U.S. Mineral Survey 1629. The Venus claims are shown on U.S. Mineral Survey 1630.

**References:**

Maddren, 1913; Mertie, 1925; Reed, 1927; Reed, 1930 (MR 31-4); Stanford, 1931; Boadway, 1932; Boadway, 1933; Anderson, 1944; Heiner and Wolff, 1968; Chipp, 1970; Cobb, 1972 (MF 457); Cobb, 1976 (OFR 76-340); DeYoung, 1978; Dillon, 1982; Cobb and Cruz, 1983; Bundtzen and others, 1984; Barker and Bundtzen, 2004.

**Primary reference:** Chipp, 1970

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

# Site name(s): Squaw Creek; Big Squaw Creek

**Site type:** Mine

**ARDF no.:** CH047

**Latitude:** 67.5431 **Quadrangle:** CH C-3

**Longitude:** 148.2282

**Location description and accuracy:**
Big Squaw Creek (Squaw Creek on the modern topographic map) drains the area of the Chandalar gold lodes and terminates at Squaw Lake. The coordinates are on the upper creek at the most likely location of the probably limited mining on the creek. The mine is about 0.7 mile southwest of Little Squaw Peak in section 4, T. 32 N., R. 3 W., of the Fairbanks Meridian. The location is accurate.

**Commodities:**

**Main:** Au

**Other:** Ag, Mo, Pb, Sb, Th, U

**Ore minerals:** Arsenopyrite, galena, gold, molybdenite, monazite, pyrite, stibnite, uranothorianite, zircon

**Gangue minerals:**

**Geologic description:**
Squaw Creek cuts through the Chandalar lode gold district, and the placer gold occurrences in this area are generally attributed to direct weathering of the gold-bearing veins. In spite of the proximity of Squaw Creek to the gold-bearing veins, most of the placer mining activity on this creek appears to have been limited to an area near the head of the creek (Chipp, 1970). This area on the upper creek, just below the Jupiter claim on the Eneveloe prospect (CH046), was mined, although there was little gravel in the creek bed and in places the creek was running on bedrock. On the lower creek early efforts at mining the deeper gravels were thwarted as the gravels were thawed and the shafts were flooded. The gold that has been produced was in thin gravels along an irregular bedrock surface. The gravels are coarse and subangular with numerous greenstone boulders and slabs of schist. Glacial damming and disruption of drainage has created both pre- and post-glacial generations of placers. The placer concentrates contain gold, pyrite, arsenopyrite, stibnite, monazite, uranothorianite, galena, molybdenite, and zircon. A sediment sample from the middle fork of Big Squaw Creek showing 0.001 percent eU contained trace monazite, uranothorianite, pyrite, galena, and rare molybdenite, and zircon (Nelson and others, 1954, p. 16, 18, table 10, sample 4638).
In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes all or part of Squaw Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**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:** Active

**Workings/exploration:**

The only mining on Little Squaw Creek was from small-scale surface workings by hand methods. Mining in 1923 was in gravel 3 to 4 feet deep. Mining was reported as late as 1928, but there is no information on any later activity.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which includes all or part of Squaw Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**

Probably some small production that cannot be documented.

**Reserves:**

**Additional comments:**

**References:**

Maddren, 1913; Mertie, 1925; Smith, 1926; Reed, 1929; Reed, 1930 (MR 31-4); Smith, 1930 (B813); Roehm, 1949 (IR 31-2); Nelson and others, 1954; Overstreet, 1967; Heiner and Wolff, 1968; Chipp, 1970; Cobb, 1972 (MF 457); Cobb, 1973 (B 1374); Cobb, 1976 (OFR 76-340); Eakins and Forbes, 1976; Cobb, 1977 (OFR 77-168B); DeYoung, 1978; Dillon, 1982; Cobb and Cruz, 1983; Bundtzen and others, 1987; Maas, 1987; Swainbank and others, 1991; Swainbank and others, 1997; Barker and Bundtzen, 2004.

**Primary reference:** Mertie, 1925

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

# Site name(s): Tobin Creek

**Site type:** Mine

**ARDF no.:** CH048

**Latitude:** 67.5309 **Quadrangle:** CH C-3

**Longitude:** 148.3130

**Location description and accuracy:**

Tobin Creek is a tributary to Chandalar Lake and heads just to the west of the Chandalar area gold lodes. The placer-mined area as shown on the map by Chipp (1970) is the lower 1/2 to 1/4 mile of the left-limit headwater tributary of Tobin Creek (sec. 6, T. 32 N., R. 3 W., of the Fairbanks Meridian). This branch of the headwaters of Tobin Creek drains directly from the area of the Mikado lode mine (CH045). The location is accurate within a 1/4-mile radius.

**Commodities:**

**Main:** Au

**Other:** Pb, REE, W

**Ore minerals:** Galena, gold, magnetite, monazite, pyrite, scheelite

**Gangue minerals:**

**Geologic description:**

Prospecting on Tobin Creek began in 1930 with encouraging results. Mining was reported sporadically from 1930 through as late as 1991. Bulldozer and hydraulic operations were set up in the 1950s and continued into at least the 1980s. Little production data are available, but the total has probably been significant. Heiner and Wolff (1968) reported that there was moderate production from 1957 until 1968. The production from the Chandalar district was 2,129 ounces in 1983; most of probably came from Tobin Creek but partly from Little Squaw Creek. The 1983 production was said to be more than double the 1982 production, and production in 1984 was expected to double again (Alaska Construction and Oil, 1984). Chandalar Development Corp. mined for two consecutive years on Tobin Creek and was reported to be the largest producer in the northern Alaska region (Bundtzen and others, 1992).

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which may include all or part of Tobin Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

Tobin Creek drains the area of the Mikado mine, one of several gold-quartz lode deposits in the Chandalar district and the Mikado fault, along which the Mikado vein occurs. The stream has probably been one of the principal producers in the Chandalar area, but there is only a modest amount of information about this mine. Initial prospecting began in 1930 and was encouraging. Mining was begun by at least 1934. Concentrates contain hematite, monazite, scheelite, pyrite, magnetite, rutile, and galena in addition to the gold (White, 1952). The pay zone is reported to be more than 100 feet thick in thawed gravel.

**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:** Active

**Workings/exploration:**

Prospecting with encouraging results began in 1930. Mining was reported sporadically from 1930 through as late as 1991. Bulldozer and hydraulic operations were set up in the 1950s and continued into at least the 1980s.

In 2004, Little Squaw Gold Mining Company controlled 8,550 acres of patented and unpatented mining claims in the Chandalar district which may include all or part of Tobin Creek. This company contracted a district-scale analysis of the placer and lode gold potential of the district by Pacific Rim Geological Consulting, Inc. This study was completed in April, 2004 (Barker and Bundtzen, 2004).

**Production notes:**

Little production data are available, but the total has probably been significant. Heiner and Wolff (1968) reported that there was moderate production from 1957 until 1968. Production of 2,129 ounces in 1983, said to be mostly from Tobin Creek but partly from Little Squaw Creek, was said to be more than double the 1982 production, and production in 1984 was expected to double again (Alaska Construction and Oil, 1984). Chandalar Development Corp. mined for two consecutive years on Tobin Creek and was reported to be the largest producer in the northern Alaska region (Bundtzen and others, 1992).

**Reserves:**

Alaska Construction and Oil (1984) reported that Canadian Barranca Ltd., Inc., the operator in 1984, considered that the placer reserves in Tobin Creek, Little Squaw Creek, and two additional unnamed creeks in the area were at least 100,000 ounces with potential for as much as 500,000 ounces.

**Additional comments:**

**References:**

Reed, 1929; Reed, 1930 (MR 31-4); Reed, 1930 (MR 195-13); Smith, 1933 (B836); Smith, 1933 (B844-A); Smith, 1936; Smith, 1937; Smith, 1938; Smith, 1939 (B917-A); Smith, 1939 (B917A); Smith, 1941; Smith, 1942; Roehm, 1949 (IR 31-2); Stewart, 1949; Glover, 1950 (MR 195-1); White, 1952; Holdsworth, 1952; Holdsworth, 1955; Nelson and others, 1954; Saunders, 1959; Brosg and Reiser, 1964; Overstreet, 1967; Heiner and Wolff, 1968; Carnes, 1976; Chipp, 1970; Cobb, 1972 (MF 457); Cobb, 1973 (B 1374); Cobb, 1976 (OFR 76-340); Eakins and Forbes, 1976; Cobb, 1977 (OFR 77-168B); Grybeck, 1977; DeYoung, 1978; Grybeck and DeYoung, 1978; Bundtzen and others, 1982 (ADGGS Ann. Rept. 1981); Bundtzen and others, 1982 (ADGGS Ann. Rept. 1981-82); Cobb and Cruz, 1983; Eakins and others, 1983; Alaska Construction and Oil, 1984; Eakins and others, 1985; Bundtzen and others, 1987; Bundtzen and others, 1988; Green and others, 1989; Bundtzen and others, 1990; Swainbank and others, 1991; Bundtzen and others, 1991; Bundtzen and others, 1994; Nokleberg and others, 1996; Swainbank and others, 1997; Barker and Bundtzen, 2004.

**Primary reference:** Chipp, 1970

**Reporter(s):** J.M. Britton (Anchorage, Alaska); Travis Hudson (Applied Geology, Inc.)

**Last report date:** 10/22/05

# Site name(s): Unnamed (near Pin Peak, Coronation Island)

**Site type:** Mine

**ARDF no.:** CR001

**Latitude:** 55.9126 **Quadrangle:** CR D-7

**Longitude:** 134.3311

**Location description and accuracy:**
Several adits are on the east side of Pin Peak at elevations between about 700 and 980 feet. The site is near the center of the area of workings, about 0.2 mile southwest of the center of section 2, T. 69 S., R. 71 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Pb

**Other:** As, Hg, Sn, Zn

**Ore minerals:** Cerussite, galena, hydrozincite, limonite, smithsonite, sphalerite, tetrahedrite

**Gangue minerals:** Calcite

**Geologic description:**
This mine is in limestone of the Silurian Heceta Limestone (Moerlein and others, 1971-1973; Eberlein and others, 1983; Brew, 1996). A small Cretaceous granitic pluton is nearby. The deposit consists of irregular, scattered masses of galena with sphalerite and tetrahedrite (Wright and Wright, 1908; Roehm, 1940; Twenhofel and others, 1949; Wedow and others, 1952). Some of the ore is oxidized to limonite, hydrozincite, cerussite, and smithsonite. The maximum dimension of the ore bodies was about 20 feet. The largest was about 8 feet by 12 feet by 18 feet; one 1- to 4-foot-thick body extended for about 100 feet. The deposit was mined from three adits at elevations of about 700 feet, 860 feet, and 980 feet; the underground workings total about 800 feet. A sample from the highest adit contained 9.7 percent lead, 0.16 ounce of gold per ton, and 20.8 ounces of silver per ton.

Roppel (1991) presents a detailed history of the development and mining. Galena was discovered in 1900 and ten claims were staked. By 1901, several hundred bags of ore had been mined. A test shipment of 16 tons of ore proved to have a value of $88 per ton in lead and silver. Possibly as much as 400 tons of ore was then shipped. Mining continued intermittently until 1905 when 5 tons of ore was sent to the smelter and another 25 tons of ore was stacked on the beach. The claims were restaked several times until at least 1928 and there were several more small test shipments. Phelps Dodge mapped much of Coronation Island in the early 1970's, sampled the workings and held their claims until 1973 (Moerlein and others, 1971-1973; Still and others, 2002) and drilled several holes. There is no record of any significant discovery in their drilling.

The Bureau of Land Management located many of the old working and collected numerous samples in the adits and from the dumps in the late 1990's (Still and others, 2002). The highest grade sample they collected from below the number 2 adit was of oxidized gossan with knots of galena. It contained 13.95 parts per million (ppm) gold, 682 ppm silver, more than 1 percent lead, 3.58 percent zinc, more than 1 percent arsenic, 39.3 ppm mercury, and 307 ppm tin. They concluded that the ore was mainly in irregular pods and that most of the mineralization found in the underground work had been mined out.

**Alteration:**
Some of the ore was oxidized to limonite, hydrozincite, cerussite, and smithsonite.

**Age of mineralization:**
The deposit is younger than the Silurian host rock.

**Deposit model:**
Galena masses in limestone.

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

**Production Status:** Yes; small

**Site Status:** Inactive

**Workings/exploration:**
Roppel (1991) presents a detailed history of the development and mining. Galena was discovered in 1900 and ten claims were staked. By 1901, several hundred bags of ore had been mined. A test shipment of 16 tons of ore proved to have a value of $88 per ton in lead and silver. Possibly as much as 400 tons of ore was then shipped. Mining continued intermittently until 1905 when 5 tons of ore was sent to the smelter and another 25 tons of ore was stacked on the beach. The claims were restaked several times until at least 1928 and there were several more small test shipments. Phelps Dodge mapped much of Coronation Island in the early 1970's (Moerlein and others, 1971-1973) and drilled several holes but there is no indication of any significant discovery. The Bureau of Land Management found and mapped several of the old working and collected numerous samples in the late 1990's.

**Production notes:**
Most references indicate that about 100 tons of ore was shipped but there are indications that production may have been higher.

**Reserves:**

**Additional comments:**
All of Coronation Island is now a Forest Service Wilderness Area and is closed to exploration and mining.

**References:**
Wright and Paige, 1908; Wright and Wright, 1908; Wright, 1915; Chapin, 1916; Roehm, 1940; Twenhofel and others, 1949; Wedow and others, 1952; Wedow and others, 1953; Moerlein and others, 1971-1973; Cobb, 1978 (OF 78-869); Eberlein and others, 1983; Roppel, 1991; Maas and others, 1995; Brew, 1996; Still and others, 2002.

**Primary reference:** Roppel, 1991; Still and others, 2002

**Reporter(s):** Donald Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Gold Standard; Blue Jay; Lakeview; Lower Gold Standard; Lone Jack; Alaska; Free Gold

**Site type:** Mine

**ARDF no.:** CR028

**Latitude:** 55.6514 **Quadrangle:** CR C-1

**Longitude:** 132.0041

**Location description and accuracy:**

The Gold Standard Mine has a long and complex history dating back to before 1900. The workings are in two distinct areas that were part of the same claim group. Managerially and operationally they were always were tied together and they share the same geology. There is an 'upper', early set of workings (in the Craig C-1 quadrangle); the upper workings are about 0.3 mile northwest of the 'lower', younger workings (in the Ketchikan C-6 quadrangle) which consist of several glory holes undercut by a long adit. The coordinates are for the lower workings which are just back from the shoreline about 1.3 miles northwest of the the north end of Forss Island in Helm Bay. The location is near the northeast corner of section 12, T. 72 S., R. 87 E. Figure 46 of Maas and others (1995) shows the location of the upper and lower workings and Figure 47 has detailed maps of the lower workings.

**Commodities:**

**Main:** Ag, Au

**Other:** Pb, Te

**Ore minerals:** Galena, gold, pyrite, tetradymite, tetrahedrite

**Gangue minerals:** Calcite, chlorite, quartz

**Geologic description:**

The original discovery in 1897 on what was to become the Gold Standard mine was at the so-called upper workings about 0.3 miles back from the sea shore, when 17 claims were staked over the property. The gold occurred near or at the surface, either as a creek placer or as a residual deposit over a quartz vein, or both (Brooks, 1902, Maas and others, 1995; Roppel, 2005). Some pans were said to contain up to $100 in gold and 120 ounces of gold was soon recovered. A small arrastre using a water nozzle to move the ground into it was built and by the end of the 1898 season the upper workings had produced $20,000 (almost certainly in gold at $20.67 per ounce). The discovery aroused considerable interest and in 1898, the Alaska Gold Standard Mining Company was incorporated. By the fall of 1899, a camp had been built, a 5-stamp mill powered by a Pelton wheel was in operation at the upper workings, a tram was built to the coast, and the workings consisted of a 260-foot tunnel from a 50-foot shaft. The mill began operating in December 1899 and by April, 1901, 2,430 tons of ore had been run through it with a net yield of $10,540. There was very little work in the upper workings from 1902 to 1906. By 1907, depending on the source $150,000 or $75,000 had been invested in the property with a return of only $35,000. There was intermittent activity from 1902 to 1914, mainly changes in the principals of the company. Several leasers examined or did some work on the upper workings, and several mining companies examined the property. In 1914, a new slate of officers was in place and interest shifted to what would become the lower workings, where three holes were diamond. drilled. In 1921, a leaseholder took out $28,000 (almost certainly in gold) from 2 tons of material in a rich pocket in the lower workings; larger bodies of lower-grade material were also identified. In 1922, a 1,600-foot tunnel was started under what would become two glory holes that were the focus of mining by several leasers from 1922 to the start of WWII. Detailed production records are not available but the ore was processed in the old 5-stamp mill that was moved from the upper workings to a mill site near the sea shore.

Maas and others (1995, p. 192) did considerable sample and mapping of the mine, especially the lower workings (Figure 47), as part of a Bureau of Mines regional mineral assessment. They also reported that the adit at the lower workings was sampled by private interests in 1993 but the gold values were subeconomic.

The rocks in the vicinity are are andesitic and basaltic metavolcanic rocks that are gradationally interbedded with flysch like metasedimentary rocks (Berg and others, 1988, p. 18). The strata were regionally metamorphosed to greenschist-grade phyllite and semischist in Late Cretaceous time (Brew, 1996, p. 27). The premetamorphic age of the strata is uncertain. Berg and others (1988, p. 17) report that they closely resemble Jurassic to Cretaceous strata nearby on Gravina Island.

According to Brooks (1902) and Wright and Wright (1908), the mineralization at the upper workings consisted of two sets of quartz veins in metamorphosed greenstone and greenschist. One set, typified by the principal vein, is parallel to the schistosity of the host rocks. It strikes about N25W and dips 60E and varies from 6 inches to 6 feet thick. The other set consists of gash veins that extend from the main vein; they also strike about N25W but dip 60-75 SW. The veins are faulted and there is considerable gouge along the footwalls. The veins are mainly quartz with subordinate chlorite and calcite. Free gold occurs in the veins with minor pyrite, tetrahedrite, and galena; the telluride tetradymite is reported in the gash veins. The ore is free milling and was said to run about $5 to $15 per ton in gold (at $20.67 per ounce). Bittenbender and others (1993) and Maas and others (1995) sampled the upper workings. The average content of their samples, taken along 40 meters of vein that averages 0.73 meter thick, was 3,713 parts per billion (ppb) gold. A sample across 0.43 meters of the 'Folwarzny vein' contained 5,500 ppb gold.

The Lakeview prospect described by Maas and others (1995) is about 0.1 mile west of the upper workings of the Gold Standard Mine. The deposit is probably similar. The average gold content of samples taken over a length of 550 feet of a vein that averages about 20 inches wide was 3,103 ppb. The only workings are trenches and prospect pits.

The mineralization of the lower workings is similar in character and orientation to that of the upper workings. The walls of the veins are well defined by slickensides, with gouge on the footwall side and by a seam filled with calcite carrying free gold along the hanging wall. Locally, the wallrock next to the veins is bleached and impregnated with pyrite (Maas and others, 1995, p. 183). Maas and others (1995, table 25) collected numerous samples in the lower workings, they averaged 10.4 parts per million (ppm) gold, 99 ppm copper, 7.4 ppm lead, 48 ppm zinc, 2.3 ppm tellurium, and 9.6 ppm tin. Two samples of quartz contained 8.12 and 8.71 ppm gold, and the gold content in several samples of pyritic schist was 17.0 and 35.9 ppm. The sampling by Maas and others (1995, p. 184) shows a distinct northward plunge to the ore zone, which is cut off by a fault that strikes NE and dips 45SE. The continuation of the ore zone past this fault has not yet been determined.

Fluid inclusion studies of quartz vein material from several of the Helm Bay lodes suggest that the veins formed at temperatures and pressures consistent with conditions during the Late Cretaceous greenschist-grade regional metamorphism (Maas and others, 1995, p. 184).

**Alteration:**

Locally, the wallrock next to the veins in at least the lower workings is bleached and impregnated with pyrite (Maas and others, 1995).

**Age of mineralization:**

The quartz veins cut country rocks that may be as young as Cretaceous or as old as Paleozoic.

**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:** Undetermined

**Workings/exploration:**

The original discovery in 1897 on what was to become the Gold Standard mine was at the so-called upper workings about 0.3 miles back from the sea shore, when 17 claims were staked over the property. The gold occurred near or at the surface, either as a creek placer or as a residual deposit over a quartz vein, or both (Brooks, 1902, Maas and others, 1995; Roppel, 2005). Some pans were said to contain up to $100 in gold and 120 ounces of gold was soon recovered. A small arrastre using a water nozzle to move the ground into it was built and by the end of the 1898 season the upper workings had produced $20,000 (almost certainly in gold at $20.67 per ounce). The discovery aroused considerable interest and in 1898, the Alaska Gold Standard Mining Company was incorporated. By the fall of 1899, a camp had been built, a 5-stamp mill powered by a Pelton wheel was in operation at the upper workings, a tram was built to the coast, and the workings consisted of a 260-foot tunnel from a 50-foot shaft. The mill began operating in December 1899 and by April, 1901, 2,430 tons of ore had been run through it. There was very little work in the upper workings from 1902 to 1906. By 1907, depending on the source $150,000 or $75,000 had been invested in the property with a return of only $35,000. There was intermittent activity from 1902 to 1914, mainly changes in the principals of the company. Several leasers examined or did some work on the upper workings, and several mining companies examined the property. In 1914, a new slate of officers was in place and interest shifted to what would become the lower workings, where three holes were diamond. drilled. In 1921, a leaseholder took out $28,000 (almost certainly in gold) from 2 tons of material in a rich pocket in the lower workings; larger bodies of lower-grade material were also identified. In 1922, a 1,600-foot tunnel was started under what would become two glory holes that were the focus of mining by several leasers from 1922 to the start of WWII. Detailed production records are not available but the ore was processed in the old 5-stamp mill that was moved from the upper workings to a mill site near the sea shore.

Maas and others (1995, p. 192) did considerable sample and mapping of the mine, especially the lower workings (Figure 47), as part of a Bureau of Mines regional mineral assessment. They also reported that the adit at the lower workings was sampled by private interests in 1993 but the gold values were subeconomic.

**Production notes:**

Maas and others (1995, p. 192) estimate that the combined production from the lower and upper Gold Standard mines from about 1898 to 1941 was 310 kg or more of gold, and 33 kg or more of silver. The production figures for the lower workings alone are not available. Judging from the assay values and the extent of the workings, the production from the upper and lower workings may have been about equal.

**Reserves:**

None.

**Additional comments:**

**References:**

Brooks, 1902; Wright and Wright, 1906; Wright, 1907; Wright, 1908; Wright and Wright, 1908; Smith, 1914; Brooks, 1915; Chapin, 1916; Brooks, 1922; Roehm, 1938 (PE 120-6); Bufvers, 1967; Cobb, 1978 (OF 78-869); Eberlein and others, 1983; Berg and others, 1988; Gehrels and Berg, 1992; Bittenbender and others, 1993; Clautice and others, 1994; Maas and others, 1995; Brew, 1996; Roppel, 2005.

**Primary reference:** Wright and Wright, 1908; Bittenbender and others, 1993

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Flagstaff; Last Chance; Treasure

**Site type:** Mine

**ARDF no.:** CR043

**Latitude:** 55.5345 **Quadrangle:** CR C-2

**Longitude:** 132.6645

**Location description and accuracy:**
The Flagstaff Mine is a well known property on the east side of Granite Mountain. The workings are extensive and the location used here is the main adit of the mine at an elevation of about 1,400 feet. This adit is shown on the USGS 1:63,360-scale topographic map; it is about 0.5 mile southwest of the center of section 16, T. 73 S., R. 84 E.

**Commodities:**

**Main:** Ag, Au, Pb

**Other:** Cu, Zn

**Ore minerals:** Bornite, chalcocite, chalcopyrite, copper, covellite, galena, gold, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**
The rocks in the vicinity of the Flagstaff Mine are part of a large granodiorite-quartz diorite stock (Sainsbury, 1961; Eberlein and others, 1983; Brew, 1996). Early workers considered the stock to be Mesozoic or Cretaceous, but recent radiometric dating indicates that it is Devonian (S.M. Karl, oral communication, 2003). The granitic rocks are cut by diabase dikes of unknown age.

Roppel (2005) provides much detail on the history of the mine. The property was originally staked in 1902 as the Treasure group; by 1905, it had been developed by a lower 400-foot adit and an upper 50-foot adit and a road had been built from Karta Bay to Salmon Lake and from Salmon Lake to the mine. The 400-foot tunnel became the main adit of the mine (Wright and Wright, 1908; Twenhofel and others, 1949; Stewart, 1938, 1944; Maas and others, 1991, 1995). By 1908, the original locator of the property relinquished it and in 1912, the claims were restaked by T.N. Steven as the Last Chance Group; he would hold the property for the next 22 years. By 1935, Stevens or leaseholders had extended the upper tunnel to 432 feet and the lower tunnel to 987 feet. In 1937, the Flagstaff Mining Company was formed to develop the property and they rebuilt the road, built several buildings at the property and a 2,000-foot tramway to the main adit, and built a 25-ton mill at the bottom of the tramway. The mill was run intermittently in 1936 and 1938 but the recovery of gold was poor. Mining and milling continued intermittently until the fall of 1941 when the property reverted to its original owners and the mine closed. Poor gold and silver recovery in the mill is cited as a major cause of the closure. There is no record of production since 1941 but several companies have examined the property; among the more intensive efforts, El Paso Mining and Milling Company examined the property in the mid-70's and Killick Gold Company, Ltd. optioned the property and did geological mapping and geochemical surveys from 1980 to 1988.

The property has two vein systems. The main workings of the mine are on a quartz vein--the lower or Flagstaff vein-- that can be traced for nearly a mile through a vertical extent of at least 1,300 feet. The vein strikes about N55W and dips 60-86NE. The footwall of the vein is a diabase dike more than 8 feet thick that near the vein is almost completely altered to calcite, chlorite, and brown clay. Twenhofel and others (1949) describe the hanging wall as diorite and gabbro. Detailed maps of the main vein are on Plate 1 of Twenhofel and others (1949) and on several appendices in Stewart (1944). The vein varies from less than an inch to more than 36 inches thick; it averages about 18 inches thick but the thickness often varies abruptly. The vein is white, vuggy quartz with free gold and locally abundant sulfide minerals that in many places are banded parallel to the vein. The sulfide minerals include galena, chalcopyrite, pyrite, bornite, and sphalerite. Native copper, covellite and chalcocite occur and may be secondary. The sulfides average 1-2 percent of the vein but may form up to 5 percent locally. The main vein has been sampled several times (see Stewart, 1944, in particular). There are high gold and silver values, but the data are not systematic enough to provide their average values in the vein. The mill operators told Stewart (1938) that the ore was running about $25 to $35 in gold and silver (with gold at $35 per ounce). Maas and others (1991) sampled the main vein. One sample across 2.5 feet of the vein contained 0.35 ounce of gold per ton, 10.77 ounces of silver per ton, and 7.04 percent lead. The weighted average of 4 other samples was 0.15 ounce of gold and 1.75 ounce of silver per ton across an average width of 1.9 feet.

The upper vein is exposed west of the main workings of the mine between about 2, 600 to 2,800 feet elevation near the top of Granite Mountain. This vein strikes about N25E and dips about 20NW, but it is cut by several cross faults and/or deflects markedly and varies in strike and dip. It varies in width from about 1 to 3 feet. The upper vein is similar to the lower vein, but it is mainly in quartz diorite. The intersection of the two veins has not been found. The upper vein has less sulfides but more free gold than the lower vein.

Maas and others (1995) give the total production of the Flagstaff Mine as 257 ounces of gold, 1,980 ounces of silver, 2,864 pounds of copper, and 5,926 pounds of lead from 873 tons of ore; however, they cite another report that gives the total production from 1938 to 1940 as 1,305 tons of ore.

**Alteration:**

Diabase dikes are almost totally altered to chlorite, calcite, and brown clay near the veins.

**Age of mineralization:**

Unknown, other than that the veins are in Devonian granitic rocks.

**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:** Active?

**Workings/exploration:**

Roppel (2005) provides much detail on the history of the mine. The property was originally staked in 1902 as the Treasure group; by 1905, it had been developed by a lower 400-foot adit and an upper 50-foot adit and a road had been built from Karta Bay to Salmon Lake and from Salmon Lake to the mine. . The 400-foot tunnel became the main adit of the mine (Wright and Wright, 1908; Twenhofel and others, 1949; Stewart, 1938, 1944; Maas and others, 1991, 1995). By 1908, the original locator of the property relinquished it and in 1912, the claims were restaked by T.N. Steven as the Last Chance Group; he would hold the property for the next 22 years. By 1935, Stevens or leaseholders had extended the upper tunnel to 432 feet and the lower tunnel to 987 feet. In 1937, the Flagstaff Mining Company was formed to develop the property and they rebuilt the road, built several buildings at the property and a 2,000-foot tramway to the main adit, and built a 25-ton mill at the bottom of the tramway. The mill was run intermittently in 1938 and 1938 but the recovery of gold was poor. Mining and milling continued intermittently until the fall of 1941 when the property reverted to its original owners and the mine closed. Poor gold and silver recovery in the mill is cited as a major cause of the closure. There is no record of production since 1941 but several companies have examined the property; among the more intensive efforts, El Paso Mining and Milling Company examined the property in the mid-70's and Killick Gold Company, Ltd. optioned the property and did geological mapping and geochemical surveys from 1980 to 1988.

**Production notes:**

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another report that gives the total production from 1938 to 1940 as 1,305 tons of ore.

**Reserves:**

Probably none.

**Additional comments:**

This mine is in the Karta River Wilderness Area, and any area which is not already a valid claim or is patented is closed to exploration and mining.

**References:**

Wright and Wright, 1906; Wright, 1907; Wright and Wright, 1908; Chapin, 1916; Chapin, 1918; Stewart, 1938; Smith, 1939 (B 910-A); Wilcox, 1938 (PE 119-6); Smith, 1941; Smith, 1942 (B 933-A); Stewart, 1944; Tolonen, 1945; Twenhofel and others, 1949; Sainsbury, 1961; Herreid and Rose, 1966; Bufvers, 1967; Black, 1981; St. Louis, 1981; Eberlein and others, 1983; Maas and others, 1991; Maas and others, 1992; Maas and others, 1995; Brew, 1996; Roppel, 2005.

**Primary reference:** Stewart, 1944; Twenhofel and others, 1949

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Mount Andrew

**Site type:** Mine

**ARDF no.:** CR071

**Latitude:** 55.5167 **Quadrangle:** CR C-1

**Longitude:** 132.3021

**Location description and accuracy:**

The location of the Mount Andrew Mine is shown on the USGS 1:63,360-scale topographic map. It is about 0.5 mile north-northwest of the center of section 26, T. 73 S., R. 86 E. The extensive surface and underground workings of the Mount Andrew Mine and the geology of the mine area are shown on plates 7 to 11 of Warner and others (1961).

**Commodities:**

**Main:** Cu, Fe

**Other:** Ag, Au

**Ore minerals:** Chalcopyrite, magnetite, pyrite

**Gangue minerals:** Calcite, epidote, garnet, hornblende

**Geologic description:**

The Mount Andrew is one of the principal mines on the Kasaan Peninsula (Wright and Wright, 1908; Wright, 1915; Wright and Tolonen, 1947; Warner and others, 1961; Maas and others, 1995; Hedderly-Smith, 1999 [Inventory]). The host rocks are mainly greenstone, largely altered to tactite composed of garnet, epidote, and hornblende, and scattered small marble lenses. The dominant structure in the deposit is a syncline that outcrops over an area at least 600 feet long and 550 feet wide, and exposes about 550 feet of layered rocks. The syncline trends about N10W. Nearly half the rock in the syncline is massive magnetite in conformable layers or mantos a few feet to 50 feet thick, interlayered with the greenstone. The greenstone and magnetite layers are cut by numerous north-trending, steeply dipping dikes of alkalic granodiorite, gabbro, andesite, and diorite porphyry. Pyrite and chalcopyrite are disseminated widely in the tactite and magnetite; there were probably local concentrations of chalcopyrite-rich ore, but most such high-grade pockets were probably mined prior to 1919.

The Mount Andrew Mine comprises three adits, 4 glory holes, several winzes, and a sublevel, to a depth of about 250 feet. The geology and workings are shown in detail on plates 7 to 11 of Warner and others (1991). The deposit was discovered in 1898 and the first ore was shipped in 1906 to the Tacoma smelter (Wright and Wright, 1915; Warner and others, 1961; Roppel, 1991). There was intermittent production until 1918, but none since. In 1944, the U.S. Bureau of Mines trenched the deposit and drilled 14 holes. The U.S. Geological Survey mapped the deposit in detail from 1942 to 1944. Utah Construction and Mining did geologic mapping and geophysical surveys in 1957 and drilled the deposit from 1960 to 1962 and in 1968.

In 2006, Full Metal Minerals began work at Mount Andrew and they drilled 5 shallow holes that totaled 481 meters to test the periphery of the old surface and underground workings (Full Metal Minerals, 2008, Mount Andrew Property). The holes cut several zones of mineralization including: 1) 13.2 meters that contained 1.41 percent copper, 0.25 gram of gold per ton, and 5.33 grams of silver per ton, 2) 18.0 meters that contained 1.05 percent copper, 0.13 gram of gold per ton, and 4.06 grams of silver per ton, 3) 13.8 meters that contained 1.01 percent copper, 0.11 gram of gold per ton, and 4.40 grams of silver per ton, 4) 7.7 meters that contained 1.53 percent copper, 0.08 gram of gold per ton, and 5.15 grams of silver per ton, and 5) 38.7 meters that contained 0.42 percent copper, 0.09 gram of gold per ton, and 1.40 gram of silver per ton. The work suggests that the mineralization is of the iron oxide-copper-gold deposit in andesitic volcanic rocks and intermediate intrusive rocks that are cut by post-mineralization dikes. In 2007, Full Metal drilled 1,500 meters in another 13 holes and cut several intervals with strong chalcopyrite-magnetite mineralization (Full Metal Minerals, 2008, Mount Andrew Property; 2008, Mount Andrew drilling; 2008, Mount Andrew locations). Some notable intercepts were: 4.89 meters with 4.45 percent copper, 15.25 grams of silver per ton, and 0.89 grams of gold per tonne and 2.95 meters with 3.75 percent copper and 12.44 grams of silver per tonne (with gold values yet to be received).

There have been several estimates of the remaining resources in the Mount Andrew, Stevenstown (CR072), and Mamie (CR073) mines. Warner and others (1961) and Wright and Tolonen (1947) estimate a collective resource of 2,684,000 long tons of ore, of which about 80 percent is in the Mount Andrew deposit. The weighted average grade of this resource is 47.8 percent iron, 0.32 percent copper, and 0.011 ounce of gold and 0.55 ounce of silver per ton (Wright and Tolonen, 1947). Twenhofel (1953) estimated that about 3,500,000 tons of ore remain in the deposits. Carr and Dutton (1959) estimated that the deposits still contain about 2.3 million tons of indicated magnetite ore with 50 percent iron, and 0.91 million tons of inferrred ore. The total production from the Mount Andrew, Stevenstown, and Mamie mines from 1905 to 1918 was about 270,000 tons of ore with an average grade of 2.37 percent copper, and 0.026 ounce of gold and 0.212 ounce of silver per ton (Warner and others, 1961). Little copper-rich ore such as was mined prior to 1919 probably remains.

Warner and others (1961) and Maas and others (1995) describe several geologically similar, small deposits east of the Mount Andrew Mine. They were originally under the same management as the Mount Andrew Mine and some produced small amounts of ore. These include the Peacock, Rico, North Star, Glory, and Good Luck claims, and the Good Luck-Mayflower group.

The Mount Andrew Mine is one of many copper-iron deposits on the Kasaan Peninsula having similar geology and origin (Warner and others, 1961; Eberlein and others, 1983; Brew, 1996). The rocks on the peninsula consist mainly of andesite ('greenstone' in much of the older literature) interbedded with about 25 percent sedimentary rocks comprising approximately equal amounts of limestone or marble, calcareous mudstone and sandstone, and graywacke and conglomerate. These units are part of the Luck Creek Breccia of Silurian and Devonian age, but many of the sedimentary units are similar to and probably grade into rocks of the Silurian and Ordovician, Descon Formation. The bedded rocks are intruded by a profusion of Silurian or Ordovician dikes, sills, and irregular masses of porphyritic gabbro, basalt, andesite, diorite, dacite, and granodiorite. Near some of the deposits, these intrusions may make up 20 percent or more of the outcrop and usually are associated with the development of tactite and alteration of the greenstone. The area subsequently was intruded by several large Silurian or Ordovician plutons; they are mainly granodiorite but locally are diorite and gabbro.

The ore deposits are typically small and of irregular shape; often the ore bodies form lenses or mantos. Some of the deposits conform to the layering in the greenstone and sedimentary rocks. The principal ore minerals are chalcopyrite, pyrite, and magnetite; hematite is often present and a little molybdenite occurs in some deposits. Most of the deposits are associated with tactite or skarn with varying amounts of actinolite, calcite, chlorite, garnet, diopside, epidote, and hornblende. There was significant by-product silver and gold in the ore that was mined in the past, and the gold values in some deposits are high enough to have encouraged exploration in recent years. Marble is more common in the deposits in the western part of the peninsula, where the gold values are generally higher as well (Wright and Wright, 1908; Wright, 1915; Warner and others, 1961; Myers, 1985; Bond, 1993; Maas and others, 1995).

Early interpretations of the ore deposits on the Kasaan Peninsula emphasize their contact metamorphic origin and their probable Mesozoic age (for example, Warner and others, 1961). However, recent radiometric dating and mapping indicate that the deposits formed in a Silurian or Ordovician, arc-related environment characterized by deposition of andesite and submarine sedimentary rocks that were intruded by swarms of dikes of varying composition, mineralized, and then intruded by large granodiorite plutons (Hedderly-Smith, 1999 [Inventory]).

The copper deposits of the Kasaan Peninsula were known to the Russians and the first claim was staked in 1867. Most of the production and development occurred from about 1900 to 1918, especially from 1905 to 1907, when copper prices soared and a smelter was built at Hadley on the north side of the Kasaan Peninsula. After World War I, copper supply exceeded demand, prices fell, and there has been no further copper production since 1918 (Wright, 1915; Warner and others, 1961; Roppel, 1991; Maas and others, 1995). However, because of the intense and widespread mineralization on the peninsula, the area has repeatedly been re-examined for copper, iron, and gold, notably during WW II (Warner and others, 1961) and since

1990.

**Alteration:**

Pervasive development of tactite.

**Age of mineralization:**

The deposit formed in a Silurian or Ordovician, submarine arc-related environment characterized by the deposition of volcanic and sedimentary rocks, the intrusion of swarms of dikes of diverse composition, and the emplacement of several large plutons.

**Deposit model:**

Cu-Fe skarn (Cox and Singer, 1986; model 18d).

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

18d

**Production Status:** Yes; medium

**Site Status:** Active

**Workings/exploration:**

The Mount Andrew Mine comprises three adits, 4 glory holes, several winzes, and a sublevel, to a depth of about 250 feet. The geology and workings are shown in detail on plates 7 to 11 of Warner and others (1991). The deposit was discovered in 1898 and the first ore was shipped in 1906 to the Tacoma smelter (Wright and Wright, 1915; Warner and others, 1961; Roppel, 1991). There was intermittent production until 1918, but none since. In 1944, the U.S. Bureau of Mines trenched the deposit and drilled 14 holes. The U.S. Geological Survey mapped the deposit in detail from 1942 to 1944. Utah Construction and Mining did geologic mapping and geophysical surveys in 1957 and drilled the deposit from 1960 to 1962 and in 1968. In 2006, Full Metal Minerals began work at Mount Andrew ; they drilled 5 shallow holes that totaled 481 meters to test the periphery of the old surface and underground workings (Full Metal Minerals, 2008, Mount Andrew Property). In 2007, Full Metal drilled 1,500 meters in another 13 holes and cut several intervals with strong chalcopyrite-magnetite mineralization (Full Metal Minerals, 2008, Mount Andrew Property; 2008, Mount Andrew drilling; 2008, Mount Andrew locations).

**Production notes:**

No figures are available solely for the production of the Mount Andrew Mine. However, the cumulative production from it and the nearby Stevenstown (CR072) and Mamie (CR073) mines from 1905 to 1918 was about 270,000 tons of ore with an average grade of 2.37 percent copper, and 0.026 ounce of gold and 0.212 ounce of silver per ton (Warner and others, 1961).

**Reserves:**

There have been several estimates of the remaining resources of the Mount Andrew, Stevenstown (CR72), and Mamie (CR73) mines. Warner and others (1961) and Wright and Tolonen (1947) estimate a collective resource of 2,684,000 long tons of ore, of which about 80 percent is in the Mount Andrew deposit. The weighted average grade of this resource is 47.8 percent iron, 0.32 percent copper, and 0.011 ounce of gold and 0.55 ounce of silver per ton (Wright and Tolonen, 1947). Twenhofel (1953) estimated that about 3,500,000 tons of ore remain in the deposits. Carr and Dutton (1959) estimated that the deposits still contain about 2.3 million tons of indicated magnetite ore with 50 percent iron, and 0.91 million tons of inferrred ore. Little copper-rich ore such as was mined prior to 1919 probably remains.

**Additional comments:**

The Mount Andrews Mine is covered by patented claims. The Sealaska Corporation holds the subsurface rights to the land around it.

**References:**

Brooks, 1902; Wright and Wright, 1905; Wright and Wright, 1906; Wright, 1907; Wright and Paige, 1908; Wright and Wright, 1908; Wright, 1909; Brooks, 1910; Knopf, 1910; Brooks, 1912; Brooks, 1913; Brooks, 1915; Wright, 1915; Chapin, 1916; Smith, 1917 (B 142); Smith, 1917 (B 153); Buddington and Chapin, 1929; Thorne and others, 1945; Wright and Tolonen, 1947; Twenhofel, 1953; Carr and Dutton, 1959; Mount Andrew Mining Company, 1960; Warner and others, 1961; Bufvers, 1967; Nordine, 1972; Cobb, 1978 (OF 78-869); Eberlein and others, 1983; Myers, 1985; Roppel, 1991; Maas and others, 1992; Anzman, 1995; Maas and others, 1995; Brew, 1996; Bond, 1993; Hedderly-Smith, 1997 (Kasaan); Hedderly-Smith, 1998 (Kasaan); Hedderly-Smith, 1999 (Kasaan); Hedderly-Smith, 1999 (Inventory); Full Metal Minerals, 2008 (Mount Andrew Property); Full Metal Minerals, 2008 (Mount Andrew drilling); Full Metal Minerals, 2008 (Mount Andrew locations).

**Primary reference:** Warner and others, 1961

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Harris River; Julia; Rogers; Dunton

**Site type:** Mine

**ARDF no.:** CR098

**Latitude:** 55.4615 **Quadrangle:** CR B-3

**Longitude:** 132.7090

**Location description and accuracy:**

The Harris River Mine is on the north bank of the Harris River, about 0.5 mile above its mouth. It is about 0.6 mile south-southwest of the center of section 7, T. 74 S., R. 84 E. and is marked by old mining equipment in the river. Several early geologists, notably Wright and Wright (1908), and Roppel (2005) combine their descriptions of the Harris River Mine and the Dawson Mine (CR099) about a half mile to the north. They were mined at different periods by different parties however, and are described separately in ARDF.

**Commodities:**

**Main:** Ag, Au, Cu, Pb

**Other:** Te?

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

Much of the history of the mines near the mouth of the Harris River was compiled by Roppel (2005). The first claims were staked in 1899 but soon allowed to lapse. The property was restaked in 1905 as the Julia claims which extended over an uncertain area but what was to become the Harris River Mine, and then or later probably the area to the north that included what became the Dawson Mine (CE099).

The early workings on these claims was concentrated on the Harris River Mine along the Harris River. The claims were purchased by C.H. Dunton in 1906 who sank an inclined shaft near the Harris River. By 1912, there was a 5-stamp mill run by hydro power on the property and 3,000 tons of ore had been mined that yielded $37,000 (probably all in gold at $20.67 per ounce). Another leaser worked the property from 1913 to 1919 and produced 7,000 tons of ore with a gross value of $81,570. When visited by Sales (1916), the workings consisted of a 280-foot shaft inclined at 30 degrees, with levels at 50, 100, and 200 feet. About 4,000 to 6,000 tons of ore had been produced; the ore averaged about $7.00 per ton in gold (at $20.67 per ounce), and some ran as high as $60 in gold per ton. In 1919, the Kasaan Gold Mining Company took the property over and built a 60-ton-a-day mill powered by a new hydroelectric plant on the Harris River. From 1920 to 1928, the Kasaan company produced about $160,000, probably all in gold (at $20.67 per ounce).

In 1930, the company was reorganized as the Kasaan Mining Company. What were then called the Handy claims (to the north of the Harris River) were leased to Wendell Dawson who shifted the mining to what is now called the Dawson Mine (CR099) about a half mile north of the Harris River Mine. There apparently was no further mining at the Harris River Mine.

The Harris River Mine is in a band of black graphitic slate and quartzite; however, most of the rocks exposed along the river for several hundred yards above and below the mine are massive to schistose, intermediate to felsic volcanic rocks of the Silurian and Ordovician Descon Formation (Sales, 1916; Herreid and Rose, 1966; Wilcox, 1938 [PE 119-5]; D.J. Grybeck, unpublished field notes, 1984). The deposit consists of quartz-cemented brecciated slate and conformable quartz veins and lenses in the slate; the width of the mineralized zone varies from 1 to 12 feet and averages about 6 feet (Sales, 1916; Wilcox, 1938 [PE 119-5]; Herreid and Rose, 1966). Fine-grained to porphyritic dikes commonly are conformable to the foliation but crosscut the veins. The individual quartz veins and lenses are several inches to 1 or 2 feet thick. Sulfides, mainly disseminated pyrite and rare galena and sphalerite, are sparse; the best ore was associated with the

most abundant pyrite. Tellurides were reported but have not been verified in recent studies.
The total production was substantial but uncertain because the mill treated ore from other mines in the area. Maas and others (1991) indicate that the total production from 1910 to 1929 (from the mine or the mill?) was 5,814 ounces of gold, 6,457 ounces of silver, 4,390 pounds of copper, and 1,159 pounds of lead from 8,173 tons of ore. However, the production was probably greater in so much as the Kasaan Gold Mining Company produced about $160,000 of ore from 1920 to 1928 from the Harris River Mine.

**Alteration:**

**Age of mineralization:**
Unknown, other than that the deposit is Silurian or Ordovician, or younger.

**Deposit model:**
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:** Active?

**Workings/exploration:**
Much of the history of the mines near the mouth of the Harris River was compiled by Roppel (2005). The first claims were staked in 1899 but soon allowed to lapse. The property was restaked in 1905 as the Julia claims which extended over an uncertain area but what was to become the Harris River Mine, and then or later probably the area to the north that included what became the Dawson Mine (CR099).
The early workings on these claims was concentrated on the Harris River Mine along the Harris River. The claims were purchased by C.H. Dunton in 1906 who sank an inclined shaft near the Harris River. By 1912, there was a 5-stamp mill run by hydro power on the property and 3,000 tons of ore had been mined that yielded $37,000 (probably all in gold at $20.67 per ounce). Another leaser worked the property from 1913 to 1919 and produced 7,000 tons of ore with a gross value of $81,570. When visited by Sales (1916), the workings consisted of a 280-foot shaft inclined at 30 degrees, with levels at 50, 100, and 200 feet. About 4,000 to 6,000 tons of ore had been produced; the ore averaged about $7.00 per ton in gold (at $20.67 per ounce), and some ran as high as $60 in gold per ton. In 1919, the Kasaan Gold Mining Company took the property over and built a 60-ton-a-day mill powered by a new hydroelectric plant on the Harris River. From 1920 to 1928, the Kasaan company produced about $160,000, probably all in gold (at $20.67 per ounce).
In 1930, the company was reorganized as the Kasaan Mining Company. What were then called the Handy claims (to the north of the Harris River) were leased to Wendell Dawson who shifted the mining to what is now called the Dawson Mine (CR099) about a half mile north of the Harris River Mine. There apparently was no further mining at the Harris River Mine.

**Production notes:**
The total production was substantial but uncertain because the mill treated ore from other mines in the area. Maas and others (1991) indicate that the total production from 1910 to 1929 (from the mine or the mill?) was 5,814 ounces of gold, 6,457 ounces of silver, 4,390 pounds of copper, and 1,159 pounds of lead from 8,173 tons of ore. However, the production was probably greater in so much as the Kasaan Gold Mining Company produced about $160,000 of ore from 1920 to 1928 from the Harris River Mine.

**Reserves:**
None.

**Additional comments:**

**References:**

Wright and Wright, 1908; Sales, 1916; Mertie, 1921; Wilcox, 1938 (PE 119-5); Herreid and Rose, 1966; Cobb, 1978 (OF 78-869); Maas and others, 1991; Maas and others, 1995; Roppel, 2005.

**Primary reference:** Herreid and Rose, 1966

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Dawson

**Site type:** Mine

**ARDF no.:** CR099

**Latitude:** 55.4705 **Quadrangle:** CR B-3

**Longitude:** 132.7053

**Location description and accuracy:**

The Dawson Mine is named on the USGS 1:63,360-scale topographic map. It is about 0.1 mile north of the center of section 7, T. 74 S., R. 84 E. The workings extend south to just north of the Hollis-Klawock road. Herreid and Rose (1966, figure 3) provide a map of the workings. Several early geologists, notably Wright and Wright (1908), and Roppel (2005), combine their descriptions of the Dawson and the Harris River (CR098) Mines because for much of their history they shared the same ownership. They have different histories, however, and are are described separately in ARDF.

**Commodities:**

**Main:** Ag, Au, Cu, Pb

**Other:** As, Sb

**Ore minerals:** Chalcopyrite, galena, gold, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

Much of the history of the mines near the mouth of the Harris River was compiled by Roppel (2005). The first claims were staked in 1899 but soon allowed to lapse. The property was restaked in 1905 as the Julia claims, which covered an uncertain area but certainly the area that included what was to become the Harris River Mine (CE098) and then or later probably the area to the north that included what became the Dawson Mine.

The early workings on these claims was concentrated at the Harris River Mine (CE098) and its mill along the Harris River that was in operation until about 1929 by the Kasaan Gold Mining Company. In 1930, the company was reorganized as the Kasaan Mining Company and what were then called the Handy claims were leased to Wendell Dawson who shifted the mining about a half mile north of the Harris River Mine to what is now called the Dawson Mine. Dawson mined intermittently until 1952. There apparently was no further mining at the Harris River Mine. The Dawson mine was restaked in 1976, and from 1979 to 1981, MAPCO, Inc. explored the property and drilled several holes. Discovery Gold Explorations, Inc. drilled 5 holes in 1984 and several more holes in 1985 (Harris, 1985). The drilling defined a resource of 43,800 tons of ore averaging about 1 ounce of gold per ton. In 2008, the Dawson Mine is being explored under an agreement between Full Metals Minerals and Altair Ventures Inc. (Altair Ventures, Inc., 2008; Full Metal Minerals, 2008). and they drilled 3 holes in 2007.

Herreid and Rose (1966) mapped the rocks in the vicinity of the Dawson Mine as graywacke, banded siltstone and argillite with minor slate, limestone, and phyllite. They are part of the Descon Formation of Silurian and Ordovician age (Eberlein and others, 1983; Brew, 1996).

The deposit consists of quartz veins and stringers that generally strike about N35E and dip northwest at about 28 degrees (Smith, 1914; Mertie, 1921; Roehm, 1936 [PE 119-2]; Wilcox, 1938[119-5]). The veins are in a zone 2 to more than 6 feet thick. Most of the value is in free gold that occurs along contacts between quartz stringers and slate; minor amounts of sulfides including pyrite, sphalerite, chalcopyrite, and galena are disseminated in the veins and country rocks. Pyritized, fine-grained felsic dikes parallel and crosscut the veins. Two principal veins were mined, the Freegold and Humboldt. Only the Freegold vein was mined; it extends for about 210 feet along strike but it is segmented by several near-horizontal faults.

In the 1980's and 1990's, a considerable area was stripped and trenched just north of the Hollis-Klawock road (D.J. Grybeck, unpublished field notes, 1984 and 1991). Three veins, 10-24 inches thick, were exposed that dip west at about 26-55 degrees. The veins are in deformed black shale with graphitic partings; the footwalls for up to several feet from the veins are highly sheared gouge zones. The veins contain up to 1 percent sulfides, mainly pyrite and sphalerite. Three short(?) adits were driven on the veins in this area. In the 1990s, a road had been cleared to the older workings and mill site to the north. About 200 feet higher in elevation, there were several drill sites in the vicinity of the old workings and the mill. Several selected samples of quartz vein material from dumps at the old mill site contained up to 1,000 parts per million (ppm) silver, 700 ppm arsenic, 3,000 ppm copper, 1,000 ppm antimony, more than 1 percent zinc, and 59 ppm gold, but most values were much lower.

Maas and others (1991) sampled most of the accessible workings. Their samples had a wide range of values, but several of the quartz veins contained 0.3 to more than 5 ounces of gold per ton, up to several ounces of silver per ton, and lead, zinc, and copper values that reflect as much as 1 to 2 percent sulfides in the veins.

In the 1930;s, the Dawson mine was developed by 2 short crosscut tunnels and at least 150 feet of underground workings. In 1938, Roehm (1936 [PE 119-2]) reported that about $22,000 in gold (at $35 per ounce?) had been produced since 1933; the ore ran about $20 to $30 in gold per ton. Wilcox (1938 [PE 119-5])--who may have been describing the Harris River Mine (CR098) to the south-- indicated that the total production was about $16,000 to $17,000 in gold (at $35 per ounce?). His samples assayed up to about $30 in gold per ton across 5 feet. Maas and others (1995) indicate that the Dawson Mine operated intermittently from the 1930's to 1952, with a total production of nearly 10,000 ounces of gold, 7,000 ounces of silver, and minor lead and copper. There was a small mill on the property.

As of 2008, the Crackerjack mine and several nearby properties are being explored under an agreement between Full Metals Minerals and Altair Ventures Inc. (Altair Ventures, Inc., 2008; Full Metal Minerals, 2008, CJ property). The drilled 3 holes on the veins at the Dawson Mine as well as two holes at the Hollis tunnel near the Crackerjack mine (CR101) and three holes at the Crackerjack mine itself to test the mineralization along a belt several miles long. Some of the notable mineralized intercepts cut in the drilling at the Dawson mine included 2.05 meters that contained 9.56 grams of gold per tonne and 76.7 grams of silver per tonne.

**Alteration:**

None specifically mentioned, although the felsic dikes that cross the veins commonly are bleached and altered.

**Age of mineralization:**

Unknown, other than that the veins are in Silurian or Ordovician black shale and graywacke.

**Deposit model:**

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:** Active

**Workings/exploration:**

Much of the history of the mines near the mouth of the Harris River was compiled by Roppel (2005). The first claims were staked in 1899 but soon allowed to lapse. The property was restaked in 1905 as the Julia claims, which covered an uncertain area but certainly the area that included what was to become the Harris River Mine (CE098) and then or later probably the area to the north that included what became the Dawson Mine.

The early workings on these claims was concentrated at the Harris River Mine (CE098) and its mill along the Harris River that was in operation until about 1929 by the Kasaan Gold Mining Company. In 1930, the company was reorganized as the Kasaan Mining Company and what were then called the Handy claims were leased to Wendell Dawson who shifted the mining about a half mile north of the Harris River Mine to what is now called the Dawson Mine. Dawson mined intermittently until 1952. There apparently was no further mining at the Harris River Mine. The Dawson mine was restaked in 1976, and from 1979 to 1981, MAPCO, Inc. explored the property and drilled several holes. Discovery Gold Explorations, Inc. drilled 5 holes in 1984 and several more holes in 1985 (Harris, 1985). The drilling defined a resource of 43,800 tons of ore averaging about 1 ounce of gold per ton. In 2008, the Dawson Mine is being explored under an agreement between Full Metals Minerals and Altair Ventures Inc. (Altair Ventures, Inc., 2008; Full Metal Minerals, 2008, CJ property) and they drilled 3 holes in 2007.

**Production notes:**

In 1938, Roehm (1936 [PE 119-2]) reported that about $22,000 in gold (at $35 per ounce?) had been produced at the Dawson Mine since 1933; the ore ran about $20 to $30 in gold per ton. Wilcox (1938) indicated that the total production was about $16,000 to $17,000 in gold (at $35 per ounce?). His samples assayed up to about $30 in gold per ton across 5 feet. Maas and others (1995) indicate that the mine operated intermittently from the 1930's to 1952, with a total production of nearly 10,000 ounces of gold, 7,000 ounces of silver, and minor lead and copper.

**Reserves:**

Discovery Gold Explorations, Inc. drilled 5 holes in 1984 and several more holes in 1985 (Harris, 1985). The drilling defined a resource of 43,800 tons of ore averaging about 1 ounce of gold per ton.

**Additional comments:**

**References:**

Brooks, 1902; Wright, 1907; Wright, 1908; Wright and Wright, 1908; Wright, 1909; Knopf, 1910; Knopf, 1911; Smith, 1914; Brooks, 1914; Brooks, 1915; Chapin, 1916; Chapin, 1918; Chapin, 1919; Martin, 1919; Martin, 1920; Mertie, 1921; Brooks, 1922; Brooks, 1923; Brooks and Capps, 1924; Brooks, 1925; Buddington, 1926; Smith, 1926; Moffit, 1927; Buddington and Chapin, 1929; Smith, 1929; Smith, 1930 (B 810); Smith, 1930 (B 813); Smith, 1932 (B 824); Smith, 1933 (B 836); Smith, 1933 (B 844-A); Roehm, 1936 (PE 119-2); Wilcox, 1938 (PE 119-5); Smith, 1941; Smith, 1942 (B 933-A); Herreid and Rose, 1966; Bufvers, 1967; Cobb, 1978 (OF 78-869); Mitchell, 1982; Eberlein and others, 1983; Harris, 1985; Mitchell, 1986; Maas and others, 1991; Maas and others, 1995; Brew, 1996; Barnett and Clough, 2000; Roppel, 2005; Altair Ventures, Inc., 2008; Full Metal Minerals, 2008 (CJ property).

**Primary reference:** Herreid and Rose, 1966

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Valpariso

**Site type:** Mine

**ARDF no.:** CR197

**Latitude:** 55.1456 **Quadrangle:** CR A-1

**Longitude:** 132.0793

**Location description and accuracy:**

The Valpariso Mine is near the north shore of Paul Lake, about 0.4 mile southwest of Dolomi Mountain. It is not at the mine symbol that is misplaced about a half mile to the west on the USGS 1:63,360-scale topographic map. Instead, it is about 0.3 mile south-southeast of the center of section 36, T. 77 S., R. 88 E. The Paul or Jessie prospect (CR200) to the east is an extension of the vein at the Valpariso Mine and descriptions of that prospect sometimes have been combined with that of the mine; they were often managed by the same company. The underground workings of the mine are shown on figure 30 of Maas and others (1995).

**Commodities:**

**Main:** Ag, Au

**Other:** Cu, Pb, Sb, Zn

**Ore minerals:** Chalcopyrite, galena, gold, pyrite, sphalerite, tetrahedrite

**Gangue minerals:** Calcite, quartz

**Geologic description:**

The Valpariso Mine was the most productive mine in the Dolomi area and has been described in many publications (for example: Brooks, 1902; Wright and Wright 1905, 1906, 1908; Smith, 1914; Smith, 1934a, Smith, 1934b, ; Galloway, 1952; Dyer, 1952, 1956; Herreid, 1967; Maas and others, 1991, 1995). By 1902, the mine had been developed by two shafts and three ore shipments of 31, 50, and 60 tons has been made to a smelter in California. Development and production took place intermittently from 1898 to 1920, and the deposit was mined by a lessor in 1927 and again in 1932. The surface mine plant and mill were extensively rebuilt in 1935 and again from 1946 to 1948 but no ore was produced before funds ran out. Roppel (2005) presents a detailed historical survey of the mine from its earliest days and the many legal, personality , water, and power problems, and management changes that repeatedly stymied mining.

The workings consisted of two (four?) shafts, the deepest of which was 400 feet deep, and extensive workings on at least three levels. Smith (1934a, 1934b) and Dyer (1952, 1956) reported that the mine produced about 5,000 ounces of gold to 1933. U.S. Bureau of Mines records document the production of about 730 ounces of gold and 521 ounces of silver from 1914 to 1933 (Maas and others, 1991, 1995). Galloway (1952) estimated that the total production from the mine was about $100,000 (plus some production, probably small, from leasers), mostly from 1901 to 1908. In 1983 and 1984, Houston Oil and Mineral Exploration Corporation drilled 21 holes at the mine and at the Paul Lake (CR200), Amazon (CR209), and Boston (CR207) properties (Oliver and Adams, 1984).

The host rocks at the Valpariso Mine are marble and schist of the Wales Group of Late Proterozoic and Cambrian age (Eberlein and others, 1983). The deposit consists of a vein up to 14 feet thick of quartz, quartz breccia, and quartz-marble breccia cemented by calcite; the vein is locally faulted and the marble is extensively silicified. The vein is conformable to the bedding of a thick marble layer. In an adit about 600 feet west of the mill, the marble is in contact with chlorite schist and quartzite or jasperoid. The vein strikes about N55W and dips 30-70N; it can be traced for as much as 6,000 feet to the east, to and beyond the Paul or Jessie prospect (CR200). The vein typically contains about 1 percent ore minerals, including free gold, tetrahedrite, pyrite, chalcopyrite, galena, and sphalerite. Some of the ore was very rich; some ore mined in early 1900's ran $200-$250 a ton in gold (at $20.67 an ounce) and silver (Brooks, 1902). Samples of veins and old dumps collected in 1934 ran $5.50 to $42.07 a ton in gold (at $35 per ounce) and silver (Smith, 1934). In 1934, after the last mining, Smith estimated that the deposit contained 22,500 tons of probable ore in place with an average grade of 0.28 ounce of gold per ton and minor silver. Maas and others (1991) collected 34 samples in the underground workings. Their gold values varied greatly; the best was 4.660 ounces of gold per ton across 1.2 feet, but most samples contained much less. The highest silver value was 6.18 ounces of silver per ton.

**Alteration:**

The vein is locally faulted and the marble is extensively silicified.

**Age of mineralization:**

The vein is younger than the Late Proterozoic or Cambrian host rocks.

**Deposit model:**

Low-sulfide, brecciated 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:** Active?

**Workings/exploration:**

The workings consisted of two (four?) shafts, the deepest of which was 400 feet deep, and there were extensive workings on at least three levels. In 1983 and 1984, Houston Oil and Mineral Exploration Corporation drilled 21 holes at the mine and at the Paul Lake (CR200), Amazon (CR209), and Boston (CR207) properties (Oliver and Adams, 1984).

**Production notes:**

Smith (1934) and Dyer (1952, 1956) reported that the mine produced about 5,000 ounces of gold to 1933. U.S. Bureau of Mines records document the production of about 730 ounces of gold and 521 ounces of silver from 1914 to 1933 (Maas and others, 1991, 1995). Galloway (1952) estimated that the total production from the mine was about $100,000 (plus some production, probably small, from leasers), mostly from 1901 to 1908.

**Reserves:**

In 1934, after the last mining, Smith estimated that the deposit contained 22,500 tons of probable ore in place with an average grade of 0.28 ounce of gold per ton and minor silver.

**Additional comments:**

Roppel (2005) includes an extensive bibliography of the history of the mine.

**References:**

Brooks, 1902; Wright and Wright, 1905; Wright and Wright, 1906; Wright, 1907; Wright, 1908; Wright and Wright, 1908; Wright, 1909; Brooks, 1913; Brooks, 1914; Smith, 1914; Brooks, 1915; Chapin, 1916; Smith, 1917 (B 142); Smith, 1917 (B 153); Smith, 1932 (B 824); Smith, 1933 (B 844-A); Smith, 1934 (B 857-A); Smith, 1934 (B 864-A); Smith, 1936; Smith, 1937; Dyer, 1952; Galloway, 1952; Dyer, 1956; Bufvers, 1967; Herreid, 1967; Eberlein and others, 1983; Oliver and Adams, 1984; Maas and others, 1991; Maas and others, 1995; Brew, 1996; Roppel, 2005.

**Primary reference:** Herreid, 1967; Maas and others, 1991

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Golden Fleece

**Site type:** Mine

**ARDF no.:** CR201

**Latitude:** 55.1519

**Quadrangle:** CR A-1

**Longitude:** 132.0542

**Location description and accuracy:**

This site marks the portals of the two main adits of the Golden Fleece Mine, about 0.2 mile north of the north end of James Lake. It is about 0.2 mile east-northeast of the center of section 31, T. 77 S., R. 89 E. Maas and others (1995) provide a detailed map of the underground workings.

**Commodities:**

**Main:** Ag, Au, Cu

**Other:**

**Ore minerals:** Gold, pyrite, tetrahedrite

**Gangue minerals:** Quartz

**Geologic description:**

The Golden Fleece Mine was discovered in 1899,. By 1902, a 5-stamp mill was erected at the north end of James Lake, and the mine was developed by considerable underground workings (Brooks, 1902; Wright and Wright, 1908; Bufvers, 1967; Herreid, 1967; Maas and others, 1992, 1995). The mine was active from 1901 to 1905, and produced ore that contained about $40 to $60 in gold per ton (at $20.67 per ounce). Roppel (2005) recounts much of the early history of the mine and the many legal and financial problems that swirled around the actual mining. Bufvers (1967) indicated some mining in 1933 but the production was probably minor. Production records are not available. As mapped by Maas and others (1992, 1995), the underground workings included a lower adit 428 feet long, an upper adit 195 feet long, a raise 222 feet long that connects the two levels, and stopes that extend to the surface.

The deposit consists of auriferous quartz veins along two parallel faults that trend north-northwest to north and dip about 20-50E (Brooks, 1902; Wright and Wright, 1908; Maas and others, 1991, 1995). The faults are marked by quartz lenses inches to more than 8 feet thick that pinch and swell along the trend. The faults follow the contact between blue marble and white marble; the marble is silicified and cut by diabase dikes. Several large natural caverns also are along the faults. The quartz contains minor pyrite, chalcopyrite, tetrahedrite, and native gold. Maas and others (1991, 1995) collected 15 samples in the underground workings. Most assayed between 328 and 2,493 parts per billion gold, but several samples across 0.5 to 3 feet of a quartz-rich portion of an old stope contained 0.550 to 1.585 ounces of gold per ton.

The rocks in the Dolomi area are part of the Wales Group of Late Proterozoic and Cambrian age (Herreid, 1967). They are folded into a large dome centered over the eastern third of Paul Lake, and consist of several marble layers 200 to 1300 feet thick, interbedded with calcareous chlorite schist and marble.

**Alteration:**

Silicification of marble.

**Age of mineralization:**

The mineralization is younger than the Late Proterozoic or Cambrian host rocks.

**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:** Undetermined

**Workings/exploration:**
As mapped by Maas and others (1991, 1995), the underground workings included a lower adit 428 feet long, an upper adit 195 feet long, a raise 222 feet long, and several stopes that extend to the surface.

**Production notes:**
The mine was most active from 1901 to 1905, and produced ore that contained about $40 to $60 in gold per ton (at $20.67 per ounce). Bufvers (1967) indicated some mining in 1933.

**Reserves:**
None.

**Additional comments:**

**References:**
Brooks, 1902; Wright and Wright, 1905; Wright and Wright, 1906; Wright, 1908; Wright and Wright, 1908; Bufvers, 1967; Cobb, 1978 (OF 78-869); Herreid, 1967; Maas and others, 1991; Maas and others, 1992; Maas and others, 1995; Roppel, 2005.

**Primary reference:** Brooks, 1902; Maas and others, 1995

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (near Alikula Bay)

**Site type:** Prospect

**ARDF no.:** CR225

**Latitude:** 55.9184 **Quadrangle:** CR D-7

**Longitude:** 134.2985

**Location description and accuracy:**

This prospect is near the shore on the east side of Alikula Bay near its mouth. It is about 1.3 miles east-northeast of Pin Peak and about 0.2 mile northeast of the center of section 1, T. 69 S., R. 72 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:**

**Ore minerals:** Pyrite, pyrrhotite, sphalerite

**Gangue minerals:**

**Geologic description:**

This prospect was briefly noted by Roehm (1942, 1943) but it was largely unrecognized until it was later described and mapped in detail by Still and others (2002). The host rock is Silurian Heceta Limestone that is intruded by an intermediate Cretaceous intrusion a few hundred feet away from the mineralization and mafic dikes up to 50 feet thick. (Eberlein and Churkin, 1983). The mineralization consists of irregular masses of sulfides exposed over a diameter of about 50 feet. The largest surface exposure is about 10 feet by 28 feet in size. The sulfide masses consist of about 80 percent pyrite with pyrrhotite and sphalerite. Still and others (2002) collected 7 samples; the richest taken across 8 feet contained 8,483 parts per billion (ppb) gold, 22.5 parts per million (ppm) silver, 1,173 ppm copper, 7,515 ppm lead, and 4.85 percent zinc. Of the seven samples, six had gold values over 1,200 ppb, all had silver over 10 ppm, lead was over 2,500 ppm in all, and one had more than 1 percent lead. Four of the seven had over 1.4 percent zinc and one had 8.69 percent zinc. All had bismuth over 40 ppm, one had 336 ppm bismuth, and all had high arsenic, antimony and mercury. The sulfides are locally oxidized to gossan but there are no skarn minerals.

**Alteration:**

**Age of mineralization:**

Probably related to a nearby Cretaceous intermediate pluton.

**Deposit model:**

Polymetallic replacement deposit in limestone.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**

Known (and staked?) before 1942 but went unrecognized for decades; rediscovered, mapped, and sampled by staff of the U.S. Bureau of Land Management in the late 1990's.

**Production notes:**

**Reserves:**

**Additional comments:**
This prospect is now in a Forest Service Wilderness that is closed to mineral exploration and mining.

**References:**
Roehm, 1942; Roehm, 1943; Eberlein and others, 1983; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): D Block

**Site type:** Prospect

**ARDF no.:** DI011

**Latitude:** 59.6929 **Quadrangle:** DI C-3

**Longitude:** 156.8455

**Location description and accuracy:**
This prospect is within a block of 88 State of Alaska mining claims on the east side of the lower Mulchatna River about 10 miles northeast of its mouth. The center of the block is near the northeast corner of section 1, T. 9 S., R. 44 W.

**Commodities:**

**Main:** Cu?

**Other:** Au?

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
The D Block claims were originally staked by Rio Algom in 2000 on overlapping aeromagnetic and IP anomalies. The prospect is in an area of extensive alluvial deposits and bedrock is not exposed. Two drill holes were attempted in 2003 by the TNR Gold Corporation (Chapman, 2004). IL-D-01 reached a total depth of 129.3 meters (424 feet) in unconsolidated deposits and did not reach bedrock. Il-D-02 was inclined 80 degrees southeast from a location 1.5 km northwest of IL-D-01. This hole also did not reach bedrock after passing through 104.9 meters (344 feet) of unconsolidated deposits. The unconsolidated deposits in these two holes were mostly silt, and fine sand, with minor fine gravel. This prospect essentially remains a geophysical anomaly. Drilling equipment has been moved to the prospect as of April 27, 2006 and the plan is to drill at least 250-meter holes to test the geophysical anomaly (TNR Gold Corporation, 2006).

**Alteration:**

**Age of mineralization:**

**Deposit model:**
Porphyry Cu-Au? (Cox and Singer, 1986, model 20c)

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
20c?

**Production Status:**

**Site Status:** Active

**Workings/exploration:**
The D Block prospect was discovered as a result of regional geophysical surveys in a search for Pebble-like (ARDF DI007) porphyry copper-gold deposits. Rio Algom contracted a 7,468-kilometer-long (4,640 mile) aeromagnetic survey; the flight line spacing was 1,600 meters and the survey was flown at an altitude of 300 meters. This survey was followed up by IP surveys over 7 anomalies identified by the aeromagnetic

survey. Two of these anomalies, D Block and H Block (DI012) were subsequently staked. BHP-Billiton Minerals International controlled these prospects when they were optioned to TNR Gold Corp. in 2002. TNR Gold Corp. in turn optioned the D Block to Geocom Resources Inc. in 2003. Geocom completed two diamond drill holes (Il-D-01 and IL-D-02) on the D Block prospect in August and September 2003. Drilling equipment has been moved to the prospect as of April 27, 2006 and the plan is to drill at least 250-meter holes to test the geophysical anomaly (TNR Gold Corporation, 2006).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Chapman, 2004.

**Primary reference:** Chapman, 2004

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

# Site name(s): H Block

**Site type:** Prospect

**ARDF no.:** DI012

**Latitude:** 59.3898 **Quadrangle:** DI B-2

**Longitude:** 156.6868

**Location description and accuracy:**

The H Block prospect consists of 149 State of Alaska mining claims approximately centered at the northeast corner of section 22, T. 9 S., R. 44 W., i.e., at about the center of the township. The center of these claims is about 5.3 miles west of triangulation station Yellow Hill 2, which is about 22 miles north-northeast of the village of Lovelock.

**Commodities:**

**Main:** Cu

**Other:** Au

**Ore minerals:** Chalcopyrite, pyrite, pyrrhotite

**Gangue minerals:** Biotite, carbonate, chlorite, potassium feldspar, quartz, sericite

**Geologic description:**

The H Block prospect is in an area of extensive glacial outwash about 8 km west of a terminal moraine complex associated with the west end of Iliamna Lake. Because bedrock is not exposed, the geology of the prospect is only known from two diamond drill holes by TNR Gold Corporation (Chapman, 2004).

Il-H-01 is a vertical drill hole drilled in the center of a positive magnetic anomaly. It went through 67.1 meters (220 feet) of sand, silt, and fine gravel deposits to bedrock. Bedrock is a metasedimentary and metavolcanic(?) sequence that extended to the bottom of the hole at a depth of 208.8 meters (685 feet). The entire bedrock sequence was variably altered and mineralized. Petrographic descriptions (Chapman, 2004, Appendix B) indicate that at least some of these rocks are hornfels and calc-silicate rocks containing biotite-amphibole-plagioclase, plagioclase-clinopyroxene-quartz-sphene, and plagioclase-biotite-orthopyroxene assemblages. These rocks may be altered volcanic rocks and/or skarn. Granitic dikes were also encountered. The alteration varies from weak sericite, carbonate, and chlorite alteration to strong biotite veining and replacement. Secondary potassium feldspar was identified in and adjacent to some veins and fractures. Chalcopyrite, pyrite, and pyrrhotite occur both as disseminations and in veins and fractures but the veining is generally weakly developed. The sulfide-bearing veins commonly include quartz +/- carbonate. Some fractures contain sulfide linings and lack gangue minerals.

Drill hole Il-H-02 was located about 1 km west of Il-H-01 and inclined - 70 degrees east. It targeted an IP anomaly on the flank of a positive magnetic anomaly. It intersected 85.4 meters (280 feet) of sand, silt, and fine gravel overlying medium- to coarse-grained granodiorite. This hole terminated in a fine- to medium-grained granitic intrusive (dike?) at a depth of 254.6 m (835 feet). The granodiorite varies from unaltered to extensively altered with chlorite, carbonate, and sericite replacement, local silicification, and secondary potassium feldspar and biotite adjacent to fractures. Sulfides in IL-H-02 are disseminated and fracture-controlled chalcopyrite, pyrite, and pyrrhotite similar in occurrence to that in IL-H-01.

Assay results are fairly consistent over long intervals in these holes (Chapman, 2004). In Il-H-01, 141.8 meters (465 feet) contained 0.0195 gram of gold per ton and 231 parts per million (ppm) copper. The bottom 73 m (240 feet) contained 0.02 gram of gold per ton and 244 ppm copper. The best assays were 0.068 gram of gold per ton and 601 ppm copper over 1.5 meter (5 feet) and 0.044 gram of gold per ton and 709 ppm copper over 3 meters (10 feet). In Il-H-02, the entire 168.6 meters (553 feet) of bedrock averaged 0.0484 gram of gold per ton and 212 ppm copper. The high values included 3 meters (10 feet) of 0.0535 gram of gold per ton and 235 ppm copper and 1.5 meter (5 feet) of 0.037 gram of gold per ton and 1,125 ppm copper.

The initial exploration shows that a porphyry copper-gold system is present at the H Block prospect. This system is buried by 200 feet or more of glacial outwash deposits where it has been drilled.

**Alteration:**

The granodiorite varies from unaltered to extensively altered, with chlorite, carbonate, and sericite replacement, local silicification, and secondary K-feldspar and biotite adjacent to fractures.

**Age of mineralization:**

The age of this mineralization is assumed to be Late Cretaceous or early Tertiary based on the general age of intermediate intrusive rocks north of the prospect (Wilson and others, 2003). The similar(?) Pebble porphyry copper-gold deposit (ARDF IL007) nearby has been dated at 89.7 Ma.

**Deposit model:**

Porphyry Cu-Au (Cox and Singer, 1986, model 20c)

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

20c

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The H Block prospect was discovered as a result of regional geophysical surveys meant to locate Pebble-like (ARDF IL007) porphyry copper-gold deposits. In 2000, Rio Algom contracted a 7,468-kilometer-long (4,640 miles) aeromagnetic survey; the flight line spacing was 1,600 meters and it was flown at an altitude of 300 meters. This survey was followed up by ground IP surveys over 7 anomalies identified by the aeromagnetic survey. Two of these anomalies, H Block and D Block (DI011) were subsequently staked. BHP-Billiton Minerals International controlled these prospects when they were optioned to TNR Gold Corp. in 2002. TNR Gold Corp. in turn optioned the H Block to Geocom Resources Inc. in 2003. Geocom completed two diamond drill holes (Il-H-01 and IL-H-02) on the H Block prospect in August and September 2003. In late summer 2004, Geocom completed a 47 kilometer (28 miles) three-dimensional induced polarization-resistivity survey in the area of IL-H-01 and IL-H-02 in the H Block prospect. This survey identified several anomalies, some of which were tested in the fall of 2004 by five more drill holes (http://www.tnrgoldcorp.com/news/tnr_050605.asp; May 6, 2005). One of these holes, IL-H-06 encountered drilling problems and did not reach bedrock.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Wilson and others, 2003; Chapman, 2004.

**Primary reference:** Chapman, 2004

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/11/05

## Site name(s): Red Dog; Hilltop; Aqqaluk; Paalaaq

**Site type:** Mine

**ARDF no.:** DL001

**Latitude:** 68.0704 **Quadrangle:** DL A-2

**Longitude:** 162.8379

**Location description and accuracy:**

This record describes the Main Red Dog deposit, and the nearby Hilltop, Aqqaluk, and Paalaaq deposits. The map site is at the open pit of the Main deposit, two miles northwest of Deadlock Mountain in section 20, T. 31 N., R. 18 W., of the Kateel River Meridian. The Hilltop deposit is one mile south of Main deposit in section 29, T. 31 N., R. 18 W.; Aqqaluk is 1,500 feet north of the Main deposit, and Paalaaq is just west-northwest of Aqqaluk in sections 17 and 20, T. 31 N., R. 18 W., of the Kateel River Meridian.

**Commodities:**

**Main:** Ag, Pb, Zn

**Other:** Ba

**Ore minerals:** Barite, bornite, boulangerite, chalcopyrite, covellite, galena, marcasite, polybasite, pyrite, sphalerite, tetrahedrite

**Gangue minerals:** Quartz

**Geologic description:**

The DeLong Mountains are characterized by stacked and folded, thrust allochthons. The structurally lower allochthons are composed of Devonian through Cretaceous clastic and chemical sedimentary rocks. The two uppermost allochthons contain Jurassic or older mafic and ultramafic igneous sequences. Minor igneous rocks of basic composition are exposed 0.6 mile northeast of Red Dog (Kulas, 1992).

The Red Dog deposit complex comprises multiple, superimposed thrust fault slices of stratabound, massive sulfides and barren mudstones. It occurs in black, siliceous shale and chert of the Mississippian to Pennsylvanian Kuna Formation. The Kivalina unit, an interbedded calcarenite and calcareous shale, is the footwall of the deposit. Mineralization is syngenetic with respect to sediment deposition. Silicification occurs within and peripheral to the main mass of sulfides. A barite facies is concentrated toward the top and periphery of the deposit. Major sulfides in decreasing order of abundance are sphalerite, pyrite, marcasite, and galena. Rare disseminated chalcopyrite and pyrrhotite occur in sphalerite. The ore textures are massive, fragmental, chaotic, and veined; they rarely show typical sedimentary layering. The upper portion of the ore body is oxidized. The deposit is weakly enriched upward in lead relative to zinc.

The Main deposit is composed of two major mineralized thrust fault slices and one lesser mineralized fault slice. It extends 1,600 meters in a northwest direction and varies in width from 150 to 975 meters. High-grade portions of the deposit are 135 meters thick. The base of the Main deposit is a tectonic melange zone which separates it from the Cretaceous Okpikruak Formation.

The Hilltop occurrence is a flat-lying klippe of the same ore body as the Main deposit (Moore and others, 1986). The mineralized zone is 490 meters long by 245 meters wide and the exhalite package is less than 100 meters thick. The mineral assemblage is similar to that at the Main deposit except that copper sulfides occur at Hilltop. Significant amounts of chalcopyrite, covellite, and bornite occur locally. The deposit contains 0.3 percent copper with gold values of about 1 gram per ton. The presence of copper and gold may indicate that this deposit formed near a vent (Kulas, 1992).

The Aqqaluk deposit was discovered during a drilling program in 1995. The ore is similar to that at the Main deposit. Sphalerite and galena occur in silica rock, barite and shale. Sulfides are disseminated, semi-massive to massive, and rarely laminated. Late crosscutting sulfide veins and stringers occur in the host

shale and occasionally in the exhalites (Phelps, 1998).
The Paalaaq deposit is the newest and deepest exploration target in the Red Dog complex.

**Alteration:**
Silicification of host mudstone.

**Age of mineralization:**
Mississippian to Permian.

**Deposit model:**
Sedimentary exhalitive Zn-Pb (Cox and Singer, 1986; model 31a)

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
31a

**Production Status:** Yes, Large

**Site Status:** Active

**Workings/exploration:**
The first reported visit to the Red Dog area was in 1968 by the U.S. Geological Survey. In 1975, the U.S. Bureau of Mines conducted a mineral examination of the Red Dog site. Active exploration of the site and adjacent area began in 1975 and the first claims were staked in 1978. In 1980, Cominco Alaska drilled 9 holes that totaled 915 meters, to determine the size of the deposit. Geologic mapping at a scale of 1:12000 was done in the region from 1977 to 1984. The Red Dog deposit was mapped at a scale of 1:2400 in 1982 and 83. One hundred core holes were drilled from 1981 to 1984 for a total of 9800 meters. This provided a 30-meter drill spacing for the first five years of production. It also provided information for metallurgical testing.
Geophysical methods used at Red Dog include CS-ATM, Input, Induced Polarization, and Gravity (Young, 1989).
An open pit mine and associated facilities were designed and constructed; the first ore was processed by the mill in late 1989. Mining is by open pit with a stripping ratio of 1:1. Exploration in the Red Dog area is ongoing with core drilling programs and geophysical surveys.

**Production notes:**
By 1999, the mine was processing 2.5 million metric tons per year of ore which produces 100,000 metric tons of lead and 650,000 metric tons of zinc concentrate per year. After the expansion program in 1999, the mine is projected to produce 175,000 metric tons of lead and 975 metric tons of zinc concentrate from 3.2 million metric tons of ore (Phelps, 1998). The ore mining rate in 1997 was 3.1 million metric tons and the stripping ratio in 1999 was less than 1:1.

**Reserves:**
The Main Red Dog ore body reserves in 1989 were 85 million short tons of ore grading 17.1 percent zinc, 5.6 percent lead and 2.2 ounces of silver per ton. The 1998 reserves total 146 million metric tons grading 16.1 percent zinc, 4.3 percent lead and 2.6 ounces silver per metric ton. Specifically, the Main deposit contains indicated reserves of 50.6 million metric tons grading 19.5 percent zinc, 5.2 percent lead, and 3 ounces silver per ton. The Aqqaluk deposit has inferred reserves of 72.9 million metric tons grading 13.7 percent zinc, 3.6 percent lead, and 2 ounces silver per ton. The Hilltop deposit holds probable reserves of 9.6 million tons grading 17.8 percent zinc, 5.5 percent lead, and 3.6 ounces silver per ton. Paalaaq has possible underground resources of 13 million tons grading 15 percent zinc, 4.3 percent lead, and 2.8 ounces silver per ton.

**Additional comments:**
The Red Dog ore body is the world's largest lead-zinc deposit. Red Dog went into production in 1990 at 3,000 metric tons per day. Current (1999) reserves and mining plans give a 50+ year mine life. All of the

deposits except Paalaaq can be mined as open pits. Paalaaq will be developed as an underground mine.

**References:**

Tailleur, 1970; Cobb, 1972 (MF 404); Cobb, 1975 (OFR 75-628); Tailleur and others, 1977 (C 751B); Grybeck, 1977; Bundtzen and Henning, 1978; Degenhart and others, 1978; Grybeck and De Young, 1978; Plahuta, 1978; Grybeck and Nokleberg, 1979; Mayfield and others, 1979 (C 804B); Lange and others, 1985; Moore and others, 1986; Young and Moore, 1987; Schmidt and Zierenberg, 1988 (C 1035); Young, 1989; Kulas, 1992; Phelps, 1998; Cominco Alaska Staff, 1998; Kelley and Jennings, 2004.

**Primary reference:** Young, 1989; Kulas, 1992; Phelps, 1998

**Reporter(s):** Anita Williams (Anchorage, AK); Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

## Site name(s): Lead Creek

**Site type:** Prospect

**ARDF no.:** EA057

**Latitude:** 58.9600 **Quadrangle:** EA C-1

**Longitude:** 161.6520

**Location description and accuracy:**

The Lead Creek prospect is located in the headwaters of Lead Creek, about 8 miles west-northwest of Liberty on the Taylor Highway. Lead Creek is not labeled on the U.S. Geological Survey topographic map of the Eagle C-1 quadrangle (1956). The coordinates are the approximate center of the 4-square-mile prospect area, located in the southwest corner of section 36, T. 4 S., R. 31 E., of the Fairbanks Meridian. The location is accurate. The hills around the head of Lead Creek (none named on the Eagle C-1 map) are, clockwise from west to east: Wizard Hill, Paradox Hill, Nodular Knob, Pebble Dike Hill, and Macarena Hill. Argent Creek is a small, west-flowing creek in the draw near the middle of section 5, T. 5 S., R. 32 E. between Pebble Dike Hill and Macarena Hill. The Lead Creek prospect is on Doyon, Ltd. selected or conveyed land.

**Commodities:**

**Main:** Ag, Pb, Zn

**Other:** As, Au, Bi, Cd, Cu, Hg, Sb

**Ore minerals:** Arsenopyrite?, chalcopyrite, galena, iron-oxide, manganese oxide, pyrite, sphalerite

**Gangue minerals:** Ankerite, dolomite, garnet, pyroxene, quartz, scorodite, siderite, wollastonite

**Geologic description:**

Rocks in the vicinity of the Lead Creek prospect include carbonaceous quartz-mica schist and phyllite; weakly metamorphosed silicified volcanic rocks, quartzite, marble, and metachert; unmetamorphosed limestone, sandstone, argillite, and tuff; slightly metamorphosed greenstone, basalt, and pillow basalt; and serpentinite (WGM Inc., 1998 [DLR 98-12]). The protolith ages for these rocks may be Triassic, Permian, or Mississippian and Devonian (Dusel-Bacon and others, 1998); they are tentatively correlated with Paleozoic rocks that host stratiform lead-zinc-silver deposits in the Yukon Territory. Granodiorite, diorite, and dacite intrusions of Tertiary to Mesozoic age also occur in the Lead Creek area.

The models proposed for the Lead Creek prospect include: lead-zinc stratiform massive sulfide (Schmidt, 1997); manto replacement silver-lead-zinc; breccia-hosted silver-lead-zinc; skarn-hosted lead-zinc-silver; pluton-hosted lead-zinc-copper-silver; or another type of deposit indicated by precious and base metals in siliceous nodules (WGM Inc., 1998 [DLR 98-12]). The prospect is defined by anomalous lead in soils over a 3-mile by 1.5-mile area. The mineralized system may be more extensive than indicated by soil sampling since favorable ore intervals pass under overlying units on the ridges (WGM Inc., 2000 [Champion property summary]).

Graphitic quartz-mica schist and phyllite crop out on top of Paradox Hill and Nodular Knob (WGM Inc., 1998 [DLR 98-12]). A strongly graphitic schist east of Nodular Knob contains siliceous nodules and iron (?) oxide-cemented concretions that are anomalous in precious and base metals. The graphitic schist and phyllite grade into, or are in fault contact with, underlying silicified volcanic rocks.

A steeply dipping, east-southeast-trending fault separates the silicified metavolcanic rocks on Nodular Knob from limestone on Pebble Dike Hill (WGM Inc., 1998 [DLR 98-12]). Sections of impure massive limestone were intersected in drill holes on the west side of Pebble Dike Hill. The limestone has been bleached, silicified, brecciated, and mineralized; it has a trace to greater than 20 percent combined pyrite, galena, and sphalerite. A carbonaceous sequence of interlayered limestone, shale, argillite, siltstone, and sandstone underlies the massive limestones. Massive sulfides (50 percent or more galena, pyrite, and sphalerite) are present in strata-bound layers within the carbonaceous sedimentary rocks. Pillow basalts form prominent outcrops on the west side of Macarena Hill and are present northwest of Paradox Hill and in drill core.

Small granodiorite and quartz diorite bodies and numerous andesite, dacite, and feldspar porphyry dikes are scattered throughout the upper basin of Lead Creek (WGM Inc., 1998 [DLR 98-12]). Many of these intrusions are argillically altered, fractured, and sheared; the feldspar is altered to clays, and chlorite occurs along cleavage planes. Galena and sphalerite are sparsely disseminated in granodiorite in a drill hole on Wizard Hill. Fine-grained hornfels and skarn zones in limestone units contain garnet, wollastonite, and pyroxene. Skarns are generally small and spatially related to dikes and (or) sills. A 120-foot-thick intercept of hydrofracture breccia with greater than 25 percent disseminated pyrite that occurs in a drill hole on Pebble Dike Hill is possibly intrusion-related. A pebble dike cuts across limestone on Pebble Dike Hill.

Structural features at the Lead Creek prospect include Triassic to Jurassic thrust faults, folds, and later, north-south-trending and east-southeast-trending high-angle faults (WGM Inc., 1998 [DLR 98-12]). Airborne geophysical data indicate that Lead Creek is on the periphery of a semicircular magnetic zone that contains the Champion II (EA049), North Champion (EA046), East Champion (EA047), and Little Champion Creek (EA051) prospects. An arcuate trend of high conductivity follows topographic contours around the Lead Creek basin, possibly indicating a graphitic unit with the potential for stratiform sulfide mineralization (WGM Inc., 1998 [DLR 98-12]).

Sulfides at Lead Creek predominantly are galena, sphalerite, and pyrite, with trace chalcopyrite (WGM Inc., 1998 [DLR 98-12]). Sphalerite is typically reddish and coarse grained. Silver is closely associated with galena. Pyrite is the most widespread and abundant sulfide, and is present in all rock types. Silicification accompanies much of the sulfide mineralization and is especially strong in mineralized limestone. Carbonate alteration is marked by dolomite-ankerite and possibly siderite; the carbonates are primarily found in veins and breccia matrix.

There are four main target areas at the Lead Creek prospect: Nodular Knob, Argent Creek, Wizard Hill, and Paradox Hill (WGM Inc., 1998 [DLR 98-12]). Siliceous nodules and scorodite-cemented nodules in graphitic schist and phyllite immediately east of Nodular Knob are anomalous in gold, silver, lead, zinc, arsenic, antimony, cadmium, mercury, and bismuth. One nodule contains 2,000 parts per billion (ppb) gold, 31.4 parts per million silver, greater than 10,000 ppm arsenic, 6 ppm bismuth, 374 ppm antimony, 1,330 ppm copper, 2.82 percent lead, and 744 ppm zinc.

In the Argent Creek area, drilling intersected a stratiform massive sulfide horizon; a 47-foot interval averages 1.4 percent lead, 1.3 percent zinc, and 1.53 ounces of silver per ton (WGM Inc., 1998 [DLR 98-12]). Base metals and abundant pyrite occur in brecciated and sheared carbonaceous shale, argillite, and gray limestone, and are also found as semi-massive replacements of graywacke. Another drill hole (LC-14) in the Argent Creek area has a 31.5 foot intercept with 23.3 ounces of silver per ton and 6.4 percent lead. The Argent Creek fault has been identified as a possible ore control (Ventures Resource Corp., 2001). Quartz-vein float with iron and manganese oxides and sparse galena was found in sandstone and limestone north of Argent Creek; the float contains 2,500 ppm lead, 4,800 ppm zinc, and 1.8 ppm silver. A weakly developed skarn is exposed on Pebble Dike Hill. Step-out hole LC-15, drilled 430 feet to the southeast of 2000 hole LC-14, has a 50.6 foot intersect with 11.9 ounces of silver per ton, 5.1 percent lead, and 0.2 percent zinc in the same zone as hole LC-14. Mineralization is open west of hole LC-14; other 2001 holes tentatively indicate that it is to the east (Swainbank and others, 2002; Ventures Resource Corp., 2002).

Paradox Hill contains complex, siliceous, metavolcanic breccias with clasts of quartzite, limestone, siltstone, claystone, basalt, and tuffaceous material (WGM Inc., 1998 [DLR 98-12]). Galena and sphalerite are disseminated in the quartzite clasts and occur as replacements and open-space fillings in silicified breccia matrix and in quartz-carbonate veins. The veins contain as much as 2.82 percent lead, 2.84 percent zinc, and 0.79 ounce of silver per ton. A small amount of sulfide-bearing skarn is also present in core.

At Wizard Hill, sparse pyrite, galena, sphalerite, and chalcopyrite are associated with quartz-carbonate veins in quartzite and graphitic schist. Altered granodiorite contains minor disseminated pyrite, chalcopyrite, galena, and sphalerite (WGM Inc., 1998 [DLR 98-12]).

The Lead Creek prospect was originally identified by stream-sediment sampling conducted by the Alaska Division of Mines and Minerals in 1968 (Smith, 1968). Argentiferous galena float was found on the ridge south of Champion Creek (the west end of Wizard Hill) in 1968 (Foster and Clark, 1970). In 1976, WGM Inc. conducted stream-sediment and soil sampling in the Lead Creek area (WGM Inc., 1998 [DLR 98-12]).

In 1977 and 1978, WGM Inc. conducted soil sampling and gridded geophysical surveys, and drilled about 600 feet of core in three holes. Three EM conductors were identified during a 13.3-mile vertical-loop survey. Analyses of soil, stream-sediment, pan-concentrate, and rock samples from the Lead Creek area are reported in Burleigh and Lear (1994). In 1996, WGM Inc. carried out a mapping and sampling program at Lead Creek and identified new drilling targets. In 1997, WGM Inc. followed up an airborne EM-magnetics survey, carried out geologic mapping and sampling, and drilled a total of 3,853 feet in seven core holes. WGM Inc. drilled an additional 2,033 feet at Lead Creek in 2000 and 5,464 feet in 2001 and reported high-grade silver-lead mineralization (Ventures Resource Corp., 2001; Ventures Resource Corp., 2002). As of May 2006, the Lead Creek prospect was being examined by Full Metal Minerals under an agreement with Doyon Limited (Full Metal Minerals, 2008, 40 mile). Full Metals web site shows the location of the 22 drill holes on the property and the footages of the mineralized intercepts in them (Full Metal Minerals, 2008, Lead Creek).

**Alteration:**

Some limestones are bleached, silicified, brecciated, and (or) contain weak skarn alteration (WGM Inc., 1998 [DLR 98-12]). Metavolcanic rocks are locally silicified and altered to clay, but the relationship of alteration to mineralization is unclear. Granodiorite porphyry is argillically altered and contains green chlorite along fractures. Many intrusions are argillically altered, fractured, and sheared, with feldspars altered to clays; chlorite occurs along cleavages.

**Age of mineralization:**

Probably Mesozoic, as inferred from the presence of skarns adjacent to Mesozoic intrusions and a Cretaceous common lead age from galena (Dusel-Bacon and others, in press [in 2003]).

**Deposit model:**

Possibly Zn-Pb skarn, polymetallic replacement, or sedimentary exhalative (Cox and Singer, 1986; models 18c, 19a, or 31a).

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

18c, 19a, or 31a

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The Lead Creek prospect was originally identified by stream-sediment sampling conducted by the Alaska Division of Mines and Minerals in 1968 (Smith, 1968). Argentiferous galena float was found on the ridge south of Champion Creek (the west end of Wizard Hill) in 1968 (Foster and Clark, 1970). In 1976, WGM Inc. conducted stream-sediment and soil sampling in the Lead Creek area (WGM Inc., 1998 [DLR 98-12]). In 1977 and 1978, WGM Inc. conducted soil sampling and gridded geophysics surveys and drilled about 600 feet of core in three holes at the prospect. Three EM conductors were identified during a 13.3-mile vertical-loop survey. Analyses of soil, stream -sediment, pan-concentrate, and rock samples from the Lead Creek area are reported in Burleigh and Lear (1994). In 1996, WGM Inc. carried out a mapping and sampling program at Lead Creek and identified new drilling targets. In 1997, WGM Inc. followed up an airborne EM-magnetics survey, carried out geologic mapping and sampling, and drilled a total of 3,853 feet in seven core holes. WGM Inc. drilled an additional 2,033 feet at Lead Creek in 2000 and 5,464 feet in 2001 (Ventures Resource Corp., 2001; Swainbank and others, 2002. As of May 2006, the Lead Creek prospect was being examined by Full Metal Minerals under an agreement with Doyon Limited (Full Metal Minerals, 2008, 40 mile). The Full Metals web site shows the location of the 22 drill holes on the property and the footages of the mineralized intercepts in them (Full Metal Minerals, 2008, Lead Creek).

**Production notes:**

**Reserves:**

None.

**Additional comments:**

The Lead Creek prospect is located within Doyon, Ltd. selected or conveyed land. For more information contact Doyon, Ltd., Fairbanks, Alaska.

**References:**

Smith, 1968; Foster and Clark, 1970; Cobb, 1972 (MF-393); Cobb, 1977 (OFR 77-845); Eberlein and others, 1977; WGM Inc., 1977; Lessman and Holm, 1978 (DLR 78-02); Dashevsky and others, 1986; Burleigh and Lear, 1994; U.S. Bureau of Mines, 1995; Schmidt, 1997; Dusel-Bacon and others, 1998; Swainbank and others, 1998; WGM Inc., 1998 (DLR 98-12); WGM Inc., 2000 (Champion Property Summary); Szumigala and others, 2001; Ventures Resource Corp., 2001; Dusel-Bacon and others, 2003; Swainbank and others, 2002; Ventures Resource Corp., 2002; Full Metal Minerals, 2008 (40 mile); Full Metal Minerals, 2008 (Lead Creek).

**Primary reference:** WGM Inc., 1998 (DLR 98-12)

**Reporter(s):** M.B. Werdon; D.J. Szumigala (Alaska Division of Geological and Geophysical Surveys); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Fish

**Site type:** Prospect

**ARDF no.:** EA062

**Latitude:** 64.2550 **Quadrangle:** EA B-4

**Longitude:** 142.7044

**Location description and accuracy:**
This prospect covers the drainages of several tributaries of Fish Creek. The prospect is about 0.6 mile northwest of hill 4280 near the center of the southern boundary of the Eagle B-4 quadrangle. The coordinates are the location of a quartz-carbonate vein and gossan zone at the headwaters of Texas Creek in the NE1/4 section 1, T. 8 S., R. 25 E., of the Fairbanks Meridian. Texas Creek, a small tributary of Fish Creek, is not labeled on the U.S. Geological Survey topographic map of the Eagle B-4 quadrangle (1956); its mouth is located in the NE1/4 section 24, T. 7 S., R. 25 E. The location is accurate.

**Commodities:**

**Main:** Ag, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, smithsonite, sphalerite

**Gangue minerals:** Carbonate, quartz

**Geologic description:**
In upper Fish Creek, Paleozoic metasedimentary and metavolcanic rocks are intruded by Mesozoic to early Tertiary(?) biotite-hornblende quartz monzonite and granodiorite stocks (Dashevsky and others, 1986). Hornfelsed metamorphic rocks are common near the contact of a quartz monzonite pluton. Quartz-carbonate veins and a gossan zone are present in the headwaters of Texas Creek (see EA061). Mineralization in one drainage appears to be associated with a 5- to 10-foot-wide gossan zone along a north-south-trending fault zone at a contact of granodiorite and metasedimentary rock. Gossan samples from the fault zone contain 8 to 24 percent zinc, as much as 2,000 parts per million lead, and as much as 200 ppm copper. Gossan samples and silicified zones contain greater than 30,000 ppm zinc, as much as 6,424 ppm lead, and 12 ppm silver (U.S. Bureau of Mines, 1995). Five VLF lines run at right angles to the trend of the fault zone showed 'crossovers' probably related to the fault. The geology in the prospect area is considered permissive for skarn, structurally controlled, or stratabound deposits (Dashevsky and others, 1986). There has been placer gold prospecting on Fish Creek (EA059) and Texas Creek (EA061) to the north and west of this prospect.

Sulfides in the area were first noted by Foster (1976). Reconnaissance stream-sediment sampling was done in the upper Fish Creek drainage in 1976 by WGM Inc. (Dashevsky and others, 1986). Initial reconnaissance sampling detected elevated zinc and lead in stream sediments (600 to 1,000 ppm zinc, and 60 to 150 ppm lead) in several tributaries to Fish Creek. In 1977, WGM Inc. conducted reconnaissance traverses and soil and rock sampling, and fill-in stream sediment sampling. In 1981, Arctic Resources Inc. conducted ridge line traverses and ran a soil sampling line across the north-south-trending fault zone. Soils with elevated lead and zinc were found west of the fault in hornfels and quartzite, but no mineralization was observed. In 1991, Central Alaska Gold Co. conducted rock sampling in the area; no gold was detected in any samples (WGM Inc., 1998 [DLR 98-10]). The U.S. Bureau of Mines briefly examined the Fish Creek area in 1994. Soil sampling and mapping by WGM Inc. in 2001 resulted in defining a steeply dipping metal-enriched shear zone that extends uninterrupted for 4,800 feet across a high ridge crest to the edge of the soil grid. The zone is defined by zinc, lead, silver, copper, bismuth, arsenic, antimony, cadmium, and manganese anomalies. All zinc values exceed 1,000 ppm for the entire 4,800 feet. In mirror-image 1,200-foot segments on opposite sides of the ridge, all zinc values exceed 5,000 ppm. Near the south end of the soil grid a second polymetallic anomaly appears and is also open off the grid to the south. Gossan float extends 1,200 feet down the north and south slopes from the ridge crest. Twenty-eight grab samples average 11.6 percent zinc, 0.13 percent lead, and 18.7 ppm silver. Highest values are 28 percent zinc and 215 ppm (6.3 ounces per ton) silver. The mineralized zone thickness is estimated at 50 to 75 feet, based on gossan distribution (Swainbank and others, 2002; Ventures Resource Corp., 2002).

Under an agreement with Doyon Ltd., Full Metal Minerals began work on the prospect in 2006 and drilled 7 holes (Full Metals, 2008, 40 mile). They described the mineralization as strongly oxidized massive sulfides up to 44 meters thick; they drilled on a gossan 15 to 23 meters thick derived from intensely weathered massive to semi-massive sulfides. The zinc in the gossan occurs mainly as smithsonite. The gossan has been traced 1,500 meters along strike and 250 meters down dip; the drilling tested about 500 meters of strike length and 175 meters down dip. Some of the highest grade drill intercepts include 11 meters with 205.2 grams of silver per ton, 0.11 percent copper, 0.20 percent lead, and 4.2 percent zinc; 12.8 meters with 181.3 grams of silver per ton, 0.09 percent copper, 0.41 percent lead, and 4.0 percent zinc; 44.4 meters with 34.1 grams of silver per ton, 0.10 percent copper, 0.09 percent lead, and 3.3 percent zinc; 28.1 meters with 0.27 gram of gold per ton, 8.3 gram of silver per ton, 0.08 percent copper, and 4.9 percent zinc; and 20.6 meters with 52.0 grams of silver per ton, 0.06 percent copper, 0.08 percent lead, and 1.7 percent zinc. Twenty-eight of the 71 rock samples taken along 760 meters of the mineralized zone averaged 11.6 percent zinc, 0.13 percent lead, and 18.7 grams of silver per ton. As of early 2008, Full Metal completed 10 holes at Fish; they continued to cut encouraging intercepts and the mineralization remains open in depth and in both directions along strike.

**Alteration:**

**Age of mineralization:**

Paleozoic metasedimentary and metavolcanic rocks are intruded by Mesozoic to early Tertiary(?) biotite-hornblende quartz monzonite and granodiorite stocks in the upper Fish Creek drainage (Dashevsky and others, 1986).

**Deposit model:**

As of 2008, considered to be a weathered massive sulfide deposit (Full Metals Minerals, 2008).

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

Sulfides in the area were first noted by Foster (1976). Reconnaissance stream-sediment sampling was done in the upper Fish Creek drainage in 1976 by WGM Inc. (Dashevsky and others, 1986). In 1981, Arctic Resources Inc. conducted ridge line traverses and ran a soil sampling line across the north-south-trending fault zone. In 1991, Central Alaska Gold Co. conducted rock sampling in the area; no gold was detected in any samples (WGM Inc., 1998 [DLR 98-10]). The U.S. Bureau of Mines briefly examined the Fish Creek area in 1994. WGM carried out soil sampling and mapping. Under an agreement with Doyon Ltd., Full Metal Minerals began work on the prospect in 2006, drilled 7 holes , and carried out surface mapping and sampling (Full Metals, 2008, 40 mile). They drilled 3 more holes in 2008.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

This prospect is located on Doyon, Ltd. selected or conveyed land. For more information contact Doyon, Ltd., Fairbanks, Alaska.

**References:**

Foster, 1976; WGM Inc., 1977; Lessman and Holm, 1978 (DLR 78-02); Carter, 1981; Dashevsky and others, 1986; Central Alaska Gold Co., 1992 (DLR 92-70); Central Alaska Gold Co., 1992 (DLR 92-72); Burleigh and Lear, 1994; U.S. Bureau of Mines, 1995; WGM Inc., 1998 (DLR 98-10); Swainbank and others, 2002; Ventures Resource Corp., 2002; Full Metal Minerals, 2008 (40 mile).

**Primary reference:** Dashevsky and others, 1986; U.S. Bureau of Mines, 1995; this record

**Reporter(s):** M.B. Werdon; R.L. Flynn; D.J. Szumigala (Alaska Division of Geological and Geophysical Surveys); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): LWM

**Site type:** Occurrence

**ARDF no.:** EA102

**Latitude:** 64.2284 **Quadrangle:** EA A-4

**Longitude:** 142.8415

**Location description and accuracy:**

The LWM prospect covers 9 square miles in upper Little Whiteman Creek. The coordinates are at about the center of the drill holes in section 8, T. 8 S., R. 25 E., of the Fairbanks Meridian. The location is accurate within 1 mile. The LWM prospect is located on Doyon, Ltd. selected or conveyed land.

**Commodities:**

**Main:** Ag, Au, Hg, Pb, W, Zn

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**

The rocks in upper Little Whiteman Creek consist of Paleozoic quartzite, schist, marble, and greenstone that have been intruded by Mesozoic granodiorite and quartz monzonite stocks and Jurassic syenite dikes (Foster, 1976; WGM Inc., 1998 [DLR 98-10]). A northeast-trending greenstone belt underlies the ridge at the south end of the prospect.

Anomalous lead, zinc, and silver are present in reconnaissance stream-sediment samples from Little Whiteman Creek, and panned heavy-mineral concentrates contain anomalous tungsten, silver, and mercury. Geochemical anomalies identified by the stream-sediment and panned concentrates are spatially separated and perhaps reflect input from two different deposit types. Sulfides noted by Foster (1976) on the ridge east of Little Whiteman Creek and on the ridge line at the head of the creek are probable sources for the geochemical anomalies. Several other prospects are associated with the Mount Veta intrusive complex, including Little Enchilada (EA103), East Eva (EA098), Eva Creek (EA099), Oscar (EA096), Oscar West (EA097), unnamed (north of Fish Creek) (EA062), Molly Creek (EA100), and Mitchell (EA101).

WGM Inc. conducted a regional stream-sediment reconnaissance in the upper Little Whiteman Creek area in 1975 (Dashevsky and others, 1986). In 1977, WGM Inc. conducted ridge and hillside prospecting traverses, reconnaissance soil sampling, and a reconnaissance magnetic survey. Follow-up panned heavy-mineral concentrates were collected in 1978. In 1981, Arctic Resources Inc. conducted ridge mapping and soil grab sampling in the Little Whiteman Creek area, and Doyon, Ltd. conducted placer reconnaissance in 1982. In 1990, Central Alaska Gold Co. conducted geologic mapping and soil, rock, and stream-sediment sampling in the Little Whiteman Creek prospect area (WGM Inc., 1998 [DLR 98-10]). WGM Inc. conducted sampling and mapping in 2001 and hypothesized that mineralization is hosted by gently dipping siliceous to carbonaceous phyllite. The target, which is open to the north, is well defined by a 6,000 by 1,200-foot zinc, lead , and silver soil anomaly; zinc and lead values are greater than 1,000 parts per million (ppm). All values in a 3,000 by as much as 800-foot segment of the anomaly exceed 500 ppm lead, 1,000 ppm zinc, and as much as 9.4 ppm silver. The only rock found in the heart of the target area is rare gossan in soil sample pits. Gossan samples contained up to 34 percent lead, 16 percent zinc, and 13.75 ounces of silver per ton (Swainbank and others, 2002; Ventures Resource Corp., 2002).

Under an agreement with Doyon Ltd., Full Metal Minerals began work on this prospect in 2006 and drilled 3 shallow holes on a gravity high identified in a ground survey (Full Metals, 2008, 40 mile). Some of the best intercepts included 12.1 meters that contained 110.9 grams of silver per ton, 0.32 percent copper, 4.02 percent lead, and 15.72 percent lead and 12.5 meters that contained 37.0 grams of silver per ton, 0.05 percent copper, 2.94 percent lead, and 2.79 percent zinc. One drill hole intersected coarse-grained pyrite, chalcopyrite, sphalerite, and galena in brecciated and silicified argillite associated with dikes or flows of altered felsic rocks. Interpreted as a carbonate replacement deposit in dolomite, argillite, and felsic breccia it is partly oxidized near the surface. The prospect is associated with a zinc-silver-lead soil anomaly 1,800 by 365 meters in size in a area of low relief and stunted vegetation due to acid soils. Surface samples of gossan averaged 5.0 percent zinc, 11.895 percent lead, 0.5 percent copper, and 105.4 grams of silver per ton.

By the end of 2007, Full Metal had drilled 21 holes on the LWC deposit, many of which intersected impressive lead-zinc-silver mineralization (the details are laid out in Full Metal Minerals, 2008, 40 mile; 2008, LWM; 2008, Map). The best intercept in the 2007 drilling was 126.5 meters that averaged 10.8 percent zinc, 2.0 percent lead, and 30.7 grams of silver per ton; that intercept included 5.64 meters that averaged 19.9 percent zinc, 31.8 percent lead, and 346.8 grams of silver per ton. The mineralization as drilled extends for more than 300 meters along strike to a depth of more than 200 meters and is open in all directions.

**Alteration:**

**Age of mineralization:**

This carbonate replacement deposit may be related to nearby Mesozoic granodiorite or quartz monzonite intrusive rocks.

**Deposit model:**

Carbonate replacement.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

WGM Inc. conducted regional stream sediment reconnaissance in the upper Little Whiteman Creek area in 1975 (Dashevsky and others, 1986). In 1977, WGM Inc. conducted ridge and hillside prospecting traverses, reconnaissance soil sampling, and a reconnaissance magnetic survey. Follow-up panned heavy-mineral concentrates were collected in 1978. In 1981, Arctic Resources Inc. conducted ridge mapping and soil grab sampling in the Little Whiteman Creek area, and Doyon, Ltd. conducted placer reconnaissance in 1982. In 1990, Central Alaska Gold Co. conducted geologic mapping and soil, rock, and stream-sediment sampling in the Little Whiteman Creek prospect area (WGM Inc., 1998 [DLR 98-10]). WGM Inc. conducted sampling and mapping in 2001. Under an agreement with Doyon Ltd., Full Metal Minerals began work on this prospect in 2006 and drilled 3 shallow holes on a gravity high identified in a ground survey (Full Metals, 2008, 40 mile). By the end of 2007, Full Metal had drilled 21 holes on the LWM deposit.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

The LWM prospect is located within Doyon, Ltd. selected or conveyed land. For more information contact Doyon, Ltd., Fairbanks, Alaska.

**References:**

Foster, 1976; WGM Inc., 1977; Lessman and Holm, 1978 (DLR 78-02); Lessman, 1979; Carter, 1981; Dashevsky, 1983; Dashevsky and others, 1986; DiMarchi and others, 1991 (DLR 91-8a); DiMarchi and others, 1991 (DLR 91-8b); DiMarchi and others, 1991 (DLR 91-8c); DiMarchi and others, 1991 (DLR 91-

8g); Burleigh and Lear, 1994; WGM Inc., 1998 (DLR 98-10); Swainbank and others, 2002; Ventures Resource Corp., 2002; Full Metal Minerals, 2008 (40 mile); Full Metal Minerals, 2008 (LWM); Full Metal Minerals, 2008 (Map).

**Primary reference:** WGM Inc., 1998; this record

**Reporter(s):** M.B. Werdon; R.L. Flynn; D.J. Szumigala (ADGGS); Donald Grybeck (Port Ludlow, WA); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Wattamuse Creek

**Site type:** Mine

**ARDF no.:** GO021

**Latitude:** 59.3278 **Quadrangle:** GO B-6

**Longitude:** 161.2391

**Location description and accuracy:**

Wattamuse Creek is a northwest tributary to Slate Creek (GO020), a north tributary to Goodnews River. It has been placer mined from its junction with Slate Creek for a distance of about 2 miles. The coordinates are at the approximate midpoint of the workings, in the NE1/4 of section 9, T. 10 S., R. 71 W., of the Seward Meridian.

There are conflicting opinions about the extent of Wattamuse Creek. Some hold that it extends down to Slate Creek; some that it continues to the mouth of Cascade Creek (GO022) and Cascade Creek continues to Slate Creek. For this record, Wattamuse Creek continues to Slate Creek following local usage.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**

Wattamuse Creek is the principal gold producer in the Goodnews River drainage. Gold was discovered in 1917 by a native reindeer herder (Harrington, 1921), and the first mining took place in the fall of 1917, when about 500 ounces were produced. There has been extensive mining along Wattamuse Creek for at least two miles above the mouth of Slate Creek (Fechner, 1988; Calista Corp., 2008). Much of the mining until the early 30's was by various hand and small-scale mechanized mining when the New York-Alaska Company drilled the property. It was subsequently leased and a 2 1/2- foot dredge was built in 1938. The dredge operated until 1941 and mined from near the mouth of Cascade Creek downstream for about 1.4 miles to Slate Creek. In 1946 and 1947, Bristol Bay Mining Company used a dragline to mine in the narrow canyon above the mouth of Cascade Creek on claims 2 Above and 5-8 Above.

The pay streak on Wattamuse Creek was 20 to 30 feet wide in upper parts of the creek to over 100 feet wide on lower parts. The pay,1 to 2 feet of gravel and about 6 inches of bedrock, ranged in grade from 0.015 to 0.15 ounce of gold per cubic yard. The overburden was 2 to 5 feet of soil and gravel (Harrington, 1921). The gravel became coarser upstream, where boulders up to a few feet across became more abundant. The gold recovery in the dredge was about four times that indicated by the drilling due to the large boulders in the creek.

Fechner (1988) collected eight 0.1 cubic yard placer samples in the Wattamuse Creek drainage, including one from lower Wattamuse below the mouth of Cascade Creek. These samples, from along the active drainage and from benches, contained 0.0013 to 0.7583 ounce of gold per cubic yard. Fechner (1988) indicates that the tailings along the creek could be reworked and that local unmined areas are also present. One unmined area is estimated to contain 60,000 cubic yards with an average grade of 0.015 to 0.018 ounce of gold per cubic yard. The lower dredged part of the creek (included with Cascade Creek by Fechner, 1988) is estimated to have had about 800,000 cubic yards of tailings. In as much as the dredge is reported to have recovered about 0.025 ounce of gold per cubic yard (Fechner, 1988), about 20,000 ounces of gold production are indicated for this part of the creek. However, the recorded production for this creek segment is 9,300 ounces of gold (Fechner, 1988). The upper part of the creek has recorded and estimated production of 18,300 ounces of gold (Fechner, 1988), possibly making total production from the creek as much as 38,000 ounces.

Wattamuse Creek is a glaciated drainage. Bedrock in the area includes Paleozoic and Mesozoic sedimentary and volcanic rocks intruded by an Upper Cretaceous granitic stock in the headwaters of the creek (Hoare and Coonrad, 1978).

**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; medium

**Site Status:** Probably inactive

**Workings/exploration:**

Gold was discovered in 1917 by a native reindeer herder (Harrington, 1921), and the first mining took place in the fall of 1917, when about 500 ounces were produced. There has been extensive mining along Wattamuse Creek for at least two miles above the mouth of Slate Creek (Fechner, 1988; Calista Corp, 2008). Much of the early mining was by various hand and small-scale mechanized mining until the early 30's when the New York-Alaska Company drilled the property. It was subsequently leased and a 2 1/2 foot dredge was built in 1938. The dredge operated until 1941 and mined from near the mouth of Cascade Creek downstream for about 1.4 miles to Slate Creek. In 1946 and 1947, Bristol Bay Mining Company used a dragline to mine in the narrow canyon above the mouth of Cascade Creek on claims 2 Above and 5-8 Above.

**Production notes:**

About 2,000 ounces of gold were produced from 1917 to 1919 (Harrington, 1921). Fechner (1988) indicates that the tailings along the creek could have been be reworked and that local unmined areas are also present. One unmined area is estimated to contain 60,000 cubic yards with an average grade of 0.015 to 0.018 ounce of gold per cubic yard. The lower dredged part of the creek (included with Cascade Creek by Fechner, 1988) is estimated to have had about 800,000 cubic yards of tailings. In as much as the dredge is reported to have recovered about 0.025 ounce of gold per cubic yard (Fechner, 1988), about 20,000 ounces of gold production are indicated for this part of the creek. However, recorded production for this creek segment is 9,300 ounces of gold (Fechner, 1988). The upper part of the creek has recorded and estimated production of 18,300 ounces of gold (Fechner, 1988), possibly making total production from the creek as much as 38,000 ounces.

**Reserves:**

**Additional comments:**

**References:**

Harrington, 1921; Cobb and Condon, 1972; Hoare and Cobb, 1977; Hoare and Coonrad, 1978; Fechner, 1988; Calista Corp., 2008.

**Primary reference:** Fechner, 1988

**Reporter(s):** Travis L. Hudson (Applied Geology); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Cascade Creek

**Site type:** Prospect

**ARDF no.:** GO022

**Latitude:** 59.3311 **Quadrangle:** GO B-6

**Longitude:** 161.2407

**Location description and accuracy:**
Cascade Creek is a north tributary to Wattamuse Creek (GO021). The mouth of Cascade Creek is about 1 mile upstream from the mouth of Wattamuse Creek on Slate Creek. The lower potentially auriferous portion flows through the upper part of section 9 and the center of section 4, T. 10 S., R. 71 W.
There are conflicting opinions about the extent of Wattamuse Creek. Some hold that it extends down to Slate Creek; some that it continues to the mouth of Cascade Creek (GO022) and Cascade Creek continues to Slate Creek. For this record, Wattamuse Creek continues to Slate Creek following local usage.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
Cascade Creek has been explored, and drilled but apparently the only mining was near its mouth where a dredge began to work down Wattamuse Creek (GO021) (Calista Corp., 2008). The gravels are somewhat finer than on Wattamuse Creek and 8 to 10 feet deep. The drilling on Cascade Creek produced poor results.
Six, 0.1 cubic yard placer samples from along about 4 miles of Cascade Creek contained a trace to 0.0017 ounce of gold per cubic yard (Fechner, 1988). Bedrock in the area includes Paleozoic and Mesozoic sedimentary and volcanic rocks, locally intruded by Upper Cretaceous to Lower Tertiary granitic rocks and Jurassic mafic/ultramafic plutonic rocks (Hoare and Coonrad, 1978).

**Alteration:**

**Age of mineralization:**
Quaternary.

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

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**
Exploration including drilling has taken place, especially along lower Cascade Creek near its confluence with Wattamuse Creek (GO021).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Hoare and Cobb, 1977; Hoare and Coonrad, 1978; Fechner, 1988; Calista Corp., 2008.

**Primary reference:** Fechner, 1988

**Reporter(s):** Travis L. Hudson (Applied Geology); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Wattamuse

**Site type:** Prospect

**ARDF no.:** GO023

**Latitude:** 59.3448 **Quadrangle:** GO B-7

**Longitude:** 161.3346

**Location description and accuracy:**

This lode prospect is on the ridge crest that makes up the divide between the headwaters of Wattamuse Creek (GO021), Granite Creek, and South Fork Arolik River. It is on the saddle about 1,000 feet east of a 1,813-foot summit, and 0.6 mile due north of Granite Creek. It is accurately located.

**Commodities:**

**Main:** Au

**Other:** Ag, Hg, Sb, W

**Ore minerals:** Arsenopyrite, chalcopyrite, gold, pyrite, pyrrhotite, stibnite

**Gangue minerals:** Quartz

**Geologic description:**

An Upper Cretaceous granodiorite-diorite stock underlies the head of Granite and Wattamuse Creeks (Hoare and Coonrad, 1978). This stock hosts 1 inch- to 1-foot-thick quartz veins containing arsenopyrite, stibnite, pyrite, and some chalcopyrite (Calista Corp. 2008). A soil-geochemical grid over about a 1/4- by 1/2-mile area straddling the ridge crest showed large areas of soil containing more than 100 parts per billion (ppb) gold, and several areas containing more than 1,000 ppb gold. Individual grab samples collected for Calista Corporation contain up to 9.5 parts per million (ppm) gold, 14.9 ppm silver, 17 percent arsenic, 22 percent antimony, and 1,500 ppm mercury (Fechner, 1988, p. 58). The U. S. Bureau of Mines collected 19 grab samples of rocks in the headwaters of Wattamuse Creek. One of these, a composite grab sample collected in this prospect area, assayed 2.18 ounces of gold per ton, 6.6 ppm silver, 2,850 ppm arsenic, 400 ppm bismuth, 40 ppm antimony, and 184 ppm tungsten (Fechner, 1988). Grab samples of quartz veins contained 1.25 to 5.3 ppm Au. The country rocks around the granitic stock locally include mafic rocks; a sample of mafic rock containing arsenopyrite, pyrrhotite, and chalcopyrite assayed 17.4 ppm silver, 3.3 ppm gold, 0.13 percent arsenic, 30 ppm bismuth, and 0.19 percent copper (Fechner, 1988, p. 58).

**Alteration:**

Silicification.

**Age of mineralization:**

Late Cretaceous or younger. A K/Ar age of biotite from the host granitic stock is 71.3 +/- 2.1 Ma on biotite (Hoare and Coonrad, 1978).

**Deposit model:**

Granitic rock-hosted epithermal gold/silver.

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

**Production Status:** None

**Site Status:** Active?

**Workings/exploration:**

A soil geochemistry grid, selected rock sampling, and probably surface mapping have been completed on the prospect (Calista Corp., 2008).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Hoare and Coonrad, 1978; Fechner, 1988; Calista Corp., 2008.

**Primary reference:** Fechner, 1988

**Reporter(s):** Travis L. Hudson (Applied Geology); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Suzie Mountain

**Site type:** Prospect

**ARDF no.:** HG016

**Latitude:** 58.9600 **Quadrangle:** HG D-5

**Longitude:** 161.6520

**Location description and accuracy:**

This prospect is on the west ridge of Suzie Mountain and along the west side of Suzie Creek. The site is on the ridge crest at an elevation of about 900 feet and about 3.5 miles northeast of Goodnews Mining Camp. It is in the NE1/4 of section 20, T. 14 S., R. 74 W., of the Seward Meridian. The prospect is accurately located. Cobb's locality number 2 (1972 [MF 362]; 1980 [OF 80-909]) appears to be at this location.

**Commodities:**

**Main:** Pt

**Other:** Cu

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**

This prospect is on the west ridge of the Suzie Mountain ultramafic complex, a composite dunite, peridotite, and clinopyroxenite pluton that is inferred to be Jurassic in age (Hoare and Coonrad, 1978; Alaska Earth Sciences, 2000). A geochemical survey in the area of this prospect in 2000 defined 700-meter-long and up to 100-meter-wide soil anomaly that averages 130 parts per billion platinum; the maximum platinum value in the anomaly is 345 ppb Pt (Alaska Earth Sciences, 2000). The anomaly extends northwest from Suzie Creek across the ridge crest at this locality.

In 2004, the Calista Corporation did extensive rock and soil sampling over the prospect and did detailed total field , magnetic susceptibility, and resistivity surveys (Calista Corp., 2004). One rock sample contained 2.5 part per million platinum and many of the soil samples were anomalous in platinum. A coherent zone of ore grade mineralization could not be defined at the surface but the data suggest the potential for deeper mineralization.

A. L. Clark (Cobb, 1972; Cobb, 1980) noted that copper minerals had been found at this locality. Alaska Earth Science (2000) noted that in the Salmon River area traces of chalcopyrite, pyrite, or pyrrhotite are common in surface outcrops of hornblende-bearing rocks in marginal parts of the ultramafic complexes.

**Alteration:**

**Age of mineralization:**

Jurassic, the inferred age of the ultramafic plutons in the area (Hoare and Coonrad, 1978).

**Deposit model:**

Alaskan PGE (Cox and Singer, 1986; model 9)

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

9

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

There has been surface soil and rock sampling at this location (Alaska Earth Sciences, 2000). An aero-magnetic survey was flown over the Salmon River area in 1994, a gravity survey has been completed, and some controlled-source audio magneto-telluric lines have been run over selected parts of the ultramafic complexes (Alaska Earth Sciences, 2000). In 2004, the Calista Corporation did extensive rock and soil sampling over the prospect and did detailed total field , magnetic susceptibility, and resistivity surveys.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Cobb, 1972 (MF 362); Hoare and Coonrad, 1978; Cobb, 1980 (OF 80-909); Alaska Earth Sciences, 2000; Calista Corp., 2004.

**Primary reference:** Alaska Earth Sciences, 2000; this record

**Reporter(s):** Travis L. Hudson (Applied Geology); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Broken Shovel

**Site type:** Prospect

**ARDF no.:** ID081

**Latitude:** 62.6148 **Quadrangle:** ID C-3

**Longitude:** 157.1711

**Location description and accuracy:**

The Broken Shovel prospect is about 0.3 mile southeast of hill 2225 and 1.2 mile northwest of the Moore Creek placer mine (ID084). It is at an elevation of about 1,700 feet, about 0.3 mile southwest of the center of section 9, T. 29 N., R. 42 W., of the Seward Meridian. The location is accurate. Work in 2007 nearby identified nearby mineralization in the Spring and Troy Zones.

**Commodities:**

**Main:** Ag, Au

**Other:** As, Cu, Pb, Sb, Zn

**Ore minerals:** Arsenopyrite, gold, lead-antimony sulfosalts, scheelite, tetrahedrite

**Gangue minerals:** Dolomite, quartz, tourmaline

**Geologic description:**

The Broken Shovel prospect is a N20E-trending, steeply dipping quartz-dolomite-sulfide vein in medium-grained monzonite of the Upper Cretaceous, Moore Creek pluton (Bundtzen, Laird, and Lockwood, 1988; Miller, Bundtzen, and Gray, in press). The pluton has been dated at 68.9 Ma (Miller, Bundtzen, and Gray, 2005) The Broken Shovel vein, as defined in prospect trenches and rubble, is about 5 feet thick and can be traced along strike for about 650 feet. Both walls of the vein are sericitized and a pocket of tourmaline is exposed near the its southwest end (Bundtzen, Laird, and Lockwood, 1988). Grab and chip-channel samples contained up to 555 parts per million (ppm) silver, 1,600 parts per billion (ppb) gold, 4,860 ppm copper, 1,430 ppm lead, 760 ppm zinc, 5,500 ppm arsenic, and 2,400 ppm antimony (Bundtzen, Laird, and Lockwood, 1988; McGimsey and others, 1988). Arsenopyrite, scheelite, visible gold, and lead-antimony sulfosalts have been identified in both hand specimen and by microprobe analysis; gold and tungsten values may be understated in the chemical analyses of the samples.

The Broken Shovel prospect has been investigated intermittently since the 1930s by placer miners from Moore Creek, notably Elmer Keturi and Jules Stuver, who prospected the lode in the 1940s and 1950s (Don Harris, oral communication, 1983). When the prospect was examined in 1983 by the Alaska Division of Geological and Geophysical Surveys, it had been explored both by modern bulldozer cuts and much older hand-dug prospect pits (Bundtzen, Laird, and Lockwood, 1988).

On the basis of numerous chip-channel surface samples, Bundtzen, Laird, and Lockwood, (1988) estimated that the Broken Shovel prospect contains an inferred resource of about 16,000 tons of material that contained about 150.0 ppm silver, and about 1.0 percent combined base metals. The average gold grade was not determined.

In early 2008, Full Metals and Highbury Projects, Inc. were jointly exploring the area under a letter of agreement (Full Metal Minerals, 2008, Moore Creek; 2008, Trenching) . They dug numerous trenches and identified three zones with multiple types of mineralization. In the Spring Zone, sheeted quartz-tourmaline veins contain coarse gold and disseminated sulfides. Several notable samples across widths of from 4.0 to 11.0 meters contained 2.17 to 8.86 grams of gold per ton. The mineralization in the Troy Zone consists of gold-quartz veins in a wider zone of lower grade gold mineralization. Notable samples of the veins included 0.2 meters with 88.5 grams of gold per ton and 0.2 meters with 36.0 grams of gold per ton; these occur within a 3.0-meter-long channel sample that averaged 7.6 grams of gold per ton. The Broken Shovel zone is a steeply dipping quartz vein; twelve samples contained from a trace to 3.84 grams of gold per ton and 2.0 to 1,105 grams of silver per ton, along with anomalous bismuth, arsenic, and mercury.

**Alteration:**

The rocks adjacent to the vein have been altered to sericite, dolomite, and tourmaline.

**Age of mineralization:**

Unknown; the Moore Creek pluton that hosts some of the mineralization is 68.9 Ma (Bundtzen, Laird, and Lockwood, 1988).

**Deposit model:**

Gold--silver-quartz veins with sulfides.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The Broken Shovel prospect has been investigated intermittently since the 1930s by placer miners from Moore Creek, notably Elmer Keturi and Jules Stuver, who prospected the lode in the 1940s and 1950s (Don Harris, oral communication, 1983). When the prospect was examined in 1983 by the Alaska Division of Geological and Geophysical Surveys, it had been explored both by modern bulldozer cuts and by much older hand-dug prospect pits (Bundtzen, Laird, and Lockwood, 1988). The U.S. Geological Survey also investigated the prospect in 1985 ( McGimsey and others, 1988). In early 2008, Full Metals and Highbury Projects, Inc. were jointly exploring the area under a letter of agreement (Full Metal Minerals, 2008, Moore Creek; 2008, Trenching). They dug numerous trenches and identified three zones with multiple types of mineralization: the Spring, Troy, and Broken Shovel zones.

**Production notes:**

**Reserves:**

Based on numerous chip-channel surface samples, Bundtzen, Laird, and Lockwood, (1988) estimated that the Broken Shovel prospect contains an inferred resource of about 16,000 tons of material with about 150.0 ppm silver, and about 1.0 percent combined base metals. The average gold grade was not determined.

**Additional comments:**

**References:**

McGimsey and others, 1988; Bundtzen and others, 1988; Miller and Bundtzen, 1994; Miller and others, 2005; Full Metal Minerals, 2008 (Moore Creek); Full Metal Minerals, 2008 (Trenching).

**Primary reference:** Full Metal Minerals, 2008 (Moore Creek)

**Reporter(s):** T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.), M.L. Miller (U.S. Geological Survey); and C.C. Hawley (Hawley Resource Group); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Fog Lake

**Site type:** Prospect

**ARDF no.:** IL030

**Latitude:** 59.5116 **Quadrangle:** IL C-4

**Longitude:** 154.3639

**Location description and accuracy:**
This record represents an approximately 4,000-foot-long mineralized area along locally-named Fog Creek, a northwest-flowing tributary of Fog Lake (Fog Pond on some older maps). The site is in the approximate center of the area, in the NE1/4 SW1/4 sec. 3, T. 8 S., R. 30 W., Seward Meridian. The location is accurate within 0.1 mile for the center of the prospect area. The prospect is number 14 of Detterman and Cobb (1972) and number 12 of Reed (1967).

**Commodities:**

**Main:** Au, Cu

**Other:** Ag, Zn

**Ore minerals:** Azurite, chalcopyrite, gold, malachite, pyrite, sphalerite

**Gangue minerals:** Calcite, quartz

**Geologic description:**
The Fog Lake prospect is mainly in volcanic rocks exposed in the canyon of locally-named Fog Creek, a southeast tributary of Fog Lake.
The volcanic rocks and subordinate interbedded sedimentary rocks unconformably overlie Jurassic plutonic rocks at shallow depth (Retherford and Klemmick, 1999). From their base up, the strata are: (1) plutonic-cobble conglomerate of probable early Tertiary age; (2) green polymict conglomerate of probable early Tertiary age that possibly correlates with the upper conglomerate member of the Copper Lake Formation (Detterman and Reed, 1980); (3) dacite/dacite breccia of probable late Eocene to early Oligocene age; (4) dacite/quartz porphyry breccia similar in age to unit 3; (5) lahar flow breccia; (6) quartz-porphyry tuff breccia of probable late Eocene to early Oligocene age; (7) rhyodacite crystal tuff; and (8) argillized dacite. The volcanic rocks are cut by dacite dikes 2 to 20 feet in width (Retherford and Klemmick, 1999). Depending on their original composition, the volcanic rocks are widely propylitized and locally sericitized, silicified, and argillized. The dacite/dacite breccia of unit 3 may be coeval with intrusive rocks exposed about 6 miles east of Fog Lake that have been dated at about 36 Ma (Detterman and Reed, 1980). The Fog Lake deposit apparently is aligned northwesterly, subparallel to a fault along Fog Creek nearly coincident with the axis of a syncline. The deposit locally may extend east to northeast along cross faults or dacite dikes.
The Fog Lake deposit consists of gold- and sulfide-bearing quartz-calcite veins and sulfide disseminations (Butherus and others, 1981; Moller and others, 1982; Freeman and Farnham, 1983; Retherford and Klemmick, 1999). Pyrite and chalcopyrite are disseminated in all of the volcanic rocks but are most abundant in units 1 through 5. Swarms of sulfide veinlets up to an inch or so thick occur in northeast, northwest, and east-west fracture sets. Maximum vein density is about 8 per foot. Sulfides, mainly pyrite and chalcopyrite, along with subordinate olive-colored sphalerite, form small masses in quartz-calcite gangue. Azurite and malachite occur locally in gossan. Gold appears to correlate with sulfide content, and probably is free milling; it can be panned along about 2,200 feet of Fog Creek. Rock samples locally contain more than 1 ounce of gold per ton (Reed, 1967; Retherford and Klemmick, 1999). The deposit has been explored by shallow trenches. The maximum gold content in various samples from the trenches was 1.5 parts per million, and the maximum copper content was 11 percent (Freeman and Farnham, 1983). A gold-in-soil anomaly along Fog Creek is about one-half mile long and 700 feet wide. An exceptional soil sample contained

18.8 parts per million gold. Gold in soil correlates moderately well with copper and zinc.

As of 2008, Andover Ventures is exploring the deposit under an agreement with the Bristol Bay Native Corporation (Andover Ventures, 2006, Fog Lake; 2007, Progress Report). They have yet to drill the property but they have provided a map of the areas of interest and indicate several zones where numerous samples are anomalous in gold, copper, silver, and zinc (Andover Venures, 2008, Map of Fog Lake).

**Alteration:**

Extensive propylitic alteration in the darker volcanic rocks; local argillic, sericitic, and silicic alteration. Oxidation of iron and copper minerals.

**Age of mineralization:**

Possibly about 36 Ma, the age of intrusive rocks about six miles east of Fog Lake.

**Deposit model:**

Epithermal gold-copper deposit, possibly grading downward into porphyry copper-gold deposit (Cox and Singer, 1986; models 25b and 20c).

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

25b, 20c?

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**

The deposit was discovered in 1967 by B. L. Reed of the U.S. Geological Survey. Reed collected samples that contained anomalous copper and silver and as much as 37.7 parts per million gold (Reed, 1967). The prospect was subsequently staked by St. Eugene Mining Company, but abandoned without significant work. It was explored by Resource Associates of Alaska (RAA) for several years (Butherus and others, 1981; Moller and others, 1982; Freeman and Farnham, 1983). Soil samples were collected on a grid totaling more than 24,000 lineal feet (Butherus and others, 1981). Soil sampling was followed by detailed geologic mapping along Fog Creek, by trenching, and by magnetic and VLF surveys (Moller and others, 1982).

As of 2008, Andover Ventures is exploring the deposit under an agreement with the Bristol Bay Native Corporation (Andover Ventures, 2006, Fog Lake; 2007, Progress Report). They have yet to drill the property but they have provided a map of the areas of interest and indicate several zones where numerous samples are anomalous in gold, copper, silver, and zinc (Andover Venures, 2008, Map of Fog Lake).

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Reed, 1967; Detterman and Cobb, 1972; Detterman and Reed, 1980; Butherus and others, 1981; Moller and others, 1982; Freeman and Farnham, 1983; Retherford and Klemmick, 1999; Andover Ventures 2006 (Fog Lake); Andover Ventures, 2007 (Property Progress); Andover Ventures, 2008 (Map of Fog Lake).

**Primary reference:** Moller and others, 1982; Retherford and Klemmick, 1999

**Reporter(s):** C.C. Hawley (Hawley Resource Group, Anchorage, Alaska); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): KUY

**Site type:** Prospects

**ARDF no.:** IL035

**Latitude:** 59.2631 **Quadrangle:** IL B-5

**Longitude:** 154.6110

**Location description and accuracy:**
The KUY prospects are about five miles south of the east end of Gibraltar Lake. They are in, and on the east and west flanks of, the incised north-trending canyon of informally-named Katrina Creek, in the SE1/4 sec. 35, T. 10 S., R. 32 W., Seward Meridian. Mineralization related to the KUY deposit may extend into the SW1/4 sec. 36, same township, and into the NE1/4 sec. 2, T. 11 S., R. 32 W.. For this record, the location is at an elevation of about 1,300 feet in the canyon, and is accurate for the center of this large and complex mineralized system.

**Commodities:**

**Main:** Au, Cu, Mo, Te

**Other:** Ag, Zn

**Ore minerals:** Chalcopyrite, gold, gold and silver tellurides?, magnetite, molybdenite, pyrite

**Gangue minerals:** Clay, quartz

**Geologic description:**
The KUY prospects explore deposits potentially valuable for gold and copper-molybdenum. The geologic setting of the prospects has been interpreted in different ways. From 1979 until 1984, Resource Associates of Alaska (RAA) mapped the country rocks as Cretaceous or Tertiary andesite and dacite flows that locally dip 50 degrees. As interpreted by RAA, the flows are cut by an irregular zone of breccia as much as 2,500 feet across composed mostly of fragments of dacite tuff that forms the center of a caldera about 8,000 feet across (Butherus and others, 1981). Retherford and Hickok (1990) subsequently proposed that the volcanic rocks are intruded by a Cretaceous or Tertiary quartz diorite stock, and that the breccia is a diatreme immediately north of the stock.

About 60 percent of the breccia is pervasively altered and contains 3 to 5 percent sulfides, mostly pyrite and subordinate chalcopyrite. The breccia is locally cut by quartz-magnetite veins, vuggy gold-bearing quartz veins, and pyritic clay veins. Silicification and intense argillization are probably superimposed on widespread propylitization. Retherford and Hickok (1990) proposed that there is a core zone of potassium silicate alteration and a zone of sericitic alteration between stock and diatreme (breccia).

In 1978, rich gold- and silver-bearing quartz veins were found by RAA in informally named Katrina Creek canyon at about 1,600 feet elevation. The RAA-named Discovery vein strikes NNE and dips about 55 SE; the subsequently discovered Amethyst vein strikes west-northwest and dips about 70 SW (Anderson and others, 1979). A sample of the Discovery vein assayed about 106 ounces of gold and 103 ounces of silver per ton (Anderson and others, 1979; Butherus and others, 1981). The gold occurs in masses about 2 mm across; gold and silver tellurides are also reported. The rich veins are about 10 inches or less thick and traceable for a maximum distance of about 200 feet. The auriferous part of the deposit was drilled in 1980 with little success, leading to the interpretation that the veins are in discontinuous gash fissures. There reportedly were core recovery problems and the rich veins remain an intriguing target. Two other types of gold-bearing veins are reported: pyritic clay veins that assay as much as 0.37 ounce of gold per ton, and quartz-pyrite-magnetite veins.

The exploration to 2006, suggested that a porphyry copper-molybdenum(-gold) system might underlie the highly altered volcanic complex. Freeman and Farnham (1983) reported that samples from the Hercules and Minerva trenches contained up to 495 parts per million (ppm) copper and and 45 ppm molybdenum. One sample from Minerva 1 trench contained 1.23 ppm gold. Butherus (1984) followed up Freeman and Farnham's work with more trenches in the same area. His samples from the Minerva 3 trench contained as much as 1,175 ppm copper, 193 ppm lead, and 307 ppm zinc, and generally elevated values of molybdenum. Several reports suggest that rich gold veins are near the top of the mineralized system (Butherus, 1981; Freeman and Farnham, 1983; Butherus, 1984).

As of 2008, Andover Ventures (2006, Nov 13; 2006, News; 2006, KUY) holds the property. They sampled the property and carried out ground induced polarization surveys in 2006. They drilled four holes in 2007, totaling 793 meters (Andover Ventures, 2007, Progress Report) and cut significant intervals with silica flooding, quartz stockworks, clay alteration, and up to 15 percent sulfides. The mineralization was mainly pyrite with zones of chalcopyrite in veinlets and disseminated in the altered dacitic rocks.

**Alteration:**

Widespread propylitic alteration (chlorite, magnetite, and epidote) followed by argillization (kaolinite), and silicification (Butherus and others, 1981). Retherford and Hickok (1990) mapped a core zone of potassium silicate alteration extending outward through sericite alteration to peripheral propylitic alteration.

**Age of mineralization:**

Probably Late Cretaceous or Early Tertiary.

**Deposit model:**

Epithermal low-sulfide gold-quartz veins; possibly overlying a porphyry copper-molybdenum system (Cox and Singer, 1986; models 36a and 21a).

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

36a, 21a?

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

Rich gold veins were discovered in 1978 by geologists of Resource Associates of Alaska (Anderson and others, 1979). Other veins were found in 1979, and the prospect was drilled in 1980, but the drill holes did not encounter rich ore. In addition to the drilling, the deposit has been trenched. Butherus (1984) followed up Freeman and Farnham's work with more trenches in the same area. As of 2008, Andover Ventures (2006, Nov 13; 2006, News; 2006, KUY) holds the property and did sampling and ground induced polarization surveys in 2006. They drilled four holes in 2007, totaling 793 meters (Andover Ventures, 2007, Progress Report) and cut significant intervals with silica flooding, quartz stockworks, clay alteration, and up to 15 percent sulfides. The mineralization was mainly pyrite with zones of chalcopyrite in veinlets and disseminated in the altered dacitic rocks.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Anderson and others, 1979; Butherus and others, 1981; Freeman and Farnham, 1983; Butherus, 1984; Retherford and Hickok, 1990; Andover Ventures, 2006, Nov 13; Andover Ventures, 2006, News; Andover Ventures, 2006, KUY; Andover Ventures, 2007, Progress Report.

**Primary reference:** Anderson and others, 1979; Butherus and others, 1981; Retherford and Hickok, 1990

**Reporter(s):** C.C. Hawley (Hawley Resource Group): D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Kamishak (Painted River)

**Site type:** Prospect

**ARDF no.:** IL047

**Latitude:** 59.2329 **Quadrangle:** IL A-4

**Longitude:** 154.4713

**Location description and accuracy:**

The Kamishak prospect is in the SE1/4 SE1/4 sec. 10, T. 11 S., R. 31 W. It is at an elevation of about 1,500 feet on the northwest wall of a southwest-trending canyon that continues into adjacent section 15 The location is accurate within 500 feet.

**Commodities:**

**Main:** Au, Cu

**Other:** Ag, Fe

**Ore minerals:** Bornite, chalcopyrite, magnetite, malachite, pyrite

**Gangue minerals:**

**Geologic description:**

The Kamishak prospect is a breccia pipe at least 300 feet in diameter in Jurassic(?) intermediate and mafic igneous rocks (Detterman and Reed, 1980; Alaska Geologic Materials Center, 1995; P. Thurston, written commun., 2003). The strongest mineralization in the pipe is near its walls, and consists of angular blocks of intensely sericitized, fine- to medium- grained gabbro in a matrix of coarse amphibole, biotite, and plagioclase, and 1 to more than 5 percent sulfides. Weaker mineralization occurs in less-brecciated to massive gabbro and diorite containing irregular clots of amphibole, biotite, chlorite, and sulfides. Minor phases of the breccia include hornblende gabbro and gabbroic anorthosite; the anorthosite locally contains a few percent of disseminated magnetite.

The sulfide minerals are chiefly pyrite and chalcopyrite; bornite locally makes up as much 5 percent of the breccia. Malachite coats joint faces of mineralized rock, and magnetite occurs in amounts up to about 3 percent. Samples of the breccia locally contain significant gold and copper, and up to about 0.3 ounce of silver per ton. American Copper and Nickel Company (ACNC) drilled the deposit in 1990 and 1991 for a total of 5,300 feet (Alaska Geologic Materials Center, 1995). In drill hole 83523, the interval between 166 and 235 feet contained as much as 1,990 parts per billion gold and 2.58 percent copper; none of the interval contained less than 102 parts per billion gold and 0.255 percent copper. The interval from 15 to 166 feet also is mineralized. Drill holes 83521 and 83524 through 83527 are also appreciably mineralized.

Alteration minerals in the breccia include chlorite, biotite, potassium feldspar, and sericite. Relatively high gold values appear to accompany coarse secondary biotite and do not necessarily correlate with copper content.

Full Metal Minerals and Andover Ventures drilled 5 holes on this prospect in 2006 that totaled 750 meters (Andover Resources, 2008 (Kamishak), Andover Resources, 2008 (North Breccia)). Three of the 5 holes cut mineralization. Notable intercepts were: 1) 73.5 meters that contained 0.31 percent copper and 0.28 gram of gold per ton, 2) 51.0 meters that contained 0.48 percent copper and 0.46 gram of gold per ton, and 3) 7.50 meters that contained 0.36 percent copper and 0.53 gram of gold per ton. Two areas of mineralized breccia were identified. The westernmost breccia is a pipelike body about 30 by 50 meters in size; it is cut by a narrow fault zone with malachite and by thin sulfide- and magnetite-rich veins. The other breccia is a mineralized, pipelike body about 75 by 150 meters in size that extends to a depth of at least 75 meters. It has disseminated copper minerals as well as sulfide-bearing veinlets. This breccia locally contains abundant biotite, is strongly silicified, and also has sericite-pyrite, and chlorite alteration.

**Alteration:**
Propylitic and potassic: development of secondary biotite and potassium feldspar; local sericitization.

**Age of mineralization:**
Jurassic?

**Deposit model:**
Porphyry copper-gold(?) (Cox and Singer, 1986; model 20c).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
20c

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
The prospect was discovered by Andy Snyder of the Spokane office of American Copper and Nickel Company (P. Thurston, written commun., 2003). The company core drilled 18 holes in 1990 and 1991 for a total of 5,300 feet. Full Metal Minerals and Andover Ventures drilled 5 holes on this prospect in 2006 that totaled 750 meters (Andover Resources, 2008 (Kamishak), 2008b).

**Production notes:**

**Reserves:**
None.

**Additional comments:**
Most of the geologic description in this record is abstracted from logs of drill core stored at the Alaska Geologic Materials Center in Eagle River, Alaska (Alaska Geologic Materials Center, 1995).

**References:**
Detterman and Reed, 1980; Alaska Geologic Materials Center, 1995; Andover Resources, 2008 (Kamishak); Andover Resources, 2008 (North Breccia).

**Primary reference:** This record; Alaska Geologic Materials Center, 1995

**Reporter(s):** C.C. Hawley, Hawley Resource Group, Anchorage, Alaska; D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Old Glory; Last Chance

**Site type:** Mine

**ARDF no.:** KC033

**Latitude:** 55.6086 **Quadrangle:** KC C-6

**Longitude:** 131.9977

**Location description and accuracy:**

The Old Glory mine and adjacent Last Chance prospect are on the southwest foot of Gold Mountain at an elevation of 400-500 feet, and about 1.2 miles northwest of the mouth of Falls Creek. The site is in section 24, T. 72 S., R. 88 E., of the Copper River Meridian. It corresponds to locs. 254-2 to 254-28 and 255 in Maas and others (1995, fig. 46). The location is accurate within 0.1 mile. Figure 48 in Mass and others (1995) is a recent detailed map of the underground workings of the Old Glory Mine.

Also see Additional comments.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Bornite, chalcopyrite, pyrite

**Gangue minerals:** Quartz

**Geologic description:**

The mines and prospects at the head of Smuggler Cove are an almost bewildering succession of companies, names for the mines, personalities, and financial plans if not schemes to fund the work on the deposits. Roppel (1905) has sorted out much of the detail but it is still unclear exactly what deposits were being controlled by which company at any given time in the area. Much of the knowledge of the mines she deciphered is centered on the companies rather than individual mines and prospects and it is not unlikely that the companies controlled different mines, claims, and prospects at various times. The Old Glory mine is probably the centerpiece of most of what Roppel has described in her chapter on 'Smuggler Cove MInes'.

Gold was discovered beyond the head of Smuggler Cove in 1899 and by 1901 the workings consisted of a 120-foot shaft with drifts and crosscuts from it. A 2-stamp mill was set in operation and produced a small amount of gold. Beginning in 1912, there were several companies active in the area but chiefly the Alaska Venture Syndicate and an Australian affiliate that controlled the operations, largely with capital raised on the London Stock Exchange. By 1914, there was about 1,500 feet of underground workings, a powerhouse had been constructed, and a compressor was in operation. In 1916, the Alaska Ventures Syndicate disbanded after spending more than about $150,000 on the property, and the deposits were largely dormant until the the late 1930's. A new company--the Alaska Gold Mountain Mines, Ltd.-- was formed then and began work financed by the sale of stock. They did considerable work underground, built a camp, cleared a road to the mine, and built a mill building to house the mill machinery which supposedly had been purchased. However the mill equipment never reached Alaska. The Security and Exchange Commission was soon investigating the company, and it was liquidated by 1940. After spending several hundred thousand dollars on the property from 1912 to 1940, the only production above the head of Smuggler Cove was the small amount of gold that was produced at the original 2-stamp mill in 1901. Figure 48 in Maas and others (1995) is a detailed map of the underground workings of the Old Glory Mine.

The country rocks in the area are andesitic and basaltic metavolcanic rocks that gradationally intertongue with subordinate pelitic metasedimentary rocks (Berg and others, 1988, p. 17-19). The strata were regionally metamorphosed to greenschist-grade phyllite and semischist in Late Cretaceous time (Brew, 1996, p. 27). Their pre-metamorphic age is uncertain. Berg and others (1988, p. 17) state that they closely resemble

Upper Jurassic to mid-Cretaceous marine flysch and volcanic rocks nearby on Gravina Island.

The Old Glory and Last Chance deposits consist of quartz fissure veins and stringer lodes in massive to schistose metavolcanic rocks (greenstone) (Maas and others, 1995, p. 183-184). Brooks (1902, p. 57) described two systems of quartz veins on the Last Chance claim: one strikes N-S, parallel to the foliation of the schist; the other strikes N60E. The veins contain pyrite and free gold, and the schistose country rocks adjacent to some of the veins are bleached and pyritic for a distance of up to 4.5 feet from the veins. Brooks also reported small amounts of chalcopyrite and bornite in the Last Chance veins, in addition to the pyrite and gold.

Maas and others (1995, table 25) report the following average metal contents in their samples from the main workings of the Old Glory mine: 2.29 parts per million gold, 0.30 ppm silver, 143 ppm copper, 14.0 ppm lead, and 83 ppm zinc. Samples from the Last Chance prospect contain: 6.73 ppm gold, 1.26 ppm silver, 1,338 ppm copper, 13.5 ppm lead, and 43 ppm zinc. The high copper content in the Last Chance deposit supports the early reports of copper minerals in the veins there. Maas and others (1995, table 24) also compare average gold values of the quartz veins with those of the pyritic schist at the Old Glory mine. Their results show 1.7 ppm gold in the quartz and 17.6 ppm gold in the altered schist next to the veins.

Fluid inclusion studies of quartz vein material from several of the Helm Bay lodes suggest that the veins formed at temperatures and pressures consistent with conditions during Late Cretaceous greenschist-grade regional metamorphism (Maas and others, 1995, p. 184).

**Alteration:**

The wallrocks adjacent to some of the veins are bleached and pyritic.

**Age of mineralization:**

Late Cretaceous.

**Deposit model:**

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

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

36a

**Production Status:** Yes; small

**Site Status:** Undetermined

**Workings/exploration:**

The mines and prospects at the head of Smuggler Cove are an almost bewildering succession of companies, names for the mines, personalities, and financial plans if not schemes to fund the work on the deposits. Roppel (1905) has sorted out much of the detail but it is still unclear exactly what deposits were being controlled by which company at any given time in the area. Much of the knowledge of the mines she deciphered is centered on the companies rather than individual mines and prospects and it is not unlikely that the companies controlled different mines, claims, and prospects at various times. The Old Glory mine is probably the centerpiece of most of what Roppel has described in her chapter on 'Smuggler Cove Mines'.

Gold was discovered beyond the head of Smuggler Cove in 1899 and by 1901 the workings consisted of a 120-foot shaft with drifts and crosscuts from it. A 2-stamp mill was set in operation and produced a small amount of gold. Beginning in 1912, there were several companies active in the area but chiefly the Alaska Venture Syndicate and an Australian affiliate that controlled the operations, largely with capital raised on the London Stock Exchange. By 1914, there was about 1,500 feet of underground workings, a powerhouse had been constructed, and a compressor was in operation. In 1916, the Alaska Ventures Syndicate disbanded after spending more than about $150,000 on the property, and the deposits were largely dormant until the the late 1930's. A new company--the Alaska Gold Mountain Mines, Ltd.-- was formed then and began work financed by the sale of stock. They did considerable work underground, built a camp, cleared a road to the mine, and built a mill building to house the mill machinery which supposedly had been purchased. However the mill equipment never reached Alaska. The Security and Exchange Commission was soon investigating the company, and it was liquidated by 1940. After spending several hundred thousand dollars on the property from 1912 to 1940, the only production above the head of Smuggler Cove was the small amount of gold that was produced at the original 2-stamp mill in 1901. Figure 48 in Maas and others (1995) is a detailed map of the underground workings of the Old Glory Mine.

**Production notes:**

Maas and others (1995, table 26) report production of 0.3 kilograms of gold and 0.8 kilograms of silver from the Old Glory mine.

**Reserves:**

None.

**Additional comments:**

The locations of the Old Glory and Last Chance sites in Elliott and others (1978, locs. 34 and 35) have been revised in this report to agree with the locations of the sites in Maas and others (1995, figs. 46 and 48). However, there is much uncertainty about the names and locations of the mines northwest of the head of Smuggler Cover.

**References:**

Brooks, 1902; Elliott and others, 1978; Berg and others, 1988; Maas and others, 1995; Brew, 1996; Roppel, 2005.

**Primary reference:** Maas and others, 1995; Roppel, 2005

**Reporter(s):** H.C. Berg (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Shoenbar; Laskawanda; Schoenbar;

**Site type:** Prospects

**ARDF no.:** KC068

**Latitude:** 55.3493 **Quadrangle:** KC B-5

**Longitude:** 131.6419

**Location description and accuracy:**

This site includes several prospects or occurrences in about a square-mile area in and near the city of Ketchikan. They are at elevations ranging from near sea level to about 300 feet, and are from 0.1 to 0.7 mile northwest of the mouth of Ketchikan Creek in sections 19, 24, and 30, T. 75 S., R. 91 E., of the Copper River Meridian. The location is accurate. The site is locality 65 in Elliott and others (1978), and localities 276-280 in Maas and others (1995). The old workings on several of the prospects are concealed by housing and other city development, or are on private lots and have been filled in or covered by the owners (Maas and others, 1995, p. 194).

**Commodities:**

**Main:** Ag, Au

**Other:** Cu

**Ore minerals:** Chalcopyrite, pyrite

**Gangue minerals:** Quartz

**Geologic description:**

This part of Revillagigedo Island is underlain mainly by marine, andesitic or basaltic volcanic rocks and pelitic sedimentary rocks that are intruded by Cretaceous stocks, sills, and dikes of feldspar-porphyritic granodiorite, and by a stock and probably related plugs of Tertiary gabbro (Berg and others, 1988). The strata were regionally metamorphosed to greenschist-grade phyllite and semischist in Late Cretaceous time. They subsequently were contact metamorphosed to hornblende hornfels near some of the Cretaceous granodiorite contacts, and, more widely, peripheral to the Tertiary gabbro. The pre-metamorphic age range of the strata is uncertain. Berg and others (1988) note that they closely resemble Upper Jurassic to mid-Cretaceous flysch and volcanic rocks nearby on Gravina Island. The country rocks are cut by a high-angle fault along Tongass Narrows that displays about 4 miles of right-lateral offset.

The Laskawa or Shoenbar 'Mine' consists of a N50W, 50NE sulfide-bearing band of phyllite and greenschist, cut by sulfide-bearing quartz fissure veinlets. The sulfide minerals are pyrite and chalcopyrite, and there were early reports of gold and silver (Wright and Wright, 1908, p. 152; Cobb and Elliott, 1980, p. 69). Roppel (2005) did considerable historic research on the 'Mine' and concluded that it was 'more business on paper than on what proved to be worthless ground'. The deposit was discovered in 1899 when John Shoenbar arrived in Ketchikan and purchased several claims along Ketchikan Creek. By 1904, the deposit was explored by two shafts, 125 and 85 feet deep, a short tunnel, and surface stripping. Shoenbar spend much time in the East trying to attract capital to develop the property but most of the work on the consisted of acquiring additional claims, constructing buildings and tramways, developing water rights, trying to develop power, and filing papers for patent to the claims. Little was done on the property by Shoenbar after 1904 although his claims were patented by 1920. In the 1930's, there was a brief attempt to cyanide the dump of the shafts; the results were disappointing although what little gold that may have been produced would have been the only gold produced from the property. In later years, the claims were developed and became part of the city of Ketchikan. A middle school, street, and bypass are named for Shoenbar, but all are misspelled 'Schoenbar' (Allen, 2002).

The following five occurrences were examined in the early 1990s by Maas and others (1995, locs. 276-

280), who named them either from U.S. Bureau of Mines claim records, or, informally, for local landmarks.
Loc. 276: Forest Avenue quarry. Samples of silicified(?) volcanic rocks contained up to 222 parts per billion (ppb) gold, 2970 parts per million (ppm) copper, and 111 ppm molybdenum.
Loc. 277: Prison parking lot. A 2-foot sample of silicified(?) volcanic rock contained 2.1 ppm gold.
Loc. 278: Nevada lode. a 7-foot sample of silicified(?) greenstone contained 1282 ppb gold and 5,705 ppm copper. A shaft on this property was plugged.
Loc. 279: American Legion quarry. Samples of unidentified material contained up to 2,235 ppm zinc.
Loc. 280: Cape Fox. Samples of unidentified material contained up to 20 ppb gold This property was explored in the early 1900s by a 24-foot adit and a shaft, which have been plugged.

**Alteration:**

**Age of mineralization:**
The quartz fissure veins that crosscut the metamorphic foliation probably are Late Cretaceous or younger.

**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:**
Workings in the early 1900s included surface cuts and several short adits, shafts, and tunnels most of which have been covered by housing or commercial development, or filled in.

**Production notes:**
Probably none or very small.

**Reserves:**
None.

**Additional comments:**

**References:**
Wright and Wright, 1908; Elliott and others, 1978; Cobb and Elliott, 1980; Berg and others, 1988; Maas and others, 1995; Allen, 2002; Roppel, 2005.

**Primary reference:** Wright and Wright, 1908; Maas and others, 1995

**Reporter(s):** H.C. Berg (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Sea Level; Sealevel

**Site type:** Mine

**ARDF no.:** KC095

**Latitude:** 55.3683 **Quadrangle:** KC B-4

**Longitude:** 131.1899

**Location description and accuracy:**
The Sea Level mine extends from the shoreline of Thorne Arm northeastward to an elevation of about 300 feet. The mine is in section 18, T. 75 S., R. 94 E., and it coincides with the 'Sealevel Mine' symbol on the 1:63,360-scale, Ketchikan B-4 topographic map (1949 ) The site corresponds to loc. 92 in Elliott and others (1978), and to loc. 301 (1-5) in Maas and others (1995). The location is accurate within a hundred or so feet.
Also see Additional comments.

**Commodities:**

**Main:** Ag, Au

**Other:** Pb, Zn

**Ore minerals:** Galena, gold, pyrite, sphalerite

**Gangue minerals:** Muscovite, quartz

**Geologic description:**
The history of the Sea Level Mine has been researched in some detail by Roppel (2005). The deposit was found in 1897 and by 1898 a 35-foot tunnel was driven along a vein from which $10,000 in rich ore was recovered. Following considerable interest in the property, I.B. Hammond began developing the property in 1901 as the Sealevel Mining and Milling Company. Soon it was the most active mine in southern southeastern Alaska and about 800 feet of workings were driven on the vein, a large camp had been erected, and a 30-stamp mill was built. The mill began operation in May of 1902 and ran for 3 weeks before shutting down. After more underground exploration, the mill ran intermittently but ceased operation in July of 1903 for lack of ore, and the assets of the Sealevel Mining and Milling Company were foreclosed on in 1906. There were several attempts to put the property back in operation from 1906 to 1925, but by 1913 the buildings were already deteriorating. From 1926 to 1929, there was considerable activity by the Peerless Consolidated Mining Company to put the mine back in operation, including the construction of a new camp and power plant and the construction of a new 50-ton mill. About 300 tons of ore went through the mill in 1929 and 47 ounces of gold was produced But the Peerless Company was reorganized soon after and what followed was mainly management changes and legal actions through the rest of the 1930's. There was little if any mining or milling beyond 1929 and eventually the patented claims were sold for their timber.
The total length of the workings was more than 1200 feet. A short tunnel with winze was also driven on the (main) vein at a point 350 feet N60E of the shaft house. The vein was exposed at several other points by opencuts and prospect tunnels, and it appears to continue northeastward for at least 2000 feet, onto the adjoining Sea Breeze claim (KC094).
The rocks in the area of the Sea Level Mine are mainly phyllite and semischist derived from pelitic sedimentary rocks and andesitic or basaltic volcanic rocks, intruded by Cretaceous granodiorite (Berg and others, 1988). The premetamorphic age of the strata is speculative. On the basis of various criteria, the rocks have been interpreted as Mesozoic or late Paleozoic (Berg and others, 1988) and Permo-Triassic or Jurassic-Cretaceous (Crawford and others, 2000). The bedded rocks and some of the granodiorite were regionally metamorphosed to greenschist grade in Late Cretaceous time and subsequently remetamorphosed to hornblende hornfels near contacts of Cretaceous granodiorite plutons emplaced after the regional metamor-

phism. The metamorphic and intrusive rocks are overlain by Quaternary or Tertiary andesite and basalt.

The Sea Level deposit consists of sulfide-bearing quartz fissure veins. The veins cut hydrothermally altered mafic metavolcanic (greenstone schist) country rocks, and a 25-foot-thick body that either is an intrusive dike of altered porphyry ('blue porphyry' of Brooks, 1902, p. 65-67; and Wright and Wright, 1908, p. 144-146), or a zone of hydrothermally altered mafic metavolcanic rock (Maas and others, 1995, p. 210-218). The principal workings were on two parallel veins 15 feet apart. One is 5 feet thick and one 1-2 feet thick; both strike NE and dip steeply SE, at an acute angle to the NW strike of the foliation of the metamorphic country rocks. The veins consist of coarsely crystalline, milky quartz and minor muscovite, and contain (auriferous) pyrite, galena, and sphalerite, and sparse flakes of native gold. Pyrite cubes also are common in the altered wallrocks of the veins. Included in the veins are large breccia fragments of altered country rocks that reportedly carried as high values in precious metals as the quartz. Locally conspicuous, open-space-filling textures indicate quartz deposition at shallow crustal levels. In addition to the faulting that preceded vein formation; some of the veins in turn are sheared and offset by small faults. The quartz in the veins, however, is not recrystallized, and they thus are probably younger than most or all of the Late Cretaceous regional metamorphism (Maas and others, 1995, p. 215).

Most of the quartz veins are bordered by a hydrothermally altered zone up to three feet thick, characterized by fine-grain, light-gray to bluish-gray, massive, carbonate- and sericite-bearing rock that commonly contains cubic pyrite crystals up to an inch across (Maas and others, 1995, p. 215). Maas and others (1995) interpret this zone as hydrothermally altered mafic metavolcanic rock. Early miners called this altered rock 'blue porphyry,' which they interpreted as crosscutting altered dikes that predate the quartz veins, but are closely associated with some of the orebodies (Brooks, 1902, p. 65; Wright and Wright, 1908, p. 143). Gold content of these pyritic altered zones is high adjacent to the quartz veins and diminishes away from them. Weathered altered rocks have a reddish-brown, oxidized rind up to three inches thick.

An unknown amount of gold and silver was produced from the Sea Level mine in the early 1900s, when the ore reportedly averaged $5.35 of gold per ton (at $20.67 per ounce of gold) (Brooks, 1902, p. 66-67). Forty-seven ounces of gold was produced in 1929 from 300 tons of ore.

**Alteration:**

Most of the quartz veins are bordered by a hydrothermally altered zone up to three feet thick, characterized by fine-grain, light-gray to bluish-gray, massive, carbonate- and sericite-bearing rock that commonly contains cubic pyrite crystals up to an inch across (Maas and others, 1995, p. 215). Maas and others (1995) interpret this zone as hydrothermally altered mafic metavolcanic rock. Early miners called this altered rock 'blue porphyry,' which they interpreted as crosscutting altered dikes that predate the quartz veins, but are closely associated with some of the orebodies (Brooks, 1902, p. 65; Wright and Wright, 1908, p. 143). Gold content of these pyritic altered zones is high adjacent to the quartz veins and diminishes away from them. Weathered altered rocks have a reddish-brown, oxidized rind up to three inches thick.

**Age of mineralization:**

The quartz in the veins is not recrystallized (Maas and others, 1995, p. 215). The veins thus are probably younger than most or all of the Late Cretaceous regional metamorphism.

**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:** Yes; small

**Site Status:** Undetermined

**Workings/exploration:**

The history of the Sea Level Mine has been researched in some detail by Roppel (2005). The deposit was found in 1897 and by 1898 a 35-foot tunnel was driven along a vein from which $10,000 in rich ore was recovered. Following considerable interest in the property, I.B. Hammond began developing the property in

1901 as the Sealevel Mining and Milling Company. Soon it was the most active mine in southern southeastern Alaska and about 800 feet of workings were driven on the vein, a large camp had been erected, and a 30-stamp mill was built. The mill began operation in May of 1902 and ran for 3 weeks before shutting down. After more underground exploration, the mill ran intermittently but ceased operation in July of 1903 for lack of ore, and the assets of the Sealevel Mining and Milling Company were foreclosed on in 1906. There were several attempts to put the property back in operation from 1906 to 1925, but by 1913 the buildings were already deteriorating. From 1926 to 1929, there was considerable activity by the Peerless Consolidated Mining Company to put the mine back in operation, including the construction of a new camp and power plant and the construction of a new 50-ton mill. About 300 tons of ore went through the mill in 1929 and 47 ounces of gold was produced But the Peerless Company was reorganized soon after and what followed was mainly management changes and legal actions through the rest of the 1930's. There was little if any mining or milling beyond 1929 and eventually the patented claims were sold for their timber.

The total length of the workings was more than 1200 feet. A short tunnel with winze was also driven on the (main) vein at a point 350 feet N60E of the shaft house. The vein was exposed at several other points by opencuts and prospect tunnels, and it appears to continue northeastward for at least 2000 feet, onto the adjoining Sea Breeze claim (KC094).

**Production notes:**

An unknown amount of gold and silver was produced from the Sea Level mine in the early 1900s, when the ore reportedly averaged $5.35 in gold per ton (at $20.67 per ounce of gold) (Brooks, 1902, p. 66-67). In 1929, 300 tons of ore was milled to recover 47 ounces of gold (Roppel, 2005).

**Reserves:**

**Additional comments:**

Throughout its history, the name of the property has varied from 'Sea Level' to 'Sealevel.'

In the 1930's, the management of the Sea Level Mine was frequently combined with that of the the nearby Goo Goo Mine (KC096) and they shared their many legal and operational problems.

**References:**

Brooks, 1902; Wright and Wright, 1908; Elliott and others, 1978; Berg, 1982; Berg and others, 1988; Maas and others, 1995; Crawford and others, 2000; Roppel, 2005.

**Primary reference:** Brooks, 1902; Maas and others, 1995

**Reporter(s):** H.C. Berg (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Goo Goo; Golden Dream; Mountain

**Site type:** Mine

**ARDF no.:** KC096

**Latitude:** 55.3687 **Quadrangle:** KC B-4

**Longitude:** 131.1877

**Location description and accuracy:**

The Goo Goo claim is in section 18, T. 75 S., R. 94 E., of the Copper River Meridian. It adjoins the Goo Goo Extension (KC097) claim on the northeast. It is at an elevation of approximately 150-200 feet north of, and roughly parallel to, Gokachin Creek. The main workings are about 0.3-0.4 mile inland from the shore of Thorne Arm, and the map coordinates are for the approximate center of the claim. The site corresponds to loc. 93 in Elliott and others (1978), and to loc. 302 (1-6) in Maas and others (1995). The location is accurate within 0.1 mile.

Also see Additional comments.

**Commodities:**

**Main:** Au

**Other:** Pb, Zn

**Ore minerals:** Galena, gold, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The Goo Goo Mine and Goo Goo Extension (KC097) combined soon after their discovery and they share a common history. In addition, in the 1930's, both of them were sometimes linked with the Sea Level Mine (KC095).. Roppel (2005) provides extensive details of the complex history of these properties. The Goo Goo vein was located in 1904 and the Goo Goo Extension in 1907, and they soon were developed by a 20-foot shaft and 15-foot tunnel. Brooks (1902, p. 67) reported gold values up to $4.00 in gold per ton (at $20.67 per ounce).. About $1000 in gold (at $20.67 per ounce) was produced in 1907 from rich hand-picked samples processed with a mortar and pestle. Work continued through the 1920's and increased markedly in the 1930's with some underground exploration and considerable legal and other activity by the numerous people involved or investing in the property. Perhaps the most notable mining in the later history of the mining was the recovery in 1933 of $40,000 in gold (at $35 per ounce?) by a leaser from a rich pocket. The workings, dating back to the early 1900's, include 2 adits, one 1,800 feet long and one caved, a shaft, and several surface trenches and pits.

The rocks in the area of the Sea Level Mine are mainly phyllite and semischist derived from pelitic sedimentary rocks and andesitic or basaltic volcanic rocks, intruded by Cretaceous granodiorite (Berg and others, 1988). The premetamorphic age of the strata is speculative. On the basis of various criteria, the rocks have been interpreted as Mesozoic or late Paleozoic (Berg and others, 1988) and Permo-Triassic or Jurassic-Cretaceous (Crawford and others, 2000). The bedded rocks and some of the granodiorite were regionally metamorphosed to greenschist grade in Late Cretaceous time and subsequently remetamorphosed to hornblende hornfels near contacts of Cretaceous granodiorite plutons emplaced after the regional metamorphism. The metamorphic and intrusive rocks are overlain by Quaternary or Tertiary andesite and basalt.

According to Wright and Wright (1908, p. 147), the Goo Goo deposit is a quartz fissure vein that contains pyrite, sphalerite, galena, and free gold. The vein reportedly included pockets of ore containing considerable free gold. The Wrights do not describe the country rocks or the geologic setting of the vein.

Maas and others (1995, p. 216) provide the following combined description of an auriferous quartz fissure vein more than 4900 feet long on the Goo Goo claim and its continuation southwestward onto the adjoining

Goo Goo Extension claim (KC097). The vein, which strikes NE and dips steeply SE, is in mafic metavolcanic rocks and contains, in addition to free gold, pyrite, sphalerite, and galena. Hydrothermally altered metavolcanic rock adjacent to the vein contains disseminated pyrite and accompanying gold values (see Alteration). The best results of sampling in 1946 (Maas and others, 1995, p. 217) included: 5.8 parts per million (ppm) gold in a section of vein 7.5 feet thick and 79 feet long; and 7.1 ppm gold in a section of vein 4.6 feet thick and 25 feet long. Thirty-one samples of the vein collected by Maas and others (1995) contained an average of 1.1 ppm gold. Maas and others' (1995) description of the Goo Goo and Goo Goo Extension vein indicates that its character and setting are virtually identical to the main vein on the Sea Level claim (KC095).

Combined recorded production from the claims, probably much in the early 1900s, was 1.4 kg of gold. Notably, however, $40,000 in gold (at $35 per ounce?) was produced by a leaser in 1935 from a rich pocket (Roppel, 2005).

**Alteration:**

The Goo Goo vein, like most of the other principal veins in the Sea Level mine area, is bordered by a hydrothermally altered zone up to three feet thick, characterized by generally fine-grain, light-gray to bluish-gray, massive, carbonate- and sericite-bearing rock that commonly contains cubic pyrite crystals up to an inch across (Maas and others, 1995, p. 215). Maas and others (1995) interpret this zone as hydrothermally altered mafic metavolcanic rock. Early miners called this altered rock 'blue porphyry,' which they interpreted as crosscutting altered dikes that predate the quartz veins, but are closely associated with some of the orebodies (Brooks, 1902, p. 65; Wright and Wright, 1908, p. 143). Gold content of these pyritic altered zones is high adjacent to the quartz veins and diminishes away from them. Weathered altered rocks have a reddish-brown, oxidized rind up to three inches thick.

**Age of mineralization:**

Maas and others (1995, p. 215) note that the quartz in the veins in the Sea Level mine area is not recrystallized; the veins thus are probably younger than most or all of the Late Cretaceous regional metamorphism.

**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:** Yes; small

**Site Status:** Undetermined

**Workings/exploration:**

The Goo Goo Mine and Goo Goo Extension (KC097) combined soon after their discovery and they share a common history. In addition, in the 1930's, both of them were sometimes linked with the Sea Level Mine (KC095).. Roppel (2005) provides extensive details of the complex history of these properties. The Goo Goo vein was located in 1904 and the Goo Goo Extension in 1907, and they soon were developed by a 20-foot shaft and 15-foot tunnel. Brooks (1902, p. 67) reported gold values up to $4.00 in gold per ton (at $20.67 per ounce).. About $1000 in gold (at $20.67 per ounce) was produced in 1907 from rich hand-picked samples processed with a mortar and pestle. Work continued through the 1920's and increased markedly in the 1930's with some underground exploration and considerable legal and other activity by the numerous people involved or investing in the property. Perhaps the most notable mining in the later history of the mining was the recovery in 1933 of $40,000 in gold (at $35 per ounce?) by a leaser from a rich pocket. The workings, dating back to the early 1900's, include 2 adits, one 1,800 feet long and one caved, a shaft, and several surface trenches and pits.

**Production notes:**

Combined recorded production from the Goo Goo and Goo Goo Extension claims, probably most in the early 1900s, was 1.4 kg of gold (Maas and others, 1995, p. 218). Notably, however, $40,000 in gold (at $35 per ounce?) was produced by a leaser in 1935 from a rich pocket (Roppel, 2005).

**Reserves:**

**Additional comments:**

Some early reports apparently refer to this property as the Golden Dream claim, or Mountain claim (Cobb and Elliott, 1980, p. 145).

**References:**

Brooks, 1902; Wright and Wright, 1908; Elliott and others, 1978; Cobb and Elliott, 1980; Berg, 1982; Berg and others, 1988; Maas and others, 1995; Crawford and others, 2000; Roppel, 2005.

**Primary reference:** Wright and Wright, 1908; Maas and others, 1995

**Reporter(s):** H.C. Berg (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Goo Goo Extension; Majestic; Mother Lode

**Site type:** Prospect

**ARDF no.:** KC097

**Latitude:** 55.3687 **Quadrangle:** KC B-4

**Longitude:** 131.1907

**Location description and accuracy:**

The Goo Goo Extension claim is in section 18, T. 75 S., R. 94 E., of the Copper River Meridian. It adjoins the Goo Goo claim (KC096) on the southwest. It is about 0.15 mile north of, and parallel to, Gokachin Creek, and extends from the shoreline of Thorne Arm northeastward to an elevation of about 150 feet. The coordinates at about the center of the claim. The site corresponds to loc. 94 in Elliott and others (1978), and to loc. 303 (1-16) in Maas and others (1995). The location is accurate.

Also see Additional comments.

**Commodities:**

**Main:** Au

**Other:** Pb, Zn

**Ore minerals:** Galena, gold, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The Goo Goo Extension and the Goo Goo Mine (KC096) combined soon after their discovery and they share a common history. In addition, in the 1930's, both of them were sometimes linked with the Sea Level Mine (KC095).. Roppel (2005) provides extensive details of the complex history of these properties. The Goo Goo vein was located in 1904 and the Goo Goo Extension in 1907, and they soon were developed by a 20-foot shaft and 15-foot tunnel. Brooks (1902, p. 67) reported gold values up to $4.00 in gold per ton (at $20.67 per ounce).. About $1000 in gold (at $20.67 per ounce) was produced in 1907 from rich hand-picked samples processed with a mortar and pestle. Work continued through the 1920's and increased markedly in the 1930's with some underground exploration and considerable legal and other activity by the numerous people involved or investing in the property. Perhaps the most notable mining in the later history of the mining was the recovery in 1933 of $40,000 in gold (at $35 per ounce?) by a leaser from a rich pocket. The workings, dating back to the early 1900's, include 2 adits, one 1,800 feet long and one caved, a shaft, and several surface trenches and pits.

The rocks in the area of the Sea Level Mine are mainly phyllite and semischist derived from pelitic sedimentary rocks and andesitic or basaltic volcanic rocks, intruded by Cretaceous granodiorite (Berg and others, 1988). The premetamorphic age of the strata is speculative. On the basis of various criteria, the rocks have been interpreted as Mesozoic or late Paleozoic (Berg and others, 1988) and Permo-Triassic or Jurassic-Cretaceous (Crawford and others, 2000). The bedded rocks and some of the granodiorite were regionally metamorphosed to greenschist grade in Late Cretaceous time and subsequently remetamorphosed to hornblende hornfels near contacts of Cretaceous granodiorite plutons emplaced after the regional metamorphism. The metamorphic and intrusive rocks are overlain by Quaternary or Tertiary andesite and basalt.

Wright and Wright (1908, p. 147) describe this deposit as a 20-foot-thick quartz vein in altered schists. The vein, which they suggest is a continuation of the Goo Goo vein (KC096), strikes N63E, and contains pyrite, sphalerite, and galena. Workings in the early 1900s consisted of an open pit 10 feet deep and a tunnel 10 feet long. At that time, a picked sample assayed $30 in gold per ton (at $20.67 per ounce) (Brooks, 1902, p. 67). Maas and others (1995, p. 217) report a mean value of 959 parts per billion gold in 24 samples of the Goo Goo Extension vein. Private examination in the early-mid-1980s of an 1,837-foot adit on the Goo Goo Extension claim outlined five zones of elevated gold values, mainly along the margins of the vein(s) (Maas and others, 1995, p. 215).

Maas and others (1995, p. 216) provide the following combined description of an auriferous quartz fissure vein more than 4900 feet long on the Goo Goo claim (KC096) and its continuation southwestward onto the adjoining Goo Goo Extension claim. The vein, which strikes NE and dips steeply SE, is in mafic metavolcanic rocks and contains, in addition to free gold, pyrite, sphalerite, and galena. Hydrothermally altered metavolcanic rock adjacent to the vein contains disseminated pyrite and accompanying gold values (see Alteration). The best results of sampling in 1946 (Maas and others, 1995, p. 217) included: 5.8 parts per million (ppm) gold in a section of vein 7.5 feet thick and 79 feet long; and 7.1 ppm gold in a section of vein 4.6 feet thick and 25 feet long. Thirty-one samples of the vein collected by Maas and others (1995) contained an average of 1.1 ppm gold. Maas and others' (1995) description of the Goo Goo (KC096) and Goo Goo Extension vein indicates that its character and setting are virtually identical to the main vein on the Sea Level claim (KC095).

Combined recorded production from the claims, probably much in the early 1900s, was 1.4 kg of gold. Notably, however, $40,000 in gold (at $35 per ounce?) was produced by a leaser in 1935 from a rich pocket (Roppel, 2005).

**Alteration:**

The Goo Goo Extension vein, like most of the other principal veins in the Sea Level mine area, is bordered by a hydrothermally altered zone up to three feet thick, characterized by generally fine-grain, light-gray to bluish-gray, massive, carbonate- and sericite-bearing rock that commonly contains cubic pyrite crystals up to an inch across (Maas and others, 1995, p. 215). Maas and others (1995) interpret this zone as hydrothermally altered mafic metavolcanic rock. Early miners called this altered rock 'blue porphyry,' which they interpreted as crosscutting altered dikes that predate the quartz veins, but are closely associated with some of the orebodies (Brooks, 1902, p. 65; Wright and Wright, 1908, p. 143). Gold content of these pyritic altered zones is high adjacent to the quartz veins and diminishes away from them. Weathered altered rocks have a reddish-brown, oxidized rind up to three inches thick.

**Age of mineralization:**

Maas and others (1995, p. 215) note that the quartz in the veins in the Sea Level Mine area is not recrystallized; the veins thus are probably younger than most or all of the Late Cretaceous regional metamorphism.

**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:** Yes; small

**Site Status:** Undetermined

**Workings/exploration:**

The Goo Goo Extension and the Goo Goo Mine (KC096) combined soon after their discovery and they share a common history. In addition, in the 1930's, both of them were sometimes linked with the Sea Level Mine (KC095). Roppel (2005) provides extensive details of the complex history of these properties. The Goo Goo vein was located in 1904 and the Goo Goo Extension in 1907, and they soon were developed by a 20-foot shaft and 15-foot tunnel. Brooks (1902, p. 67) reported gold values up to $4.00 in gold per ton (at $20.67 per ounce).. About $1000 in gold (at $20.67 per ounce) was produced in 1907 from rich handpicked samples processed with a mortar and pestle. Work continued through the 1920's and increased markedly in the 1930's with some underground exploration and considerable legal and other activity by the numerous people involved or investing in the property. Perhaps the most notable mining in the later history of the mining was the recovery in 1933 of $40,000 in gold (at $35 per ounce?) by a leaser from a rich pocket. The workings, dating back to the early 1900's, include 2 adits, one 1,800 feet long and one caved, a shaft, and several surface trenches and pits.

**Production notes:**

Combined recorded production from the Goo Goo and Goo Goo Extension claims, probably most in the early 1900s, was 1.4 kg of gold (Maas and others, 1995, p. 218). Notably, however, $40,000 in gold (at $35 per ounce?) was produced by a leaser in 1935 from a rich pocket (Roppel, 2005).

**Reserves:**

**Additional comments:**

Early reports refer to this property as the Majestic or Mother Lode claim.

**References:**

Brooks, 1902; Wright and Wright, 1908; Elliott and others, 1978; Berg, 1982; Berg and others, 1988; Maas and others, 1995; Crawford and others, 2000; Roppel, 2005.

**Primary reference:** Wright and Wright, 1908; Maas and others, 1995

**Reporter(s):** H.C. Berg (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Bonanza Hills; Main Saddle

**Site type:** Prospect

**ARDF no.:** LC016

**Latitude:** 60.7061 **Quadrangle:** LC C-5

**Longitude:** 154.5956

**Location description and accuracy:**

The Bonanza Hills prospect extends about 1.5 km along a ridge, between peak 3,860 and peak 3,966, in the Bonanza Hills. It is approximately 3.5 km east-southeast of Little (Upper) Bonanza Creek in the SW1/4SW1/4 sec. 6, T. 7 N., R. 30 W., of the Seward Meridian. The location is accurate.

**Commodities:**

**Main:** Ag, Cu, Pb

**Other:** Au

**Ore minerals:** Arsenopyrite, chalcopyrite, galena, tetrahedrite

**Gangue minerals:** Quartz

**Geologic description:**

A quartz-sulfide vein system containing tetrahedrite, arsenopyrite, galena, and chalcopyrite cuts sedimentary rocks and dacite hornfels (Eakins and others, 1978). The mineralization consists of a 3-meter-wide zone of quartz sulfide 'splatter' veinlets that extends at least 150 meters along strike to a depth of 50 meters. Channel samples contain an average of 103 grams of silver per tonne and 0.5 percent combined Cu and Pb. Samples contain up to 2.24 parts per million (ppm) gold.

The contact-metamorphosed dacite flows and sedimentary rocks are part of a Jurassic to Cretaceous unit (KJs) that consists of interbedded lithic graywacke, silty sandstone, black shale , and local conglomerate (Nelson and others, 1983). Irregular quartz segregations and veinlets are locally present. Scattered stocks and locally abundant dikes of intermediate to felsic composition intrude these sedimentary rocks. Contact aureoles of hornfels ring some of the larger igneous bodies which include rhyolite dikes and a Late Cretaceous, two-mica, hypabyssal, granite pluton (Nokleberg and others, 1997).

Liberty Star Uranium and Metals Corporation (2007) has 54 State of Alaska claims covering about 13.5 square miles around this prospect. Twenty samples were collected in their preliminary work; 5 contained 0.001 to 0.006 ounce of gold per ton, 2 contained 0.02 ounce of gold per ton, 1 contained 0.267 ounce of gold per ton, one contained 0.403 ounce of gold per ton, and one contained 3.11 ounces of gold per ton.

**Alteration:**

Unknown.

**Age of mineralization:**

Cretaceous or younger.

**Deposit model:**

Gold vein system or disseminated gold deposit associated with a composite intrusive center?

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

In 2008 within a large block of claims held by Liberty Star Uranium and Metals Corporation who did preliminary sampling.

**Production notes:**

No production.

**Reserves:**

Nokleberg and others (1987; 1997) estimate that the deposit contains 45,000 tonnes of material with a grade of 81 grams of silver per tonne, 0.15 grams of gold per tonne, 0.15 percent copper, and 0.067 percent lead.

**Additional comments:**

**References:**

Eakins and others, 1978; Cobb and Reed, 1981, OFR 81-1343A; Cobb and Reed, 1981, OFR 81-1343B; Nelson and others, 1983; Nelson and others, 1985; Nokleberg and others, 1987; Liberty Star Uranium and Metals Corp., 2007.

**Primary reference:** Eakins and others, 1978

**Reporter(s):** M.L. Miller (USGS); D.P. Bickerstaff (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Big Chunk; White Sox

**Site type:**

**ARDF no.:** LC054

**Latitude:** 60.0136 **Quadrangle:** LC A-7

**Longitude:** 155.5332

**Location description and accuracy:**
In 2003, Liberty Star Uranium and Metals Corp. staked two large blocks of claims that covered about 177 square miles. In 2004 and 2005, they did considerable surface work and drilled four holes on them. The exact locality of the drill holes is uncertain and arbitrarily the coordinates are placed at about the center of the largest block of claims near the center of section 7, T. 2 S., R. 36 W. However, the drilling may be many miles away. The outline of the claim blocks is shown on Liberty Star's web site (2008).

**Commodities:**

**Main:** Au, Cu, Mo

**Other:**

**Ore minerals:** Chalcopyrite, molybdenite

**Gangue minerals:**

**Geologic description:**
In 2003, Liberty Star Uranium and Metals Corp. (2007) staked two large blocks of claims that covered an area of about 177 square miles. They carried out extensive surface sampling and geochemical and geophysical surveys in 2004 and 2005 and drilled 4 holes at the White Sox locality in 2004 that totaled 1,329 feet. Visible chalcopyrite and molybdenite was seen in the core which contained low gold values. The data suggest a copper porphyry.

**Alteration:**
No information.

**Age of mineralization:**

**Deposit model:**
Au-Cu-Mo porphyry.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
In 2003, Liberty Star Uranium and Metals Corp. (2007) staked two large blocks of claims that covered an area of about 177 square miles. They carried out extensive surface sampling and geochemical and geophysical surveys in 2004 and 2005 and drilled 4 holes at the White Sox locality in 2004 that totaled 1,329 feet.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Liberty Star Uranium and Metals Corp., 2007.

**Primary reference:** This record

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (near Winter Creek)

**Site type:** Prospect

**ARDF no.:** LG032

**Latitude:** 65.4195 **Quadrangle:** LG B-4

**Longitude:** 148.6158

**Location description and accuracy:**
This prospect was drilled at several locations in section 20, T. 7 N., R. 5 W., south of Shorty Creek, near Winter Creek . Note that this may be the same as the nearby Shorty Creek prospect (LG203).

**Commodities:**

**Main:** Cu, Mo

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
This copper-molybdenum prospect was discovered in 1972 and was drilled at several locations (Eakins, 1974, p. 2). The geologic setting is Cretaceous clastic rocks intruded by felsic dikes.

**Alteration:**

**Age of mineralization:**

**Deposit model:**
Porphyry Cu-Mo ? (Cox and Singer, 1986; model 21a).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
21a?

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**
This prospect was drilled at several locations in 1972; however, there was no activity in the following years (Eberlein and others, 1977).

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Eakins, 1974; Eberlein and others, 1977.

**Primary reference:** Eakins, 1974

**Reporter(s):** C.J. Freeman, J.R. Guidetti Schaefer (Avalon Development Corporation); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Livengood; Old Smoky; Ruth Creek; Lillian Creek

**Site type:** Prospect

**ARDF no.:** LG202

**Latitude:** 65.5091 **Quadrangle:** LG C-4

**Longitude:** 148.5335

**Location description and accuracy:**

This site is at about the center of an east-trending area about a mile long and a half mile wide that in 2008 was being intensively studied and drilled by International Tower Hill Mines Ltd. The center of the area is about 0.5 miles northwest of Money Knob and about 0.6 mile west-northwest of the center of section 23, T. 8 N., R. 5 W., of the Fairbanks Meridian. The area includes several older prospects--Old Smoky, Ruth Creek, and Lillian Creek--that have similar mineralization and are now collectively called the Livengood prospect by International Tower Hill. The location is accurate.

**Commodities:**

**Main:** As, Au, Fe, Sb

**Other:**

**Ore minerals:** Arsenopyrite, cinnabar, gold, pyrite, scorodite, stibnite

**Gangue minerals:** Calcite, quartz

**Geologic description:**

In 2006, work began at the Livengood prospect by International Tower Hill Mines Ltd. (Klipfel, 2008); it covers a large area near Money Knob that includes several smaller and older prospects including the Lillian Creek, Ruth Creek, and Old Smokey prospects that individually are now mainly of historic interest.

The Lillian Creek prospect consisted of narrow auriferous arsenopyrite-quartz-scorodite veins in and near a limonite-stained dike in altered and contorted graywacke-argillite country rock; samples contained from 0.5 to 48 parts per million (ppm) gold (Foster, 1968). Joesting (1942, ATDM Pamph. 1), reported a mineralized zone in a cut bank that contains stibnite and traces of cinnabar and gold. The Ruth Creek prospect consists of numerous, nearly vertical quartz veinlets striking S20-60E, that contain pyrite and arsenopyrite (Mertie, 1918). Some of these veins contain up to 0.58 ounces of gold per ton . The veinlets are cut by calcite veins carrying some gold and sulfides (Mertie, 1918). Contiguous mineralized zones are up to 36 inches wide in altered dolomite-calcite-quartz-sulfide rock (Foster and Chapman, 1967).

The best known of the older prospects near Money Knob was the Old Smoky prospect. Trenching near the head of Olive Creek exposed narrow, northwest-trending auriferous arsenopyrite-quartz veins in ferruginous quartzite near the intersection of an altered, porphyritic, biotite-monzonite dike, and a potassium feldspar-porphyry dike (Foster, 1968). The mineralization is in shale, argillite, fine-grained sandstone, and pebbly conglomerate (Allegro, 1984; Athey, Szumigala, and others, 2004; Athey, Werdon, Newberry, and others, 2004; Athey, Werdon, Szumigala, and others, 2004; Athey and Craw, 2004;. Narrow zones of thermal metamorphism occur along sheared contacts between the sedimentary rocks and hypabyssal igneous intrusive rocks.

Most of the intrusive rocks at the Old Smokey prospect and some of the sedimentary host rocks have experienced variable degrees of metasomatic hydrothermal alteration followed by lower temperature supergene alteration (Allegro, 1984, p. 4). Allegro described four types of hydrothermal **Alteration:** 1) silicification, as partial to complete replacement of the host rock by a dense network of quartz veinlets generally localized along contacts between the intrusive and sedimentary rocks; 2) sericitization, as fine- to medium-grained white mica in selvages along quartz veins, as anastomosing sericite-opaque mineral veinlets, and as patchy to massive sericitic replacement of feldspar, ferromagnesium minerals and quartz; 3) deposition of trigonal nets of needle-like rutile often associated with secondary quartz and minor feldspar; and 4) epidote +/- sericite as a replacement of calcic plagioclase and ferromagnesian minerals resulting in massive aggregates, pseudomorphs, veins, and vug fillings of epidote commonly associated with sericite, opaque minerals, and quartz.

Allegro's (1984) investigation and sample data reveal that the mineralization in the southern portion of the Old Smoky cut is localized along the contact zones between the biotite monzonite and the surrounding sedimentary rocks, and along a contact between biotite monzonite and feldspar porphyry. Channel and chip samples of arsenopyrite-stibnite quartz veins from these zones contained 1.0 to 29.8 ppm gold. Selected samples from the prospect contain 3 to 13 ppm gold as determined by atomic absorption, and 1.6 to 7.0 ppm gold as determined by fire assay-atomic absorption (Foster, 1968, p. 2). Adjacent to the sheared contact zone, the intrusive rocks are either highly silicified with abundant rutile and some epidote, sericite, arsenopyrite, and minor stibnite, or contain epidote with sericite, rutilated quartz and arsenopyrite (Allegro, 1984, p. 6). Other rocks from the contact zone show intense supergene effects such as clay alteration, covellite and iron-oxides. In some cases these zones contain gold. Green scorodite is present throughout the mineralized areas.

In the northern portion of the Old Smoky prospect, the most abundant mineralization is located along the contact area between the feldspar porphyry and a roof pendant of sandstone and shale (Allegro, 1984). A massive 1-meter-wide stibnite lens surrounded by a bleached sericite zone occurs along the northern contact of the roof pendant. Channel samples along this contact zone range from 0.5 to 4.3 ppm gold (Allegro, 1984, p. 6). Some gold is also associated with saprolitic zones in all the intrusive phases but these zones are not limited to shear zones or contacts (Allegro, 1984, p. 6).

In recent years, several companies have worked in the area near Money Knob (Klipfel, 2008): Homestake drilled 6 holes in 1976; Occidental Petroleum drilled 6 holes in 1981; Amax Exploration drilled 3 holes in 1991 and did surface geochemistry and sampling; Placer Dome drilled 9 holes in 1995 and 1996, and Cambior explored in 2001-2002. In 2003, AngloGold Ashanti (USA) Exploration began work and drilled 12 holes. In 2006, International Tower Hill Mines Ltd. acquired the property and began an aggressive exploration program and in 2007, they drilled 12 holes and defined a mineralized area of about 2 square kilometers with potential for expansion on all sides. In addition to drilling there has been considerable geologic mapping and sampling and geochemical and geophysical surveys by the various companies.

As interpreted by International Tower Hill ((2008, Resource; Livengood) the mineralization consists of multi-stage gold-quartz veins with pyrite, arsenopyrite, stibnite, and other sulfides in addition to disseminated mineralization. The mineralization is associated with 92 to 93 Ma dikes and sills of monzonite, diorite, and syenite in thrust-bounded, Devonian sedimentary and volcanic rocks and in older metamorphic rocks. The dikes and sills are probably apophyses of a deeper Cretaceous intrusion. The mineralization is considered to be intrusion related and associated with a series of northwest-trending faults. The 27 holes drilled by AngloGold and International Tower Hill Mines suggests the a bulk tonnage gold deposit; the average thickness of the mineralization in those holes is about 70 meters with a grade of 0.9 grams of gold per ton. The first 5 holes drilled in 2007 included 28 meters with 1.7 grams of gold per ton and 16 meters with 2.1 grams of gold per ton. The area of the known mineralization is associated with a much larger gold-in-soil anomaly.

Early in 2008, International Tower Hill (Klipfel, 2008) announced that their initial inferred gold resource of the Livengood project was 181 million tonnes of ore with an average grade of 0.54 ounce of gold per ton and 0.30 grams of silver per ton, at a cut-off grade of 0.3 gram of gold per tonne, A resource of 3.629 million ounces of gold and 1.789 million ounces of silver. The deposit is still open in several directions.

**Alteration:**

Allegro (1984) described four types of hydrothermal **Alteration:** 1) silicification, as partial to complete replacement of the host rock by a dense network of quartz veinlets generally localized along contacts between the intrusive and sedimentary rocks; 2) sericitization, as fine- to medium-grained white mica in selvages along quartz veins, as anastomosing sericite-opaque mineral veinlets, and as patchy to massive sericitic replacement of feldspar, ferromagnesium minerals and quartz; 3) deposition of trigonal nets of needle-like rutile often associated with secondary quartz and minor feldspar; and 4) epidote +/- sericite as a replacement of calcic plagioclase and ferromagnesian minerals resulting in massive aggregates, pseudomorphs, veins, and vug fillings of epidote commonly associated with sericite, opaque minerals, and quartz.

**Age of mineralization:**
Probably Cretaceous based on its associated with the periphery of a Cretaceous intrusion.

**Deposit model:**
Gold-quartz veinlets and disseminated mineralization associated with sills and dikes at the periphery of a Cretaceous intrusive.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
Thin gold-quartz veins have been known in the area since at least 1918 but major exploration did not begin in the Money Knob area until the 1970's (Klipfel, 2008): Homestake drilled 6 holes in 1976; Occidental Petroleum drilled 6 holes in 1981; Amax Exploration drilled 3 holes in 1991; Placer Dome drilled 9 holes in 1995 and 1996; and Cambior explored in 2001-2002. In 2003, AngloGold Ashanti (USA) Exploration began work and drilled 12 holes. In 2006, International Tower Hills, Mines acquired the property and began an aggressive exploration program; they drilled 15 holes on the property in 2007. In addition to drilling there has been considerable geologic mapping and sampling and geochemical and geophysical surveys by the various companies.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Brooks, 1916 (B 642); Smith, 1917 (BMB 153); Brooks, 1918; Mertie, 1918; Martin, 1920; Overbeck, 1920; Mertie, 1923; Smith, 1926; Moffit, 1927; Smith, 1929; Smith, 1930 (B 813); Smith, 1932 (B 824); Smith, 1933 (B 836); Smith, 1933 (B 844); Smith, 1934 (B 857); Smith, 1934 (B 864); Smith, 1936; Smith, 1937; Smith, 1938; Smith, 1939 (B 910); Smith, 1939 (B 917); Smith, 1941; Smith, 1942; Joesting, 1942 (ATDM Pamph. 1); Joesting, 1943; Bates and Wedow, 1953; Saunders, 1955; Wedow and others, 1954; Burand, 1966; Berg and Cobb, 1967; Foster and Chapman, 1967; Overstreet, 1967; Foster, 1968; Koschmann and Bergendahl, 1968; Cobb, 1972 (MF 413); Cobb, 1973 (B 1374); Allegro, 1984; Cobb, 1976 (OFR 76-819); Swainbank and others, 1991; Athey and Craw, 2004; Athey, Szumigala, and others, 2004; Athey, Werdon, Newberry, and others, 2004; Athey, Werdon, Szumigala, and others, 2004; International Tower Hill Mines, Ltd., 2008 (Livengood); International Tower Hill Mines, Ltd., 2008 (Resource); Klipfel, 2008.

**Primary reference:** Klipfel, 2008

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Shorty Creek

**Site type:** Prospect

**ARDF no.:** LG203

**Latitude:** 65.4340 **Quadrangle:** LG B-4

**Longitude:** 148.5550

**Location description and accuracy:**
The location of the Shorty Creek prospect is uncertain other than that it is near Livengood and presumably near Shorty Creek. For this record, the the prospect is assumed to be in upper Shorty Creek near the center of section 15, T. 7 N., R. 5 W. This may be the same as or an extension of the unnamed prospect (LG032) that was drilled on lower Winter Creek about 2.3 miles to the southwest , a prospect that itself if poorly known and located.

**Commodities:**

**Main:** Au, Cu, Mo

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
In 2005, Select Resources (Tri-Valley Corporation, 2008) began work on the Shorty prospect which had previously been explored by surface geochemistry and drilling. (It is unclear, however, whether this prior work was previously unreported here or at the unnamed prospect about 2 miles to the southwest (LH032). In 2005, Select Resources collected soil samples in an area of about a square mile over four aeromagnetic anomalies and identified four base and precious metal anomalies.

**Alteration:**
No information.

**Age of mineralization:**

**Deposit model:**

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
In 2005, Select Resources (Tri-Valley Corporation, 2008) began work on the Shorty prospect which had previously been explored by surface geochemistry and drilling. (It is unclear, however, whether this prior work was previously unreported here or at the unnamed prospect about 2 miles to the southwest (LH032).) In 2005, Select Resources collected soil samples in an area of about a square mile over four aeromagnetic anomalies and identified four base and precious metal anomalies.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Tri-Valley Corp., 2008.

**Primary reference:** This record

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Coffee Dome

**Site type:** Prospect

**ARDF no.:** LG204

**Latitude:** 65.0957 **Quadrangle:** LG A-1

**Longitude:** 147.0827

**Location description and accuracy:**

The Coffee Dome prospect is on a large block of claims that cover about 16 square miles. However, most of the known mineralization is in an elongate north-trending area about 0.8 mile long and 0.3 mile wide near the center of section 11, T. 2 N., R. 3 E. The coordinates are at about the center of this area and about 2 miles east of Coffee Dome. The location is accurate.

**Commodities:**

**Main:** Au, Bi, Te

**Other:** Cu, Pb, Sb, Zn

**Ore minerals:** Arsenopyrite

**Gangue minerals:** Quartz

**Geologic description:**

The Coffee Dome prospect is controlled by Internal Tower Hill Mines, Ltd. (2008, Coffee Dome) who staked the property from 2004 to 2006. Through 2006, the work on the property was mainly stream sediment and soil geochemical surveys and some sampling of surface mineralization. The property was first identified from anomalous gold, tellurium, and bismuth geochemical anomalies and mineralized samples collected at the surface. The mineralized samples consist of banded quartz veins 10 to 30 cm thick with scorodite and occasionally arsenopyrite. During 2007, International Tower Hill (2007, Trenching) dug several trenches over the main target area that exposed veins with grades of up to 168 grams of gold per ton and high silver, arsenic, antimony, bismuth, and tellurium. Soil surveys defined two large areas anomalous in gold that are thought to reflect a large gold system over 3 kilometers long and 1 kilometer wide. They consider the deposit analogous to the Pogo mine (BD033) and probably close to an intrusive source. The rocks in the area generally consist of middle to early Paleozoic and(or) Late? Proterozoic quartz and pelitic schist of the Yukon-Tanana Upland (Wilson and others, 1998).

**Alteration:**

No data.

**Age of mineralization:**

**Deposit model:**

Arsenopyrite-gold-quartz veins with tellurium and bismuth.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The Coffee Dome prospect is controlled by Internal Tower Hill Mines, Ltd. (2008, Coffee Dome) who staked the property from 2004 to 2006. Through 2006, the work on the property was mainly stream sediment and soil geochemical surveys and some sampling of surface mineralization. During 2007, International Tower Hill (2007, Trenching) dug several trenches that exposed mineralization and they extended their soil surveys.

**Production notes:**

**Reserves:**

**Additional comments:**

The claims that cover the Coffee Dome prospect are both State of Alaska mining claims and land leased from the University of Alaska; as of 2007, most of the known mineralization is on the University of Alaska lands.

**References:**

Wilson and others, 1998; International Tower Hill Mines, Ltd., 2007 (Trenching); International Tower Hill Mines, Ltd., 2008 (Coffee Dome).

**Primary reference:** This record

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Terra

**Site type:** Prospect

**ARDF no.:** LH010

**Latitude:** 61.7739 **Quadrangle:** LH D-2

**Longitude:** 153.7027

**Location description and accuracy:**
In 2005, drilling began on the Terra prospect about 1.5 miles south of the terminus of the glacier at the head of Fish Creek, a headwater tributary to the Post River. The coordinates are at that location. However, the property consists of a large block of claims that cover about 11,441 hectares to the north and south of Fish Creek. The claims also include the Three Cubs prospect (LH009) and an unnamed prospect (LH010) which may represent similar mineralization. The center of the 2005 drill sites is accurately located about 0.5 mile south-southwest of the center of section 31, T. 19 N., R. 24 W., of the Seward Meridian.

**Commodities:**

**Main:** Ag, Au, Cu, Mo,Pb

**Other:** As, Sb, W

**Ore minerals:** Arsenopyrite, chalcopyrite, electrum, galena, jordanite, molybdenite, native gold, pyrite, pyrrhotite, sphalerite, tennantite

**Gangue minerals:** Carbonate, quartz, sericite

**Geologic description:**
In 1990 Allen reported anomalous gold in a rock at sample location 819 from a basal moraine at this locality. A GIS compilation and follow-up of published U.S. Geological survey mapping and sampling in the area (Allen, 1990; Allen and others 1990; Allen and Slaughter, 1990) by Kennecott Exploration led to the discovery on the Terra property of finely disseminated native gold and minor sulfides and sulfosalts in tectonic breccias and carbonate-quartz veins in monzonite and diorite intrusive rocks of the Hartman sequence and Jurassic or Lower Cretaceous hornfelsed sedimentary rocks of the Kahiltna terrane (Porterfield, 2000). Porterfield describes two target areas, each approximately 6,000 feet in length, that contain high-grade mineralization in quartz veins--as much as 687 parts per million (ppm) gold and 1,135 ppm silver-- and carbonate-cemented tectonic breccias (as much as 71 ppm gold and 572 ppm silver) that cut intrusive rock and hornfels. Rock-chip samples, talus fines, and soil samples were collected from two target areas on the Terra prospect. Gold assays have a positive correlation with arsenic, silver, antimony, copper, and lead, and Porterfield (2000) reports that bismuth and tungsten are anomalous in some samples.

In 2004, AngloGold Ashanti (USA) Exploration, Inc. began work on the Terra prospect with surface geochemistry and outcrop sampling and in 2005, drilled 12 holes south of the terminus of the glacier at the head of Fish Creek. In 2006, International Tower Hill Mines began work on the property in a joint venture with AngloGold; they drilled 12 holes in 2006 and another 15 holes in 2007 (International Tower Hill Mines, Ltd., 2008, Terra).

The mineralization at the Terra prospect consists of high-grade epithermal, quartz-carbonate veins 0.1 to 2 meters thick with visible gold. The veins are near the periphery of a Cretaceous diorite stock that intrudes a thick sequence of carbonaceous shale of the Late Jurassic Kahinta Shale. The veins typically contain gold, electrum, sulfosalts, arsenopyrite, pyrite, pyrrhotite, sphalerite, and chalcopyrite. Alteration includes silica-rich selvages near the veins and sericite-rich selvages farther away. The selvages may also contain up to 10 percent pyrite and arsenopyrite but seldom extend more than a meter from the veins. The holes on the Ben Vein indicate that it extends for at least 400 meters along strike to a depth of at least 350 meters. It varies from from 0.2 to 3.0 meters wide and has an average gold value of 19.8 grams per ton. . Five other vein systems have been identified on the prospect including a new discovery in 2007, the Ice vein. All of the vein systems have a north-northwest to north-south strike with with variable west dips.

Early in 2008, International Tower Hlll (Klipfel, Paul, 2008) announced an inferred resource estimate for the Ben Vein of 168,000 ounces of gold and 318,000 ounces of silver in ore with an average grade of 12.2 grams of gold per ton and 23.1 grams of silver per ton. The mineralization is open at both ends and at depth.

**Alteration:**

Carbonate, iron-oxide, quartz, and sericite in selvages near the veins.

**Age of mineralization:**

Cretaceous? Sericite from a quartz vein in hornfels gave an Ar/Ar age date of 66.4 +/- 5.7 Ma (Porterfield, 2000).

**Deposit model:**

Epithermal gold-silver veins.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

Kennecott Exploration carried out reconnaissance mapping and surface sampling in the late 1990's that first identified the Terra deposit (Porterfield, 2000). In 2004, AngloGold Ashanti (USA) Exploration, Inc. (2008) began work on the Terra prospect with surface geochemistry and outcrop sampling, and in 2005 they drilled 12 holes south of the terminus of the glacier at the head of Fish Creek. In 2006, International Tower Hill Mines began work on the property in a joint venture with AngloGold; they drilled 12 holes in 2006 and another 15 holes in 2007.

**Production notes:**

**Reserves:**

Early in 2008, International Tower Hlll (2008, Terra) announced an initial inferred resource estimate for the Ben Vein of 168,000 ounces of gold and 318,000 ounces of silver in ore with an average grade of 12.2 grams of gold per ton and 23.1 grams of silver per ton. The mineralization is open at both ends and at depth.

**Additional comments:**

**References:**

Reed and Elliott, 1970; Allen, 1990; Allen and others, 1990; Allen and Slaughter, 1990; Porterfield, 2000; International Tower Hill Mines, Ltd., 2008 (Terra); Klipfel, 2008.

**Primary reference:** International Tower Hills, Ltd., 2008 (Terra)

**Reporter(s):** Travis L. Hudson (Applied Geology) and Madelyn A. Millholland (Millholland & Associates); D. J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Chisna

**Site type:** Prospect

**ARDF no.:** MH365

**Latitude:** 63.1499 **Quadrangle:** MH A-2

**Longitude:** 144.7989

**Location description and accuracy:**

This prospect consists of a block of 180 State of Alaska claims that were staked in 2006 south of upper Slate Creek. near Chisna Pass. Most of the exploration was in the west half of section 25, T. 16 N., R. 14 E. and the coordinates are at about the center of that work. However, samples were also collected about 1.5 miles to the northwest and some about 2 miles to the southeast.

**Commodities:**

**Main:** Au, Cu

**Other:** Ni

**Ore minerals:** Chalcopyrite, gold

**Gangue minerals:** Quartz

**Geologic description:**

International Tower Hill Mines, Ltd. staked a block of 180 claims south of Chisna Pass in 2006 and did some limited sampling as an initial step in determine the potential of what they considered a favorable area for mineralization (International Tower Hill Mines, 2008). Further work in 2007 delineated anomalous nickel in the Miller Gulch Gabbro and gold-copper mineralization in the Powell Creek Diorite where a strongly silicified zone over a half-kilometer long was identified. Thirty-nine samples from this silicified zone--the POW discovery-- averaged 1.1 gram of gold per ton, 7.9 grams of silver per tonne, and 0.3 percent copper.

The rocks in the area mainly are part of the Pennsylvanian to Permian Mankomen Formation which here consists of basalt to dacite flows, breccia, agglomerate and tuff, and minor interbedded siltstone and stone, with rhyolite quartz porphyry in flows, sills, and dikes. These rocks are intruded by several large intrusions of gabbro and diorite.

**Alteration:**

Strong silica-pyrite alteration zones.

**Age of mineralization:**

**Deposit model:**

Gold and copper in altered zones volcanics rocks.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

International Tower Hill Mines, Ltd. staked a block of 180 claims south of Chisna Pass in 2006 and did some limited sampling as an initial step to determine the potential of what they consider a favorable area for mineralization (International Tower Hill Mines, 2008, Chisna). Further work in 2007 included an airborne geophysical survey and additional surface sampling that identified several zones of mineralization.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

International Tower Hill Mines, Ltd., 2008 (Chisna).

**Primary reference:** International Tower Hill Mine Ltd., 2008 (Chisna)

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Bulk Gold

**Site type:** Prospect

**ARDF no.:** NM071

**Latitude:** 64.7912 **Quadrangle:** NM D-1

**Longitude:** 165.2874

**Location description and accuracy:**

The Bulk Gold prospect of Altar Resources consists of a large block of State claims in the upper valley of Dorothy Creek. The coordinates are near the center of the block of claims; the widespread mineralization include much of sections 13 and 14, parts of section 15, and much of sections 23 and 24, T. 8 S., R. 33 W., Kateel River Meridian. The claims include the old Hed and Strand mine (NM070). The location is accurate.

**Commodities:**

**Main:** Au, Sb

**Other:** As, Bi

**Ore minerals:** Arsenopyrite, gold, stibnite

**Gangue minerals:** Calcite, quartz

**Geologic description:**

The Bulk Gold prospect was first identified in 1992 by Altar Resources by following up stream sediment samples anomalous in gold, arsenic, and antimony (Andover Ventures, 2006, Nome Drill Program; 2007, Gold Results; 2008, Bulk Gold). Between 1993 and 2003, Altar, variously with Teck Exploration and Consolidated Aston collected over 400 soil samples over the deposit and about 50 rock-chip samples. They drilled 8 shallow holes in the deposit. The most encouraging intercepts were 0.78 gram of gold per ton over 45 feet and 25 feet that averaged 0.9 gram of gold per ton. A sample in the saddle at the head of Dahl Creek contained 1.65 grams of gold per tonne, and 9,510 parts per million (ppm) arsenic. This saddle area was trenched and drilled in 1998. Four pits were dug at 300-foot intervals across the saddle. Bedrock samples from these pits contained 575 to 1,210 parts per billion (ppb) gold and 3,960 to 10,000 ppm arsenic. Andover Ventures is now (2008) the 100% owner.

In late 2006, Andover (2006, Nome Drill Program; 2007, Gold Results; 2008, Bulk Gold) drilled 8 shallow holes that totaled 285.7 meters. The most significant intercepts were 6.2 meters that that averaged 0.20 gram of gold per ton, 5.7 meters that averages 1.20 gram of gold per ton, and 6.7 meters that averaged 0.51 gram of gold per ton.

The property now being explored by Andover Resources (2008) has 4 types of mineralization on the property: 1) discordant, high-angle, high-grade stibnite-arsenopyrite-gold quartz veins (such as at the Hed and Strand mine (NM070)); 2) stratiform, possibly strata-bound disseminated gold mineralization at marble-schist contacts, 3) disseminated gold and arsenopyrite in metamorphosed felsic intrusive rocks, and 4) low-angle, high-grade gold-quartz veins. In 2001, Altar identified a 1400-foot-long geochemical anomaly--the 'Dripping Gold Zone'--associated with marble and mineralized schist; soil samples contained as high as 5.1 grams of gold per ton and more than 10,000 ppm arsenic. One float sample of altered arsenopyrite-bearing intrusive rock contained 4.5 grams of gold per ton; another contained 1.5 gram of gold per ton, more than 200 ppm silver, and 338 ppm bismuth. There are also several other notable geochemical anomalies; the Dorothy Creek gold-arsenic anomaly which is about 3,000 feet long and the Discovery Hole gold-arsenic-antimony anomaly which is 1,600 feet long and 200 to 400 feet wide.

The Bulk Gold prospect is underlain mainly by massive marble and feldspathic epidote-bearing schist. The epidote-bearing schist may be part of a regional mafic metavolcanic assemblage that has an Ordovician protolith (Till and Dumoulin, 1994). Hummel (1962 [MF 248]) mapped an approximately east-west, high-angle fault in Dahl Creek; the fault is upthrown on the south side. Earlier authors, including Mertie (1918 [B 662-I, p. 425-449]) and Cathcart (1922) noted a nearby metamorphosed granite body as possibly related to the mineralization at the Hed & [and] Strand mine, and Hummel (1962 [MF 248]) and Bundtzen and others (1994) mapped granitic orthogneisses in the area.

The metamorphic rocks in this area are part of the Nome Group derived from Proterozoic to early Paleozoic protoliths (Till and Dumoulin, 1994). The Nome Group rocks underwent regional blueschist facies metamorphism in the Late Jurassic or Early Cretaceous (Sainsbury, Coleman, and Kachadoorian, 1970; Forbes and others, 1984; Thurston, 1985; Armstrong and others, 1986; Hannula and McWilliams, 1995). The blueschist facies rocks were recrystallized to greenschist facies or higher metamorphic grades in conjunction with regional extension, crustal melting, and magmatism in the mid-Cretaceous (Hudson and Arth, 1983; Miller and Hudson, 1991; Miller and others, 1992; Dumitru and others, 1995; Hannula and others, 1995; Hudson, 1994; Amato and others, 1994; Amato and Wright, 1997, 1998). Lode gold mineralization on Seward Peninsula is mostly related to the higher temperature metamorphism in the mid-Cretaceous (Apodoca, 1994; Ford, 1993 [thesis]; Ford and Snee, 1996; Goldfarb and others, 1997).

**Alteration:**

Quartz veining and apparently some disseminated pyrite and arsenopyrite in nearby schist.

**Age of mineralization:**

Lode gold mineralization on Seward Peninsula is mostly related to higher temperature metamorphism in the mid-Cretaceous.

**Deposit model:**

Disseminated gold and stratabound gold in metamorphic rocks, and in gold-arsenopyrite-stibnite quartz veins.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The Bulk Gold prospect was first identified in 1992 by Altar Resources by following up stream-sediment anomalies in gold, arsenic, and antimony (Andover Ventures, 2006, Nome Drill Program; 2007, Gold Results; 2008, Bulk Gold) . Between 1993 and 2003, Altar variously with Teck Exploration and Consolidated Aston collected over 400 soil samples over the deposit and about 50 rock-chip samples. They drilled 8 shallow holes and dug 4 pits across a prominent area of mineralization. In late 2006, Andover Ventures (2006, Nome Drill Program; 2007, Gold Results) drilled 8 shallow holes that totaled 285.7 meters. In 2001, Altar identified a 1400-foot geochemical anomaly, the 'Dripping Gold Zone'. There are several other strong geochemically anomalous zones: the Dorothy Creek gold-arsenic anomaly which is about 3,000 feet long, and the Discovery Hole gold-arsenic-antimony anomaly, which is 1,600 feet long and 200 to 400 feet wide.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Mertie, 1918 (B 662-I); Cathcart, 1922; Hummel, 1962 (MF 248); Sainsbury, Coleman, and Kachadoorian, 1970; Hudson and Arth, 1983; Forbes and others, 1984; Thurston, 1985; Armstrong and others, 1986; Miller and Hudson, 1991; Miller and others, 1992; Ford, 1993 (thesis); Apodoca, 1994; Hudson, 1994;

Bundtzen and others, 1994; Till and Dumoulin, 1994; Amato and others, 1994; Dumitru and others, 1995; Hannula and others, 1995; Hannula and McWilliams, 1995; Ford and Snee, 1996; Goldfarb and others, 1997; Amato and Wright, 1997; Amato and Wright, 1998; Andover Ventures, 2006 (Nome Drill Program); Andover Ventures, 2007 (Gold Results); Andover Ventures, 2008 (Bulk Gold).

**Primary reference:** This report

**Reporter(s):** C.C. Hawley and Travis L. Hudson (Hawley Resource Group); D.J. Grybeck (Port Ludlow, WA); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Rock Creek (lode); Nugent

**Site type:** Prospect

**ARDF no.:** NM207

**Latitude:** 64.6148 **Quadrangle:** NM C-1

**Longitude:** 165.4181

**Location description and accuracy:**

The Rock Creek lode prospect extends for a strike distance of at least 1,000 feet in the Rock Creek valley above the confluence of Rock Creek and Sophie Gulch (NM208). The coordinates are at about the mid-point of the deposit, about 1.4 miles southwest of Mount Brynetson. The location is just inside the south-central border of section 14, T. 10 S., R. 34 W., of the Kateel River Meridian, and it is accurate to within 500 feet. It is included in locality 43 of Cobb (1972 [MF 463], 1978 [OFR 78-93]).

**Commodities:**

**Main:** Au

**Other:** Ag, Pb, Sb, W, Zn

**Ore minerals:** Arsenopyrite, boulangerite, galena, gold, hematite, limonite, pyrite, scheelite, stibnite, sphalerite

**Gangue minerals:** Albite, ankerite, calcite, quartz

**Geologic description:**

Gold-bearing, northeast-striking quartz veins in schist were known on Rock Creek by 1903 (Collier and others, 1908). Sheeted veins were later described, massive veins were locally worked, and some residual placer gold and scheelite were produced from weathered sheeted vein complexes (Moffit, 1913, p. 75-76; Mertie, 1918 [B 662-I, p. 436]; Cathcart, 1922). Lodes in the Rock Creek area were principal examples of disseminated lode gold deposits identified in a regional mineral assessment during the 1970's (Hudson and others, 1977; Hudson and DeYoung, 1978). This deposit is the most extensively explored gold lode in the Nome mining district. Significant exploration to better define the gold grades, including extensive trenching and drilling, has taken place episodically through from the 1980's to the present (2007) since its relocation by geologist R. V. Bailey of Denver in the early 1980's.

As of early 2006, NovaGold Resources Inc. (2006, Projects) is developing the property and carrying out an aggressive infill drilling program which began in 2003. The 2003 drilling totaled 8,000 m and increased total drilling on the project to 18,960 meters in 217 drill holes. Intensive infill drilling continued in 2004 when 82 core and rotary drill holes totaling 20,000 feet (5,900 meters) were completed. The infill drilling results are incorporated in a feasibility study that was started in late 2003. A positive feasibility study could lead to production from a 500 meter by 1,500 meter by 100 meter open pit by 2007. The proposed mine which would produce 5,000 to 7,000 tons per day is expected to produce about 100,000 ounces of gold per year. NovaGold is also evaluating the feasibility of processing ore from the nearby Saddle deposit (NM223) and the more distant Big Hurrah deposit (SO023) if a mill is built at Rock Creek. As of March 28, 2007, NovaGold Resources Inc. (2007, Reserve) reported the resources at Rock Creek as 9.6 million tonnes of measured and indicated reserves with an average grade of 1.31 grams of gold per ton.

The most typical and highest grade part of the Rock Creek lode consists of a sheeted vein complex. The veins strike northeast and generally dip at a high angle to the northwest. They generally range from 1 inch to 6 inches thick, although some veins are more than 1 foot thick. Vein spacing is locally about one per foot. Cathcart (1922, p. 246) described a sheeted zone near the mouth of Sophie Gulch (NM208), where 23 quartz veins from 1 inch to 8 inches thick are in a zone 28 feet wide. In general, sheeted veins are well exposed in mechanical and hydraulic cuts in a 1,000-foot-long interval north of Sophie Gulch (NM208). Although good mineralization was found in some drill holes south of the Sophie Gulch fault, such as in Placer

Dome RR-8-088, this fault appears to cut off or displace the best mineralization. The quartz and quartz-calcite veins of the sheeted set are composed mainly of white quartz with some internal crustification, but they are not banded. Albite tends to occur on the selvages and in adjacent wall rocks. Cathcart (1922) and others have reported muscovite in the veins. Sulfides tend to be relatively abundant close to the selvage, but are disseminated throughout the quartz. They consist mainly of pyrite, galena, stibnite, and sphalerite. Arsenopyrite is present but is more abundant in schist than in the veins. Lead sulfosalts such as boulangerite occur locally. Limonite tends to form on weathered veins, hematite on weathered arsenopyrite zones. The deposit is relatively long compared to its apparent thickness. Sheeted veins and most of the gold appear to lie above a marble-rich stratum which is at a depth of about 250 to 300 feet. Individual quartz stringers pinch and swell and may end abruptly at a slip plane parallel to schistosity.

The main Rock Creek deposit grades into several other deposits. Opposite the mouth of Sophie Gulch, sheeted veins 2 to 3 feet apart are in quartz-mica schist, but there are extensive arsenic- and albite-rich zones in the schist. Well-developed, fold-controlled quartz-albite zones were exposed in Kennecott trench RCT-94-8. The trench and adjacent hill slopes display arsenic-rich lodes of northwest strike. This area has locally been called Arsenic Hill. The Reinisch hydraulic pit (NM213) is in this area. A distinct vein called the Albion (NM211) was exposed by mine workings in upper Rock Creek; it probably is partly coincident with sheeted veins typical of the main Rock Creek deposit. The deposit at the Walsh Cut (NM214) resembles that at the Reinisch.

Most of the country rocks exposed at the prospect belong to the chlorite-rich metaturbidite schist and marble unit of Bundtzen and others (1994) or to the lower part of the 'mixed unit' of Till and others (1986). Graphitic mica schist and graphitic quartz schist are common; the graphitic quartz schist is locally a good marker unit. Schistosity generally strikes northeast and dips are low to moderate southeast. Quartz veins of the sheeted set are close to orthogonal to the schistosity. The schist appears to be a phyllonite. Although schistosity appears to be close to concordant with lithology, it is penetrative. Some coarse-grained units have incipient augen structure and are believed to have been sheared during a period of metamorphism that could be contemporaneous with early mineralization. Locally, schist is strongly mineralized with arsenopyrite and albite concordant to schistosity. Bedrock in the area probably is of early Paleozoic protolith age (Hummel, 1962 [MF 247]; Sainsbury, Hummel, and Hudson, 1972 [OFR 72-326]; Till and Dumoulin, 1994; Bundtzen and others, 1994).

Detailed mapping for Kennecott Exploration Company identified a strong northeast-striking fault that appears to cut off the Sophie Gulch fault. The fault, called the Arsenic Hill fault, is exposed in Placer Dome trench RRT-87-1 and in Kennecott Exploration Company trench RCT-94-8. The fault appears to localize complexly sheared graphitic quartz veins and may have both pre- and post-mineral history. It is subparallel and en echelon to the Albion (NM211) and proposed Calle (NM212) vein-fault structures.

Apodaca (1994) studied fluid inclusions and other detailed aspects of the vein geology at Rock Creek. Her work indicates that Rock Creek formed from low-salinity fluids relatively rich in carbon dioxide, methane, and nitrogen, with some hydrogen sulfide. Fluid inclusions indicate an estimated temperature of formation in the range of 225 to 275 degrees Centigrade. The Rock Creek deposit is probably similar in age (109 Ma) to the gold-quartz deposits at Bluff (Ford and Snee, 1996).

**Alteration:**

Early alteration consists of locally extensive albitization and sulfidization (introduction of arsenopyrite; late alteration consists of minor sericitization and albitization along with introduction of sheeted veins; and local development of ankerite.

**Age of mineralization:**

Mid-Creatceous. The country rocks are part of the Nome Group derived from Proterozoic to lower Paleozoic protoliths (Till and Dumoulin, 1994). The Nome Group underwent regional blueschist facies metamorphism in the Late Jurassic or Early Cretaceous (Sainsbury and others, 1970 [P 750-C]; Forbes and others, 1984; Thurston, 1985; Armstrong and others, 1986; Hannula and McWilliams, 1995). The blueschist facies rocks were recrystallized to greenschist or higher metamorphic grades in conjunction with regional extension, crustal melting, and magmatism in the mid-Cretaceous (Hudson and Arth, 1983; Miller and Hudson, 1991; Miller and others, 1992; Dumitru and others, 1995; Hannula and others, 1995; Hudson, 1994; Amato and others, 1994; Amato and Wright, 1997, 1998). Lode gold mineralization on Seward Peninsula is mostly related to the higher temperature metamorphism in the mid-Cretaceous (Apodoca, 1994; Ford, 1993 [thesis]; Ford and Snee, 1996; Goldfarb and others, 1997).

**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:** Undetermined

**Site Status:** Active

**Workings/exploration:**

Gold-bearing, northeast-striking quartz veins in schist were known on Rock Creek by 1903 (Collier and others, 1908). Sheeted veins were later described, massive veins were locally worked, and some residual placer gold and scheelite were produced from weathered sheeted vein complexes (Moffit, 1913, p. 75-76; Mertie, 1918 [B 662-I, p. 436]; Cathcart, 1922). Lode prospects in the Rock Creek area were principal examples of disseminated lode gold deposits identified in a regional mineral assessment during the 1970's (Hudson and others, 1977; Hudson and DeYoung, 1978). This deposit is the most extensively explored gold lode in the Nome mining district. Significant exploration has taken place episodically from the early 1980's to the present (2007) including extensive trenching and drilling has taken place episodically since the 1980's when the property was relocated by R.V. Bailey. to the present (2007).

Bailey reopened trenches in the hydraulic cuts north of Sophie Gulch and exposed and sampled the sheeted veins. His work brought Placer Dome into the project in 1987 to 1989. Placer Dome drilled dozens of holes on regular, northwest-aligned fences approximately 200 feet apart for nearly 2,000 feet northeast from the mouth of Sophie Gulch. Both core and RC holes were drilled, and essentially all were steeply inclined to the southwest, perpendicular to the strike of the sheeted veins.

Some of this drilling was difficult. The water table is close to the surface and some holes had artesian flow. The program was sufficient to outline a geologic resource, but it was considered subeconomic by Placer Dome. An extensive soil geochemical survey was completed in the area by BHP in 1989, and the property was optioned by Newmont Mining Company in 1992. Some new drill holes, including holes to confirm Placer Dome tests, were drilled by Newmont. The property was further explored in 1994 and 1995 by Kennecott Exploration Company, who drilled a few holes along the northwest fences. The holes were inclined to the northwest so that they would be nearly at right angles to bedrock schistosity in lower Rock Creek. Both Placer Dome and Newmont carried out preliminary metallurgical work; it appears that about 70 percent of the gold is present as free gold; the balance is in auriferous sulfides, principally pyrite and arsenopyrite. Exploration continued in 2000 by NovaGold Resources. In 1999, they announced that better recovery and analytic techniques suggested higher average grades for the deposit, perhaps about 3 grams of gold per metric tonne.

As of early 2006, NovaGold Resources, Inc. (2006, Projects) is developing the property and is carrying out an aggressive infill drilling program which began in 2003. The 2003 drilling totaled 8,000 m and increased total drilling on the project to 18,960 meters in 217 drill holes. Intensive infill drilling continued in 2004 when 82 core and rotary drill holes totaling 20,000 feet (5,900 meters) were completed. The infill drilling results are incorporated in a feasibility study that was started in late 2003. A positive feasibility study could lead to production from a 500 meter by 1,500 meter by 100 meter open pit by 2007. Processing of 5,000 to 7,000 tons per day is expected to produce about 100,000 ounces of gold per year. NovaGold is also evaluating the feasibility of processing ore from the nearby Saddle deposit (NM223) and the more distant Big Hurrah deposit (SO023) if a mill is built at Rock Creek.

**Production notes:**

**Reserves:**

As of March 28, 2007, NovaGold Resources Inc. (2007, Reserve) reported the resources at Rock Creek as 9.6 million tonnes of measured and indicated reserves with an average grade of 1.31 grams of gold per ton.

**Additional comments:**

**References:**

Collier and others, 1908; Moffit, 1913; Mertie, 1918 (B 662-I); Cathcart, 1922; Hummel, 1962 (MF 247); Sainsbury and others, 1970; Cobb, 1972 (MF 463); Sainsbury, Hummel, and Hudson, 1972 (OFR 72-326); Hudson and others, 1977; Cobb, 1978 (OFR 78-93); Hudson and DeYoung, 1978; Hudson and Arth, 1983; Forbes and others, 1984; Thurston, 1985; Armstrong and others, 1986; Till and others, 1986; Miller and Hudson, 1991; Miller and others, 1992; Ford, 1993 (thesis); Till and Dumoulin, 1994; Apodoca, 1994; Hudson, 1994; Bundtzen and others, 1994; Amato and others, 1994; Dumitru and others, 1995; Hannula and others, 1995; Hannula and McWilliams, 1995; Ford and Snee, 1996; Goldfarb and others, 1997; Amato and Wright, 1997; Amato and Wright, 1998; NovaGold Resources Inc., 2006 (Projects); NovaGold Resources Inc., 2007 (Reserve).

**Primary reference:** This report

**Reporter(s):** C.C. Hawley (Hawley Resources Group, Inc.) and Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

## Site name(s): Saddle; New Era; Big Four

**Site type:** Prospects

**ARDF no.:** NM223

**Latitude:** 64.5905 **Quadrangle:** NM C-1

**Longitude:** 165.3897

**Location description and accuracy:**

This site represents several closely related lode deposits in the headwaters of Snow Gulch, especially above the split of the gulch into two headward forks. The map location is on the Saddle deposit developed above the north fork of Snow Gulch, at an elevation of 450 feet in the SW1/4 section 25, T. 10 S., R. 10 W., Kateel River Meridian. These deposits are included in locality 46 of Cobb (1972 and 1978), and locality 1 of Hummel (1962).

**Commodities:**

**Main:** Au

**Other:** Ag, Sb, W

**Ore minerals:** Arsenopyrite, galena, gold, pyrite, scheelite, stibnite

**Gangue minerals:** Albite, calcite, quartz

**Geologic description:**

The Saddle deposit is of sheeted vein type; it trends northeasterly from near the west portal of the Miocene Ditch tunnel nearly to the top of hill 691. Other gold-bearing veins were developed in the south fork of upper Snow Gulch. One prospect in this group appears to lie on the Bernice No. 1 lode of John Leedy (U. S. Mineral Survey No. 775); the New Era tunnel is also in this vicinity. Another related vein zone possibly exists on the divide between Snow Gulch and Anvil Creek, nearly in line with the trend of Snow Gulch.

Prospecting dating back to at least 1899 has identified several gold lodes near the head of Snow Gulch. The older prospects, such as New Era and Big Four, are difficult to identify, but they can be approximately located. These vein and stratabound mineral occurrences are abundant in upper Snow Gulch and appear to be the main source of placer gold in Snow Gulch.

A prospector named John Leedy located claims on the east side of Snow Gulch and on Bonanza Hill from July 1899 until 1908; his claims were patented in 1908 (U.S. Mineral Survey No. 775). A stamp mill was moved into this area and various tunnels and workings were driven, including the New Era tunnel, reported to be more than 300 feet long. The tunnel was driven on a lode that strikes northeast and dips 40 northwest (Chapin, 1914, p. 400-401). The gold is in pyrite and arsenopyrite. The sulfides are disseminated in schist that is cut by quartz, minor albite, and locally calcite veinlets.

The New Era tunnel which was caved when visited by Chapin, appears to be near Placer Dome trenches ST-88-06, -08 and -010. These trenches expose zones containing more than 0.1 ounce of gold per ton. Mertie (1918, p. 433-434) examined this area in 1916. He repeated Chapin's description of the New Era tunnel, but was able to examine the Big Four shaft. He reported that this shaft was on the east side of Snow Gulch at an elevation of about 500 feet. Quartz stringers in a 60-foot-wide zone in marble strike about N 65 E and contain crystalline gold in vugs in quartz. This area was also described by Cathcart (1922, p. 243-244).

The Saddle deposit, mainly explored between 1986 and 1995, appears to start west of the portal of the Miocene Ditch tunnel and to continue northeasterly for about 1,300 feet. This deposit has been explored by shallow trenches and drill holes. It is irregular but is as much as 200 feet wide. The Saddle deposit is less consistently mineralized than the Rock Creek sheeted zone (NM207), but a small body of material averaging about 0.05 ounce of gold per ton has been identified, and probably more could be developed. Other trenching and shallow drilling suggest that gold-bearing veins are also present in a west-southwest-trending zone west of the portal of Miocene tunnel. The apparent strike length of the zone is about 1,200 feet. This zone probably includes the New Era deposit.

An isolated deposit, about 1,200 feet northeast of Saddle, was found by Newmont in 1992, and a deposit at the ridge between Snow Gulch and Anvil Creek was intersected in three Placer Dome trenches (ST-88-3, -4, and -5). The deposit in these trenches can be projected about 300 feet on strike.

Bedrock in the area is schist and some marble, probably of early Paleozoic protolith age (Hummel, 1962; Sainsbury, Hummel, and Hudson, 1972; Till and Dumoulin, 1994; Bundtzen and others, 1994). Strata exposed in upper Snow Gulch and continuing southward on Bonanza Hill are chloritic mica schist, marble and occasional graphitic units. In general they belong to the chlorite-rich metaturbidite schist and marble unit of Bundtzen and others (1994).

As of 2007, NovaGold Resources, Inc. (2007, Nome) is exploring the Saddle deposit and they initiated new infill drilling in 2005. The new drilling is being done to define a resource that could be mined and trucked to the proposed Rock Creek (NM207) mill. As of March 28, 2007 NovaGold Resources Inc. (2007, Reserve) lists the the reserves at the Saddle prospect as 3.6 million tonnes of material with a grade of 2.3 ounces of gold per ton.

**Alteration:**

Albitization, silicification, and sulfidization of schist.

**Age of mineralization:**

Mid-Cretaceous; veins cross cut regionally metamorphosed schist; see NM207.

**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:** Undetermined

**Site Status:** Active?

**Workings/exploration:**

Lode prospects were located in this area as early as 1899; there was considerable lode prospecting activity until World War I. In the mid-1980's, R.V. Bailey discovered the Saddle deposit and began a trenching program that identified a sheeted vein complex. This exploration was followed by an extensive trenching program and some drilling by Placer Dome in 1987 and 1988, by soil geochemistry and some drilling by BHP in 1990, by detailed mapping and some drilling by Newmont Mining Company in 1992, and by additional drilling by Kennecott Exploration Company in 1994-5.

As of 2006, NovaGold Resources, Inc. (2007, Nome) is exploring the Saddle deposit and they initiated new infill drilling in 2005. The new drilling is to define a resource that could be mined and trucked to the proposed Rock Creek (NM207) mill.

**Production notes:**

**Reserves:**

As of March 28, 2007 NovaGold Resources Inc. (2007, Reserve) lists the the reserves at the Saddle prospect as 3.6 million tonnes of material with a grade of 2.3 ounces of gold per ton.

**Additional comments:**

**References:**

Chapin, 1914; Mertie, 1918 (B 662-I); Cathcart, 1922; Hummel, 1962 (MF 247); Sainsbury, Hummel, and Hudson, 1972 (OFR 72-326); Cobb, 1972 (MF 463); Cobb, 1978 (OFR 78-93); Till and Dumoulin, 1994;

Bundtzen and others, 1994; NovaGold Resources, Inc., 2007 (Nome); NovaGold Resources, Inc., 2007 (Reserve).

**Primary reference:** This report

**Reporter(s):** C.C. Hawley (Hawley Resources Group, Inc.) and Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/12/05

## Site name(s): Nome placer field

**Site type:** Mines

**ARDF no.:** NM251

**Latitude:** 64.5439 **Quadrangle:** NM C-1

**Longitude:** 165.4026

**Location description and accuracy:**

This extensive placer gold deposit that has been mined intensively since before WWI occupies large parts of sections 11, 12, 13, and 14, T. 11 S., R. 34 W., of the Kateel River Meridian. The coordinates are immediately north of the Nome-Teller road in the SE1/4SE1/4 section 11. The site is accurately located (Bundtzen and others, 1994, sheet 1). It is approximately the same as locality 138 of Cobb (1972 [MF 463]). In his description of location 138, Cobb lists Center, Flat, Holyoke, Lake, Saturday, Wonder, and Little Creek claims and two operating companies: Hammon Consolidated Gold Fields and U.S. Smelting and Refining Company. The field was also extensively mined by the Pioneer Mining Company in the early days of the district. For convenience in this record, this composite placer deposit is hereafter referred to as the Nome placer field.

**Commodities:**

**Main:** Au

**Other:** Ag, W

**Ore minerals:** Arsenopyrite, gold, hematite, ilmenite, magnetite, pyrite, scheelite

**Gangue minerals:** Garnet

**Geologic description:**

The Nome placer field formed where the rich Anvil Creek alluvial placer (NM236) was reworked by marine processes where it flowed out onto a coastal plain. An ancestral Anvil Creek channel flowed southeasterly, turned south near modern Center Creek (not named on the 1970 revision of the topographic map but probably is the drainage near the northeast runway of the Nome airport), and eventually merged with Submarine Beach (NM285 and NM286). The field spreads out along the Third Beach (NM258). It is very wide southwest of Third Beach through the area of buried auriferous abrasion platforms seaward of Third Beach. The deposit includes a large part of the richest portion of Third Beach between Little Creek to the west and Dry Creek to the east (Moffit, 1906, p. 134; Moffit, 1907, p. 134-144; Collier and others, 1908, p. 34, 162-163). The general location of the deposit as it was recognized in 1906 can be inferred from patterns of gold distribution shown by Collier and others (1908, plate X).

The deposit is mainly developed on schist bedrock, but higher level gold concentrations occur in fan and delta-like deposits formed at times when an ancient Anvil drainage flowed into the ocean. The rather complex relations were summarized by Metcalfe and Tuck, 1942, p. 37): 'At the foothill edge of the coastal plain is an indistinguishable zone of intermixed stream and marine deposits....In this area, gold is found throughout the overburden, in horizons, in small stream channels, and as disseminations. Marine and stream gravel is often intermixed. When the shoreline was close to the hills, Anvil, Cooper, and Dry Creeks emptied gold-bearing detritus directly into the sea. In part this material formed an alluvial fan deposit and, when deposited directly into the sea, a delta..... Under such conditions, gold distribution is very erratic. Further from the foothills the gold occurs in more regular horizons.'

Placer gold at Nome is very close to 900 fine; Anvil Creek averages 897 and varies from 894 to 905 (Metcalfe and Tuck, 1942, p. 41). Garnet was relatively abundant near Third Beach; sulfides, principally pyrite and arsenopyrite, locally occurred in concentrates seaward of Third Beach. In general, minerals in the concentrates are magnetite, ilmenite, scheelite, garnet, pyrite, and arsenopyrite. Based on testing done by Fairbanks Exploration Company in 1939, after stripping all available free gold with mercury, the sulfides appear to contain about 0.25 to 0.75 ounce of gold per ton. Metcalfe and Tuck (1942) strongly suggest that some of the gold, and therefore sulfides, could have come from marine erosion of the bedrock surface itself.

The field was first worked by drifting by the Pioneer Mining Company, especially between 1904 and 1910. The average value of an almost continuous drift mine 3,000 feet in length was $4.51 or 0.22 ounce of gold per bedrock foot. Some of the ground contained an ounce of gold to the bedrock foot (Metcalfe and Tuck, 1942, figure 1). The area was mined hydraulically by the Pioneer Company from 1910 to 1922 and then by Hammon and Fairbanks Exploration companies from 1923 until 1934. During the period from 1904 until 1934, about $8,000,000 in gold (about 387,000 ounces of gold) was recovered from the area. The field furnished a significant amount of production of the Nome district (Bundtzen and others, 1994). The deposit was subsequently dredged until 1965. It was last mined as an open pit in 1994.

NovaGold Resources, Inc. (2007, Nome) has owned most of the ground that comprises this site since 1999 and is evaluating the placer gold potential of the Nome coastal plain. They developed a computer database of the approximately 8,000 holes drilled by the the Alaska Gold Company and its corporate predecessors over the long life of this major placer district. In addition, NovaGold and Kennecott Exploration have drilled new holes. The objective is to define mineable reserves that could be produced either by open pit methods or perhaps by rehabilitated dredges that were once operated by Alaska Gold in the area. As of March 28, 2007, an updated resource estimate was produced for NovaGold (2007, Reserve) by the Norwest Corporation. The property contains a measured and indicated resource of 1.6 million ounces of gold and an inferred resource of 300,000 ounces of gold. The gold is in a 194-million-tonne resource of sand and gravel which is valuable in its own right.

**Alteration:**

**Age of mineralization:**

Pliocene (?) and Quaternary; sea-level fluctuations are very important in the history of this deposit.

**Deposit model:**

Alluvial placer Au (Cox and Singer, 1986, model 39a); deltaic deposits, buried strand line beach deposits, and offshore abrasion placers seaward from ancient beaches.

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

39a

**Production Status:** Yes; large

**Site Status:** Active

**Workings/exploration:**

A buried alluvial gold deposit was discovered in the canyon of Anvil Creek in 1898 by Lindblom, Brynteson, and Lindeberg, who later formed Pioneer Mining Company. The men also located placer claims on the coastal plain along an ancient buried channel of Anvil Creek that lies between Little and Dry Creeks. These claims covered important parts of the Nome placer field deposit. Extensive underground mining of this deposit occurred between 1904 and 1910. In late 1904, the Third Beach deposit (NM258) was discovered. In the Nome placer field area, the upland limit of the Third Beach deposit was sharp and against a bedrock escarpment. The beach deposits contributed to the richness of the ancient Anvil Creek channel, and related abrasion deposits were mined seaward from Third Beach. The deposit as finally mined includes the ancestral Anvil Creek channel, Third Beach, and abrasion and transient or remnant beaches on the abrasion platform offshore from Third Beach. After drifting, the deposit was mined by surface hydraulic methods, generally with hydraulic elevators, from 1910 to 1934; it was then dredged until 1965. Final production from the area, in the 1980's until 1994, was by open-pit operations that trucked ore to central washing plants. This gold field which was mined nearly continuously for nearly a century was the most important, spatially continuous placer operation in the Nome mining district.

NovaGold Resources, Inc. has owned most of the ground that comprises this site since 1999 and is evaluating the the placer gold potential of the Nome coastal plain (NovaGold Resources Inc., 2007, Nome).

They developed a computer database of the some 8,000 holes drilled by the the Alaska Gold Company and its corporate predecessors over the long life of this major placer district. In addition, NovaGold and Kennecott Exploration have drilled new holes. The objective is to define mineable reserves that could be produced either by open pit methods or perhaps by rehabilitated dredges that were once operated by Alaska Gold in the area.

**Production notes:**

Production by dredges and surface workings of about $8,000,000 in gold (about 387,000 ounces) from 1904 to 1934 and extensive production after WW II.

**Reserves:**

The property contains a measured and indicated resource of 1.6 million ounces of gold and an inferred resource of 300,000 ounces of gold (NovaGold Resources, Inc., 2007, Reserve). The gold is in a 194 million tonne resource of sand and gravel which is valuable in its own right.

**Additional comments:**

**References:**

Moffit, 1906; Moffit, 1907; Collier and others, 1908; Metcalfe and Tuck, 1942; Cobb, 1972 (MF 463); Bundtzen and others, 1994; NovaGold Resources, Inc., 2007 (Nome); NovaGold Resources, Inc., 2007 (Reserve).

**Primary reference:** Metcalfe and Tuck, 1942

**Reporter(s):** C.C. Hawley (Hawley Resource Group, Inc.) and Travis L. Hudson (Applied Geology, Inc.); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/10/2007

# Site name(s): Unnamed (near mouth of Port Camden)

**Site type:** Prospect

**ARDF no.:** PE001

**Latitude:** 56.8066 **Quadrangle:** PE D-6

**Longitude:** 133.9509

**Location description and accuracy:**

This prospect consists of a number of radioactiive occurrences on northeastern Kuiu Island that consist of outcrops of Tertiary sandstone along the shoreline at the end of the peninsula that juts out between the mouth of Kadake Bay and the north end of Port Camden. These are commonly referred to as the Port Camden prospect. The coordinates are approximately at the center of the radioactive occurrences which are localities 7 and 8 of Grybeck, Berg, and Karl (1984). Called the the 'Kadake Bay' occurrence by Still and others (2002).

**Commodities:**

**Main:** Th, U

**Other:** Ce, La

**Ore minerals:** Pyrite, unidentified radioactive minerals

**Gangue minerals:** Apatite, magnetite, siderite

**Geologic description:**

The Tertiary Kootznahoo Formation consists of light brown, poorly sorted, non-marine, dolomitic sandstone that contains clay clasts, carbonized wood fragments, and dolomitic concretions; thin shale layers are in the sandstone (Muffler, 1967). The sandstone ranges from silty, fine-grained and thin-bedded to medium- and coarse-grained; it is partly conglomeratic, and medium- to thick-bedded. Siderite, magnetite, pyrite, and apatite are present in some lithologies. All carbonized wood fragments show radioactivity when tested in place. Instrument readings varied from 2 to 50 times background. One sample gave readings in eU of 1300, plus-or-minus 400 parts per million (ppm) uranium, and gamma eU of 2300, plus-or-minus 700 ppm uranium. Samples from a four-inch-thick bed of fine-grained Tertiary sandstone contained 11 and 12 ppm uranium and up to 30 percent magnetite. (The description is summarized from Eakins, 1975; Dickinson, 1979; Dickinson and Campbell, 1982; Dickinson and Pierson, 1988; and Still and others, 2002).

Still and others (2002) collected several samples of thin, black carbonaceous shale interbeds in the sandstone that gave slightly elevated readings on a Scintillometer; they contained up to 46 ppm uranium, 23 ppm lanthanum, and 41 ppm cerium.

**Alteration:**

**Age of mineralization:**

Tertiary or younger based on age of the host rock, the Tertiary Kootznahoo Formation.

**Deposit model:**

Sandstone uranium (Cox and Singer, 1986; model 30c)

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

30c

**Production Status:** No

**Site Status:** Probably inactive

**Workings/exploration:**

Block of 30 claims staked in 1976 and active until at least 1981 (U.S. Bureau of Mines, 1980). A few samples were collected and analyzed by the Bureau of Land Management (Still and others, 2002) but there has apparently been little private work done in recent years.

**Production notes:**

**Reserves:**

**Additional comments:**

This area has been selected for transfer to Sealaska and the Kake Tribal Corporations and in 2002 was classified as 'interim conveyed, pending patent'.

**References:**

Muffler, 1967; Eakins, 1975; Dickinson, 1979 (USGS OF 79-1427); U.S. Bureau of Mines, 1980; Dickinson and Campbell, 1982; Grybeck, Berg, and Karl, 1984; Dickinson and Pierson, 1988; Still and others, 2002.

**Primary reference:** Dickinson, 1979 (USGS OF 79-1427); Dickinson and Campbell, 1982

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Gunnuk Creek)

**Site type:** Prospect

**ARDF no.:** PE002

**Latitude:** 56.9886 **Quadrangle:** PE D-6

**Longitude:** 133.8809

**Location description and accuracy:**
These claims are on upper Gunnuk Creek on northwestern Kupreanof Island, about three miles northeast of the town of Kake. The site is locality 9 of Grybeck, Berg, and Karl (1984). The location is known only generally and the coordinates are approximately at the center of the claims.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
The only information on this prospect is that four lode claims were staked for gold in 1968; apparently they have not been active since (U. S. Bureau of Mines, 1980; Still and others, 2002). Still and others (2002) searched for some sign of these claims and collected 5 stream sediment samples. They found no sign of the claims and the samples were not anomalous.

**Alteration:**

**Age of mineralization:**

**Deposit model:**
Only known to be claims for lode gold.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
The only information on this prospect is that four lode claims were staked for gold in 1968; apparently they have not been active since (U. S. Bureau of Mines, 1980; Still and others, 2002).

**Production notes:**
No record of production and highly unlikely that there was any.

**Reserves:**

**Additional comments:**

**References:**

U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Northern Copper Company; Tower Arm Copper; Portage Bay Copper Company

**Site type:** Prospect

**ARDF no.:** PE005

**Latitude:** 56.8877 **Quadrangle:** PE D-5

**Longitude:** 133.3743

**Location description and accuracy:**

The Northern Copper prospect is at an elevation of about 1300 feet on the southern spur of Kupreanof Island. It is near the the center of the northern half of section 36, T. 57 S., R. 76 E. The area is heavily wooded and the prospect is is not easy to locate on the ground. Still and others (2002) have published detailed maps of the surface and underground workings.

**Commodities:**

**Main:** Cu, Zn

**Other:**

**Ore minerals:** Chalcopyrite, magnetite, pyrite, pyrrhotite, sphalerite

**Gangue minerals:**

**Geologic description:**

The Northern Copper prospect was first staked in 1900 and had several periods of activity, notably in 1900 and 1901 and between 1918 and 1921. Numerous workings were driven from 1900 to 1921 including a shaft, numerous trenches and open cuts, and three adits that are about 360 feet, 30 feet, and 285 feet long. A road was built part way to the prospect from the head of Duncan Canal and a tram was planned but not built from tidewater to the prospect. It has been active for short periods several times since, notably in 1978 and 1979 when Amoco Minerals Co. staked a large block of claims that covered the area around the Northern Copper prospect, and carried out extensive airborne and ground geophysics, geologic mapping, and soil and stream sediment geochemistry in the area. They also core drilled six holes to test geophysical anomalies near the Northern Copper prospect. There apparently has been no production. The prospect was covered by 4 claims patented in 1907 that were deeded to the Forest Service in 1995 and are now part of the Petersburg Creek-Duncan Salt Chuck Wilderness area. (More detailed information can be found in Wright and Wright (1908), Buddington, (1923); Roehm, 1945 [DGGS IR 195-37]; Twenhofel and others, 1949; Still and others (2002).

The rocks in the older upper workings workings consist of a thick layer of massive greenstone and chlorite schist, locally with garnet and pyroxene (Wright and Wright, 1908; Buddington, 1923; Roehm, 1945 [DGGS IR 195-37]; Twenhofel and others, 1949; Still and others, 2002). Karl and others (1999) consider the rocks to be Devonian in age. The greenstone also has layers or lenses of white crystalline marble. The mineralization consists of massive layers up to several feet thick, patches, and disseminations of sulfides, mainly pyrrhotite, pyrite, chalcopyrite, and minor sphalerite. The sulfide layers are generally oriented parallel to the layering in the greenstone. Still and others (2002) collected 36 samples in the massive greenstone. The highest copper values were 1.7 percent across 1.5 feet, 1.4 percent across 1.8 feet, and 3.5 percent in an outcrop sample. The highest zinc values were 1.2 percent across 3 feet and 2.4 percent across 1.5 feet. The highest silver value was 32.6 parts per million; the highest gold value was 165 parts per billion (ppb). A band of massive sulfides--mainly pyrrhotite, pyrite, and chalcopyrite-- 0.2 to 2 feet thick is exposed in the 30-foot adit for about 20 feet. Samples contained up to 12.4 percent copper across 2 feet; the highest gold value was 440 ppb and the highest silver value was 37.7 ppm.

The work in the late 1970's by Amoco Minerals Co. identified a unit of gray argillite under the greenstone.

The argillite contains layers 0.2 to 1.7 feet thick of massive pyrrhotite with chalcopyrite and minor sphalerite. Samples contained up to 2.5 percent copper across 1.4 feet; the maximum gold value was 29 ppb, the maximum silver value was 11.5 ppm.

The origin of the deposit is enigmatic. Most likely it is a metamorphosed volcanogenic massive sulfide deposit. But it may be a replacement deposit, or possibly a skarn-type deposit.

**Alteration:**

**Age of mineralization:**

Devonian or later based on the age of the host rocks.

**Deposit model:**

Probably a metamorphosed volcanogenic massive sulfide deposit.

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

**Production Status:** No

**Site Status:** Inactive

**Workings/exploration:**

The Northern Copper prospect was first staked in 1900 and had several period of activity, notably in 1900 and 1901 and between 1918 and 1921. Numerous workings were driven from 1900 to 1921 including a shaft, numerous trenches and open cuts, and three adits that are about 360 feet, 30 feet, and 285 feet long. A road was built part way to the prospect from the head of Duncan Canal and a tram was planned but not built from tidewater to the prospect. It has been active for short periods several times since, notably in 1978 and 1979, when Amoco Minerals Co. staked a large block of claims that covered the area around the Northern Copper prospect, and carried out extensive airborne and ground geophysics, geologic mapping, and soil and stream sediment geochemistry in the area. They also core drilled six holes to test geophysical anomalies near the Northern Copper prospect.

**Production notes:**

**Reserves:**

**Additional comments:**

The prospect was covered by 4 claims patented in 1907 that were deeded to the Forest Service in 1995; they are now part of the Petersburg Creek-Duncan Salt Chuck Wilderness area.

**References:**

Wright and Wright, 1908; Buddington, 1923; Roehm, 1945 (DGGS IR 195-37); Roehm, 1945 (DGGS IR 195-38); Twenhofel and others, 1949; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Taylor Creek

**Site type:** Prospect

**ARDF no.:** PE006

**Latitude:** 56.7937 **Quadrangle:** PE D-5

**Longitude:** 133.3638

**Location description and accuracy:**

This is a well known location that is about 1.5 miles upstream from the mouth of Taylor Creek in upper Duncan Canal. It is about 0.4 mile southeast of the center of section 36, T. 59 S., R. 76 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Calcite, dolomite

**Geologic description:**

The Taylor Creek deposit has been known since 1903 or 1904 (Wright and Wright, 1908; Kerns, 1950) and has been examined numerous times by government and industry. There was considerable activity during the 1940's, mainly restricted to surface sampling and some trenching and pitting (Fowler, 1948 [DGGS IR 195-2]; Fowler, 1948 [DGGS IR 117-5]; Roehm, 1946 [DGGS IR 195-41]; and Roehm,1946 [DGGS IR 117-4]). The property has been been intermittently active since. Kerns (1950) reported on extensive diamond drilling carried out by the U. S. Bureau of Mines in 1948 and the 14 trenches they dug on several areas of mineralization. In 1997, Kennecott Exploration Company staked a large block of claims that included the deposit.

The deposit consists of Irregular masses and disseminated grains of galena, sphalerite, pyrite, and chalcopyrite in dolomitic limestone (Kerns, 1950). In the best exposures along Taylor Creek, pervasively disseminated pyrite, galena, and sphalerite occur over an area about 3 meters wide by 7 meters long in a brecciated zone. This zone occurs in a thinly laminated to phyllitic, light-gray and white, fine-grained dolomitic marble which overlies green crenulated muscovite-chlorite-calcite schist. The mineralization persists for approximately 100 m along the southwest bank of Taylor Creek. Maximum assay values in drill cores and outcrop samples collected by Kerns (1950) were 4.3 percent zinc, 0.95 percent lead, and 1.2 ounces of silver per ton. Several origins for the deposit has been suggested. Newer work suggests that the deposit is certainly spatially and possibly genetically associated with the Duncan Canal-Zarembo belt of Triassic massive sulfide mineralization defined by Berg and Grybeck (1980), and Berg (1981). Recent geologic mapping by Karl and others (1999) indicate that the rocks at Taylor Creek are part of the Triassic Hyd Group.

Still and others (2002) briefly examined the deposit and collected several samples. The best were: 1) a sample across 0.7 feet that contained 25.9 parts per million (ppm) silver, 7.72 percent lead, and 6.9 percent zinc; 2) a select sample that contained more than 500 ppm silver, 7,217 ppm lead, and 2.1 percent zinc, and 3) a grab sample of gossan that contained 903 parts per billion (ppb) gold, 160 ppm silver, 9.69 percent lead, and 3.0 percent zinc.

**Alteration:**

**Age of mineralization:**

Triassic of younger based on the age of the host rock.

**Deposit model:**

Probably a (remobilized?) volcanogenic massive sulfide deposit based on a spatial relationship to other massive sulfide deposits in the Duncan-Zarembo belt of mineralization defined by Berg and Grybeck, 1980.

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

**Production Status:** No

**Site Status:** Active?

**Workings/exploration:**

The Taylor Creek deposit has been known since 1903 or 1904 (Wright and Wright, 1908; Kerns, 1950) and has been examined numerous times by government and industry. Considerable activity during the 1940's, mainly restricted to surface sampling and some trenching and pitting (Fowler, 1948 [DGGS IR 195-2]; Fowler, 1948 [DGGS IR 117-5]; Roehm, 1946 [DGGS IR 195-41]; and Roehm,1946 [DGGS IR 117-4]). The property has been been intermittently active since. Kerns (1950) reported on extensive diamond drilling carried out by the U. S. Bureau of Mines in 1948 and the 14 trenches they dug on several areas of mineralization. In 1997, Kennecott Exploration Co. staked a large block of claims that included the deposit.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Wright and Wright, 1908; Roehm, 1946 (DGGS IR 195-41); Roehm, 1946 (DGGS IR 117-4); Fowler, 1948 (DGGS IR 195-2); Fowler, 1948 (DGGS IR 117-5); Kerns, 1950; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Berg and Grybeck, 1980; Berg, 1981; Grybeck, Berg, and Karl, 1984; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Kerns, 1950

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Towers Arm)

**Site type:** Prospects

**ARDF no.:** PE007

**Latitude:** 56.8397 **Quadrangle:** PE D-5

**Longitude:** 133.3717

**Location description and accuracy:**

This site is approximately at the center of a large block of at least 492 claims that cover more than 30 square miles around upper Towers Arm and North Arm of Duncan Canal. It is locality 14 of Grybeck, Berg, and Karl (1984). This early ARDF record covers an area where more detailed information has subsequently become available on several sites drilled by the company who staked the block of claims. This information can be found in records PE005, PE082, PE087.

**Commodities:**

**Main:** Cu

**Other:**

**Ore minerals:** Chalcopyrite

**Gangue minerals:**

**Geologic description:**

Numerous diamond drill holes were scattered widely on the claim block (which includes the Northern Copper prospect, PE005) in 1978 and 1979 by AMOCO Minerals from a camp located on the southern end of the peninsula between Towers Arm and the North Arm of Duncan Canal. The target of the exploration was massive-sulfide, base-metal deposits and the drilling was specifically directed to test airborne geophysical anomalies. Most if not nearly all of the holes did not intercept significant metal values and only chalcopyrite in minor amounts was found. The geophysical anomalies largely proved to be associated with graphitic layers (AMOCO Minerals staff, oral communication, 1979).

This early ARDF record covers an area where more detailed information has become available on several sites drilled by the company who staked the block of claims. This information can be found in records PE005, PE091, and PE095. Recent mapping by Karl and others(1999) indicates that some of the area probably includes Triassic Hyd Group rocks, a unit that is commonly associated with volcanogenic massive sulfide deposits in the Duncan Canal area.

**Alteration:**

**Age of mineralization:**

**Deposit model:**

Unclear if significant mineralization was ever found.

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

**Production Status:** No

**Site Status:** Probably inactive

**Workings/exploration:**

Numerous diamond drill holes were drilled widely on this claim block in 1978 and 1979 by AMOCO Minerals from a camp located on the southern end of the peninsula between Towers Arm and the North Arm of Duncan Canal. The target of the exploration was massive-sulfide, base-metal deposits and the drilling was specifically directed to test airborne geophysical anomalies. Most if not all of the holes were devoid of significant metal values and the geophysical anomalies largely proved to be associated with graphitic layers (AMOCO Minerals staff, oral communication, 1979).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Grybeck, Berg, and Karl, 1984; Karl and others, 1999.

**Primary reference:** This record

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Ironton Group

**Site type:** Prospect

**ARDF no.:** PE008

**Latitude:** 56.8261 **Quadrangle:** PE D-5

**Longitude:** 133.3563

**Location description and accuracy:**

Roehm's (1946) original description was not entirely clear but his description indicates that the Ironton Group consisted of five claims that were staked along the shoreline of upper half of Tower Arm, probably on the west shore and likely in section 19 or 30, T. 58 S., R. 76 E. Still and others (2002) found workings that are probably this prospect on the west shore about 1 to 1.5 miles from the end of Tower Arm; this would place it in section 19. The coordinate reflect their location.

**Commodities:**

**Main:** Pb, Zn

**Other:**

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

Roehm (1945 [IR 195-41]) describes the prospects as a zone of mineralized schist that outcrops at high tide. Pyrite is disseminated and in thin seams in the schist. Small specks of sphalerite and galena occur in some of the thicker seams.

Recent geologic mapping by Karl and others (1999) indicates that the rocks on the west side of Tower Arm are mainly part of the Triassic Hyd Group that hosts volcanogenic massive-sulfide deposits in the region. Still and others (2002) located a few cuts, a short adit, and a trench about 1 to 1.5 miles from the head of Towers Arm that are probably at the Ironton Group. The rocks in the vicinity are interbedded greenstone, greenstone schist, quartz-calcite-chlorite schist, sericite schist, and black slate. The rocks commonly contain 3 to 15 percent pyrite but Still and others (2002) did not mention any other sulfides. They collected 10 samples whose metal content was barely above background or background.

**Alteration:**

**Age of mineralization:**

Triassic?

**Deposit model:**

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

A few cuts, a short adit, and a trench that probably date to before 1945.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Roehm, 1946 (IR 195-41); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Silver Star; Silver King

**Site type:** Prospect

**ARDF no.:** PE009

**Latitude:** 56.8485 **Quadrangle:** PE D-4

**Longitude:** 133.2638

**Location description and accuracy:**

This prospect is about 1.6 miles west-southwest of Duncan Peak at an elevation of about 400 feet. It is about 0.5 south-southeast of the center of section 10, T. 58 S., R. 77 E.

There is some confusion in the old literature about the location and geology of two prospects in the area. For example, Cobb (1972 and 1978) or Berg and Cobb (1967), and an earlier generation of ARDF almost certainly combine two different prospects on the west side of Portage Mountain. Still and others (2002) spent considerable time in the field and library trying to decipher their locations and descriptions; this record is based on their location for the Silver Star prospect. The other prospect--XXX PE New A1028--which is about 2 miles to the north-northeast is a different type of deposit.

**Commodities:**

**Main:** Cu

**Other:** Pd, Pt

**Ore minerals:** Chalcopyrite, pyrite, pyrrhotite

**Gangue minerals:**

**Geologic description:**

The rocks in the vicinity of this prospect are mafic intrusions of late Cretaceous age (Brew and others, 1984). Between an elevation of 360 and 480 feet along a creek, there are outcrops of hornblendite and hornblende diorite that were examined by Still and others (2002). Disseminated pyrrhotite, pyrite, and chalcopyrite are common and there are veinlets up to 1 inch thick in the hornblendite with pyrite and pyrrhotite. Copper staining is locally prominent. Still and others (2002) took 17 samples. The maximum copper content was 4,666 parts per million but most samples contained much less. The highest platinum value was 39 parts per billion (ppb) and the highest palladium value was was 59 ppb; all other metals were in the background range. Buddington (1923) reports that the only workings were several cuts. Still and others (2002) suggest that the prospect is a magmatic segregation deposit.

**Alteration:**

**Age of mineralization:**

Late Cretaceous or younger based on the age of the host rocks.

**Deposit model:**

Magmatic segregation with copper?

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**

The only workings were several open cuts.

**Production notes:**

**Reserves:**

**Additional comments:**

This prospect is now in the Petersburg Creek-Duncan Salt Chuck Wilderness, which is closed to mineral exploration and mining.

**References:**

Wright and Wright, 1905; Buddington, 1923; Berg and Cobb, 1967; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Cobb, 1978 (OF 78-870); Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-L); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Unnamed (near Kane Peak)

**Site type:** Occurrences

**ARDF no.:** PE010

**Latitude:** 56.9838 **Quadrangle:** PE D-4

**Longitude:** 133.0989

**Location description and accuracy:**

This well known mafic-ultramafic body is about 13 miles north-northwest of Petersburg. The body is a slightly elongate pluton about two and a half square miles in area that extends from just east of Kane Peak northeast to exposures for about a mile along the shoreline southeast of Cape Strait. The coordinates are approximately at the center of the body. This site is locality 16 and 17 of Grybeck, Berg, and Karl (1984). It is commonly informally referred to as the Kane Peak deposit or the Kane Peak ultramafic complex.

**Commodities:**

**Main:** Cr, Cu, Fe, Pt-group

**Other:**

**Ore minerals:** Chalcopyrite, chromite, magnetite, pentlandite, and pyrrhotite (but see geologic description below)

**Gangue minerals:**

**Geologic description:**

Kane Peak is a classic 'zoned' or Alaska-type mafic-ultramafic complex with a dunite-wherlite (olivine-clinopyroxenite peridotite) core bordered by a hornblendite shell about 300 feet thick. (The foregoing description is based mainly on Himmelberg and Loney, 1995; but also see Walton, 1951; Taylor, 1967; and Taylor and Noble, 1969, for earlier interpretations of this and other Alaska-type bodies in southeastern Alaska.) About 80% of the body is dunite and wehrlite that grade into each other. Small-scale cumulus layering is present but the body is poorly exposed and its overall structure is uncertain. The body probably has steeply dipping contacts and extends under Frederick Sound to the northeast for a half mile or more (Brew, 1997). The mafic-ultramafic complex intrudes metamorphosed pelite of the Jurassic or Cretaceous Semour Canal Formation and is bordered to the northwest and and south by Cretaceous migmatite. The Kane Peak complex has been dated at 93.4 to 102.0 Ma by K-Ar methods.

Pyrrhotite, pentlandite, and chalcopyrite are sporadically disseminated through the peridotite; sparse disseminated chromite occurs widely in the dunite; and the hornblendite locally contains titaniferous magnetite. Himmelberg and Loney (1995) provide trace metal content of several metals including Co, Ni, and Cr.

Still and others (2002) collected samples at several localities. Analyses of samples collected along the shoreline showed nothing of interest. A stream-sediment sample from a stream on the northeast side of Kane Peak contained 124 parts per billion (ppb) platinum, and two samples from a malachite-stained outcrop on the south-facing slope of the east ridge contained 1,954 and 2,2078 parts per million copper, 113 and 78 ppb platinum, and 180 and 83 ppb palladium.

**Alteration:**

**Age of mineralization:**

Late to Early Cretaceous based on 93.4 to 102.0 Ma, K-Ar age dates (Himmelberg and Loney, 1995).

**Deposit model:**

Zoned or Alaska-type ultramafic complex with disseminated, magmatic sulfides and oxides.

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

**Production Status:** No

**Site Status:** Probably inactive

**Workings/exploration:**

In 1960, two claims were staked for iron on the body along the coast near Cape Strait, probably on magnetite-bearing hornblendite that crops out there (U. S. Bureau of Mines, 1980). In addition, the Kane Peak body has repeatedly been visited by geologists over the years as a potential site for Fe, Cu, and Pt-group deposits and for its scientific value. With the possible exception of the claims staked for Fe along Frederick Sound, there is little evidence at present (2007) of anything close to an economic deposit in the complex.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Walton, 1951; Taylor, 1967; Taylor and Noble, 1969; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); U. S. Bureau of Mines, 1980; Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Himmelberg and Loney, 1995; Brew, 1997 (OF 97-156-J); Still and others, 2002.

**Primary reference:** Taylor and Noble, 1969; Himmelberg and Loney, 1995

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (on Wrangell Narrows)

**Site type:** Prospect

**ARDF no.:** PE013

**Latitude:** 56.5485 **Quadrangle:** PE C-3

**Longitude:** 132.9598

**Location description and accuracy:**

The only description of this prospect (Roehm, 1945) places it on the east side of Wrangell Narrows near December Point, about 2.8 miles north of Point Alexander and 1.2 mile north of Midway Rock. The coordinates reflect that position which is along the south edge of section 29, T. 61 S, R. 80 E., near the shoreline. The prospect was said to extend up from the shoreline into the forest. However, it could not be found in a recent search (Still and others, 2002).

**Commodities:**

**Main:** Ag, Au, Sb

**Other:** As, Hg

**Ore minerals:** Pyrite, stibnite

**Gangue minerals:**

**Geologic description:**

The only description of this prospect is by Roehm (1945 [IR 195-37]). Needle-like crystals of stibnite and pyrite occur along fractures in reddish-colored granite. One sample assayed 13.9 percent antimony and traces of gold and silver . The only working was a 25-foot trench. Karl and others (1999) map the rocks in the area as Cretaceous porphyritic tonalite with biotite, hornblende, epidote, and garnet.

Still and others (2002 could not locate this prospect but they did sample fractured reddish intrusive rock near December Point . Their samples contained up to 141 parts per million (ppm) antimony, 1,420 ppm arsenic, and 18.68 ppm mercury.

**Alteration:**

**Age of mineralization:**

Cretaceous or younger based on the age of the host rock.

**Deposit model:**

Stibnite along fractures.

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

**Production Status:** None

**Site Status:** Active?

**Workings/exploration:**

This small prospect with a 25-foot trench was described in 1945 but could be found in the late 1990's.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Roehm, 1945 (IR 195-37); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Roehm, 1945 (IR 195-37)

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Cascade

**Site type:** Mine

**ARDF no.:** PE014

**Latitude:** 56.9897 **Quadrangle:** PE D-3

**Longitude:** 132.7938

**Location description and accuracy:**

This small mine can be been in outcrop just above the high-tide level on the eastern shoreline of Thomas Bay. It is near an unnamed point about 0.6 mile south of Spray Island in the NW1/4, section 25, T. 56 S., R. 79 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au

**Other:** As, Cu, Pb

**Ore minerals:** Arsenopyrite, chalcopyrite, galena, pyrite, pyrrhotite

**Gangue minerals:** Quartz

**Geologic description:**

Buddington (1923) described this deposit as a quartz vein that can be traced for about 250 feet. It consists of a sheeted zone at least 12 feet thick; about half of the sheeted zone is milky-white quartz and half schist. The property was active intermittently until at least into the 1940's. In 1949, 6 tons of ore was mined that produced 6 ounces of gold and 1 ounce of silver. The quartz veins contain sparse, disseminated pyrite, arsenopyrite, chalcopyrite, pyrrhotite, and galena; specimens of arsenopyrite several inches across are common on the dump. The workings are less than 200 feet from the shore line and include two short adits, one 21 feet long and the other 71 feet long, and a trench. The rocks in the area consist of biotite schist and gneiss, gneissic granodiorite, and quartz monzodiorite (Brew and others, 1984).

Maas and Redman (1989) mapped and sampled the workings. One of their samples of a 4-inch-wide quartz vein contained 6,975 parts per billion (ppb) gold; their other 7 samples averaged 371 ppb gold. Still and others (2002) examined the property in 1998. They sampled the mineralized zones which are 3.5 to 6 feet thick. Their highest grade sample across 3.5 feet of vein contained 589 ppb gold but the average of their 8 samples was 137 ppb gold.

**Alteration:**

Unknown or minor.

**Age of mineralization:**

Cretaceous or younger based on the age of the metamorphic host rock.

**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:** Probably inactive

**Workings/exploration:**

There was some minor development on the prospect prior to 1921. The property was active intermittently until at least into the 1940's. A claim was active as recently as 1979.

**Production notes:**

In 1949, 6 tons of ore was mined that produced 6 ounces of gold and 1 ounce of silver.

**Reserves:**

**Additional comments:**

**References:**

Buddington, 1923; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); U.S. Bureau of Mines, 1980; Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Maas and Redman, 1989; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Unnamed (on Le Conte Bay)

**Site type:** Occurrence

**ARDF no.:** PE015

**Latitude:** 56.7855 **Quadrangle:** PE D-2

**Longitude:** 132.4551

**Location description and accuracy:**

Rumors of gold veins in the schist of Le Conte Bay were cited by Buddington (1923). But there is no record that any lode claims were staked in Le Conte Bay nor more recent confirmation of gold veins in the vicinity. The location defined by the coordinates were chosen arbitrarily in about the center at Thunder Point in Le Conte Bay. The site is locality 21 of Grybeck, Berg, and Karl (1984).

**Commodities:**

**Main:** Au?

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**

Gold veins were reported in the schist belt in Le Conte Bay prior to 1923 (Buddington, 1923). He did not give details and there is no more-recent indication of any deposits in the vicinity nor have any lode claims been staked in the area.

**Alteration:**

**Age of mineralization:**

**Deposit model:**

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

**Production Status:** No

**Site Status:** Inactive

**Workings/exploration:**

None known.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Buddington, 1923; Cobb, 1972 (OF 78-870); Grybeck, Berg, and Karl, 1984.

**Primary reference:** Grybeck, Berg, and Karl, 1984

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Dave's Dream

**Site type:** Prospect

**ARDF no.:** PE016

**Latitude:** 56.8347 **Quadrangle:** PE D-2

**Longitude:** 132.4490

**Location description and accuracy:**

This prospect is on what were four claims in a glacial valley on an unnamed stream that drains into the north side of Le Conte Bay about 2 1/2 miles west of the terminus of the Le Conte Glacier. The claims are in a relatively flat section of the creek, mostly in the SE1/4 of section 14, T. 58 S., R. 82 E., but a portion extends down into the NE1/4, section 23, T. 58 S., R. 82 E. The coordinates are at about the center of the claims.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**

Four placer gold claims were staked at the site in the mid-70's and there was at least serious prospecting through the late 1990's (Still and others, 2002). The site is in a glacial basin may have served as a natural trap for heavy minerals in a gravel section 60 feet or so thick. The Bureau of Land Management declared the claims invalid in 1996 and the prospect is now within the Stikine-Leconte Wilderness Area which is closed to mineral exploration and mining.

**Alteration:**

**Age of mineralization:**

Quaternary or Recent.

**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:** Undetermined

**Workings/exploration:**

Four placer gold claims were staked at the site in the mid-70's and there was at least serious prospecting through the late 1990's (Still and others, 2002). The Bureau of Land Management declared the claims invalid in 1996 and the prospect is now within the Stikine-Leconte Wilderness Area which is closed to mineral exploration and mining.

**Production notes:**
Possibly some gold produced during prospecting at the site.

**Reserves:**

**Additional comments:**
The Bureau of Land Management declared the claims here invalid in 1996 and the prospect is now within the Stikine-Leconte Wilderness Area which is closed to mineral exploration and mining.

**References:**
Still and others, 2002.

**Primary reference:** This description

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (on Stikine River)

**Site type:** Mines(?)

**ARDF no.:** PE017

**Latitude:** 56.7051

**Quadrangle:** PE C-1

**Longitude:** 132.1682

**Location description and accuracy:**

Fine placer gold was mined on bars of the Stikine River in the 1860's but it is unclear if any gold was produced along the Alaskan portion of the Stikine and if so, there are several opinions where in Alaska that might have taken place. Roppel (2005) concluded that most if not all of this early mining on the Stikine took place across the border in Canada. The only reference she could find to gold mining along the Alaskan portion of the Stikine River in the 1860's was to passing interest in fine flour gold near the mouth of what is now called 'Dry Wash' below the Popof Glacier. ('Dry Wash' is identified on the USGS 1:250,000-scale topographic map but not on the more detailed 1:63,360-scale topographic map. ) Roppel's location in about the middle of the north side of section 3, T. 60 S., R.85 E. is considered the most likely site of this early mining in Alaska, even if it is uncertain. (But see the Geologic Description for addition information.)

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**

Fine placer gold was found on bars of the Stikine River in the 1860's when Russia still owned Alaska. However, the boundary between Russian America and Canada was not delineated then and the location of this placer mining is uncertain (Blake, 1868; Spurr, 1898). Still and others (2002) conclude that this early placer mining was at 'Buck Bar' and place it between Shakes Slough and the mouth of the Ketili River in about the middle of section 31, T. 59 S., R.85 E. Roppel (2005), however, in her considerable research into early gold mining in southeastern Alaska found little evidence that Bucks Bar and the other auriferous bars being mining on the Stikine River or its tributaries were in Alaska but instead were probably across the border in Canada. The only reference she could find to gold mining on the Alaskan portion of Stikine River in the 1860's was to passing interest in fine flour gold near the mouth of what is now called 'Dry Wash' below the Popof Glacier. ('Dry Wash' is labeled on the USGS 1:250,000-scale topographic map but not on the more detailed 1:63,360-scale topographic map. ) Roppel's location is used here. In any event, the amount of gold that was mined along the Stikine in Alaska was probably small at best. Brooks (1923) noted that this may have been the first gold mined in Alaska.

**Alteration:**

**Age of mineralization:**

**Deposit model:**

Placer gold (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:**

Fine placer gold was found on bars of the Stikine River in the 1860's during early exploration for gold; some of it may have been mined in Alaska, although most was probably mined in Canada.

**Production notes:**

Probably trivial.

**Reserves:**

None.

**Additional comments:**

In view of the many generations of prospectors and others who for more than 140 years have passed along the natural corridor of the Stikine River into the interior of Canada without any further mention of placer gold on the Stikine River in Alaska, this site should now be considered to be little more than a historic point of interest.

**References:**

Blake, 1868; Spurr, 1898; Brooks, 1923; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Grybeck, Berg, and Karl, 1984; Roppel, 2005; Still and others, 2002.

**Primary reference:** Roppel, 2005

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): TB

**Site type:** Occurrence

**ARDF no.:** PE019

**Latitude:** 56.5301

**Quadrangle:** PE C-5

**Longitude:** 133.5211

**Location description and accuracy:**

This occurrence is near the center of a large, vivid yellow-orange altered zone on southern Kupreanof Island that extends for up to a mile or more in all directions from the coordinates given above and can be seen for miles from the air. The site is plotted about 2 miles north of the center of Kushneahin Lake at the southeast corner of section 34, T. 61 S., R. 76 E.

**Commodities:**

**Main:** Cu ?, Mo ? Zn

**Other:**

**Ore minerals:** Pyrite

**Gangue minerals:**

**Geologic description:**

Extensive vivid exposures of yellow-orange altered rhyolite, rhyolite tuff, and rhyolitic glass of Quaternary or Tertiary age crop out in many of the creeks and cut banks in the vicinity (Brew and others, 1984; Brew, 1997). Several exposures were briefly examined by the USGS in 1982 and 1996. Disseminated pyrite is present locally but there are no obvious signs of copper, molybdenum, or other ore minerals. The rocks are pervasively altered and locally brecciated. Several grab samples of the more-altered rhyolite and associated rocks show 5 parts per million (ppm) or less copper and molybdenum. The pyrite and host rocks are part of a large felsic igneous system; possibly a rhyolite dome. The surrounding area is heavily wooded but aerial reconnaissance shows widespread exposures of similar orange and yellow, iron-stained rocks over an area at least several miles in diameter. Although no obvious mineralization has been found, the site is included because this altered zone is so large, so prominent, and it indicates the presence of a very large felsic hydrothermal system. Resource Associates of Alaska (RAA) staked a hundred claims here in 1973, referring to it as the TB block. Several exposures were briefly examined by Still and others (2002) in the late 1990's. A grab sample contained only 425 ppm zinc.

**Alteration:**

Pyritization, silicification, and kaolinization(?).

**Age of mineralization:**

Quaternary or Tertiary.

**Deposit model:**

Highly altered felsic igneous system.

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**
None other than probable examination by various industry and government geologists who have worked in the area.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Grybeck, Berg, and Karl, 1984; Brew and others, 1984; Brew, 1997 (OF 97-156-K); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Totem Bay)

**Site type:** Occurrences

**ARDF no.:** PE021

**Latitude:** 56.4797 **Quadrangle:** PE B-5

**Longitude:** 133.4419

**Location description and accuracy:**
The coordinates are at the approximate center of a block of nine lode claims staked on southern Kupreanof Island in 1955. The center of the claims is in about the middle of the east side of section 19, T. 62 S., R. 77 E.

**Commodities:**

**Main:** Th, U

**Other:** Ce, La, Nd

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
In 1952, Houston and others (1958) searched the Totem Bay area for radioactive veins similar to those found to the south across Sumner Strait on southern Prince of Wales Island. He found no indications of them. However claims were staked here for radioactives in 1955 under the name Monongehela. Rocks in the vicinity consist of a thick sequence of Quaternary or Tertiary rhyolite (Brew, 1997 [OF 97-156-G]). Still and others (2002) briefly examined the area with a scintillometer and found a 3-foot-by-3-foot zone that was approximately 60 percent above background. A sample contained 7 parts per million (ppm) uranium, 17 ppm thorium, 43 ppm neodymium, 38 ppm lanthanum, and 110 ppm cerium.

**Alteration:**

**Age of mineralization:**
Tertiary or younger based on the age of the host rocks.

**Deposit model:**

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

**Production Status:** No

**Site Status:** Inactive

**Workings/exploration:**
Nine lode claims staked for radioactive minerals in 1955; apparently there has been no work since on these claims other than a brief examination by government geologists in the late 1990's.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Houston and others, 1958; U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew and others, 1984; Brew, 1997 (OF 97-156-G); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Indian Point)

**Site type:** Prospect

**ARDF no.:** PE023

**Latitude:** 56.7234 **Quadrangle:** PE C-4

**Longitude:** 133.2404

**Location description and accuracy:**
This site is the approximate center of block of four lode claims staked in 1977 about two miles south of Indian Point on southern Kupreanof Island. This site is near the center of section 26, T. 59 S., R. 77 E.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Pyrite

**Gangue minerals:**

**Geologic description:**
This site is the near the center of a block of four lode claims staked in 1977 and active through 1978 (U.S. Bureau of Mines, 1980). The site was examined by Still and others (2002) who found a 0.15-foot thick band of pyrite along the foliation of sericite schist. Samples contained up to 187 parts per billion gold. The rocks in the area are part of a Mesozoic phyllite and slate unit (Brew, 1997).

**Alteration:**

**Age of mineralization:**

**Deposit model:**
Thin layer of pyrite with small amount of gold.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
Approximate center of block of four lode claims staked in 1977 and active through 1978.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-J); Still and others, 2002.

**Primary reference:** U. S. Bureau of Mines, 1980

**Reporter(s):** H.C. Berg (Fullerton, California) and D.J. Grybeck (USGS)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (north of mouth of Castle River)

**Site type:** Occurrence

**ARDF no.:** PE024

**Latitude:** 56.6664

**Quadrangle:** PE C-4

**Longitude:** 133.2596

**Location description and accuracy:**

The coordinates are at the center of an area of mineralized outcrops that occur discontinuously just above the high tide line for about a half mile along the west shore of the large shallow bay at the mouth of the Castle River. The site is locality 29 of Grybeck, Berg, and Karl (1984) and this may be a continuation of the mineral occurrence at PE025 just to the northeast.

**Commodities:**

**Main:** Ag, Ba, Cu, Pb, Zn

**Other:**

**Ore minerals:** Pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

Outcrops of phyllitic, light greenish gray to cream, felsic metatuff intercalated with muscovite-rich siliceous phyllite occur discontinuously just above the high tide line for about a half mile along the edge of a large shallow bay. The metatuff locally contains massive-sulfide layers up to 6 feet thick with abundant pyrite and sparse sphalerite(?) (Grybeck, Karl, and Berg, 1984). Grab samples of the massive sulfide layers and felsic metatuff show up to 700 parts per million (ppm) lead, 350 ppm zinc, 10 ppm silver, and 2,000 ppm barium. These outcrops may be a continuation of the mineralized occurrence at PE025 just to the northeast. This is probably the locality noted by Buddington (1923) that he described as a pyrite layer about 4 feet wide exposed for 50 feet. Recent mapping by Karl and others (1999) indicates that these outcrops are part of the Hyd Group of Triassic age.

This occurrence was covered by a large block of claims staked by Pacific Alaska Resources Co in the late 1980's and early 1990's; the company planned to drill to test several geochemical anomalies in copper, zinc, and silver but apparently did not follow through. Still and others (2002) sampled several of these lenses; their samples contained up to 31.8 ppm silver, 1,304 ppm lead, 1.7 percent zinc, and 1,268 ppm arsenic.

**Alteration:**

**Age of mineralization:**

Late Triassic based on the age of the host rock.

**Deposit model:**

Kuroko massive-sulfide deposit model (Cox and Singer, 1986, model 28a); alternately a Sierran Kuroko deposit (Bliss, 1992; 28a1).

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

28a or 28a1

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

In 1979, nine lode claims were staked in the area that probably covered this deposit. By 1995, a considerable block of ground several square miles in area was staked on and northwest of this site and PE025. Informal discussions with industry geologists who worked in the area indicate that they found several to numerous additional occurrences of similar deposits on these claims (D.J. Grybeck, oral communication, 1996). An aerial examination of the area in 1996 indicated no obvious signs of surface exploration. In 1998, there was renewed interest in the area encouraged by the geophysical surveys the State of Alaska had flown over the area.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Buddington, 1923; Berg and Grybeck, 1980; Berg, 1981; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Halobia

**Site type:** Prospect

**ARDF no.:** PE025

**Latitude:** 56.6720 **Quadrangle:** PE C-4

**Longitude:** 133.2608

**Location description and accuracy:**

The prospect is in the intertidal zone at the mouth of a small creek that enters the northern side of the large shallow bay at the mouth of the Castle River; the site is in the NE1/4 section 15, T. 60 S., R. 77E. The locality as seen in 1996 was about 250 feet downstream from a log jam at the high tide mark on the creek. Massive sulfide lenses occur in the center of the creek bed but they are not conspicuous. The location is accurate.

**Commodities:**

**Main:** Ag, Pb, Zn

**Other:** As, barite, Cu

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

Thin lenses of massive sulfides occur in siliceous phyllite that is intercalated with fossiliferous, Upper Triassic black carbonaceous phyllite; garnet-bearing limestone; siltstone; and silvery dark gray muscovite- and quartz-rich phyllite (Berg and Grybeck, 1980; Berg, 1981). The carbonaceous phyllite contains abundant pyrite. The massive sulfide lenses are in several zones 10-12 feet wide and 80-100 feet long in the creek bed in the intertidal zone. Individual lenses within these zones are up to 1 foot wide and 3 feet long; they contain abundant pyrite and up to 5 percent galena and sphalerite. Analyses of grab samples show up to 100 parts per million (ppm) copper, 100 ppm silver, and 1000 ppm arsenic. Several examples of the fossil Halobia collected in rocks interbedded with the sulfide lenses at the deposit unambiguously date the deposit as Late Triassic. Recent mapping by Karl and others (1999) include the rocks at this prospect in the Triassic Hyd Group, which is extensive in the area and hosts several volcanogenic massive sulfide deposits. The deposit is part of the Triassic Duncan Canal-Zarembo Island belt of dismembered, volcanogenic massive-sulfide deposits described by Berg and Grybeck (1980) and Berg (1981). Also see PE024 which is similar in origin and probably a continuation of this deposit.

Pacific Alaska Resources explored in the area in the 1980's and 1990's. They planned to drill several geochemical anomalies in copper, lead, and zinc,about one to one and one-half miles to the west of this occurrence at an elevation of 300 to 700 feet. They apparently did not follow through. (Still and others (2002) who mention this work, say that the area to be drilled was east of the Halobia occurrence but that is unlikely as it would be near the shoreline or under Duncan Canal.) Bittenbender and others (2000) describe several geochemical anomalies in this area. Still and others (2002) sampled the Halobia occurrence; their samples contained up to 30.8 ppm silver, 5,400 ppm lead, and 5.4 percent zinc.

**Alteration:**

**Age of mineralization:**

Unambiguously Late Triassic based on the age of fossils at the site.

**Deposit model:**

Kuroko massive-sulfide deposit model (Cox and Singer, 1986, model 28a); alternately a Sierran Kuroko deposit (Bliss, 1992; 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a1

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
Discovered by the U. S. Geological Survey in 1979 (Berg and Grybeck, 1980). Nine lode claims were staked on the deposit in 1979; by 1995, a considerable block of ground several square miles in area was staked on and northwest of the original discovery (Department of Natural Resources unpublished Kardex mining claim information system). Informal discussions with industry geologists who worked in the area indicate that they have identified several to numerous additional occurrences of similar deposits on these claims (D.J. Grybeck, oral communications, 1996). Sampled by Still and others (2002).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Berg and Grybeck, 1980; Berg, 1981; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Bittenbender and others, 2000; Still and others, 2002.

**Primary reference:** Berg and Grybeck, 1980

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Castle Island

**Site type:** Mine

**ARDF no.:** PE026

**Latitude:** 56.6521

**Quadrangle:** PE C4

**Longitude:** 133.1667

**Location description and accuracy:**

The location of the Castle Island mine is well known. However, the original outcrop of the deposit was little more than a large rock at the northeast end of 'Castle Island'; that original outcrop has now been completely mined out to below sea level. Note the mine which is almost universally called 'Castle Island' is not identified as such on the USGS 1:63,360-scale topographic map and none of the Castle Islands is specifically labeled as Castle Island on the current (2007) maps. The island that is the site of the mine and is described here is an islet about about 650 yards long, located about 1,500 feet south of Big Castle Island, which is shown on current topographic maps.

**Commodities:**

**Main:** Barite

**Other:** Ag, Cu, Pb, Sn

**Ore minerals:** Barite, bornite, chalcopyrite, galena, pyrite, pyrrhotite, sphalerite, tetrahedrite

**Gangue minerals:**

**Geologic description:**

The Castle Island barite deposit was known before World War I (Burchard, 1914; Buddington, 1923; Buddington, 1925; Buddington and Chapin, 1929) and was studied several times subsequently (Williams and Decker, 1932 (DGGS IR 117-1); Race, 1963 (DGGS PE 117-9). It was mined nearly continuously from 1966 to 1980 by a succession of companies: Alaska Barite Co from 1966 to 1969; Inlet Oil from from to 1975; and Chromalloy America from 1975 to 1980. The mine closed in 1980 and all the mining equipment and buildings were removed from the island. The original deposit was a small outcrop at the northeast end of the island that was entirely removed by mining. Much of the mining was done underwater from an offshore barge that used a dragline to recover ore fragmented by submarine blasting. The total production was about three-quarters of a million tons of barite, almost all of which was mined from 1968 to 1980 as direct shipping ore.

The ore body consisted of a lenticular, massive barite lens about 300 feet long and up to 200 feet thick that was mined to a depth of about 130 feet below sea level. [This description of the mineralization is synthesized from Burchard (1914); Buddington (1923); Buddington (1925); unpublished written and oral data from David Carnes, U. S. Bureau of Mines; unpublished field notes, analyses, and laboratory studies by the D.J. Grybeck; analyses summarized in Grybeck, Berg, and Karl (1984); and Still and others (2002).] The exact stratigraphic relations are unclear because most of the deposit was under salt water. However, examination of unpublished drilling data and cross sections maintained by the mine indicates that the barite lens probably occurred along the trough of a symmetrical syncline that trends about N30W with limbs that dip about 60NE. The hanging wall was limestone and gray schist; the footwall was graphitic calcareous schist. The drilling also indicated a considerable tonnage of lower grade barite interbedded with 'gray schist,' 'chert,' and 'graphitic schists,' and the possibility of at least one more high-grade barite lens offshore. Mine-run material was massive, white to light gray, almost pure barite that almost invariably contained a percent or so of sulfides as tiny disseminated grains. Assays of the massive barite indicate that it typically contained about 0.5 to 2 percent zinc, about 0.5 percent lead, a small amount of copper, and about 1 ounce of silver per ton. Under the reflecting microscope, the sulfides are sphalerite, galena, pyrite, pyrrhotite, bornite, tetrahedrite-tennantite, and chalcopyrite, together with minor amounts of other unidentified ore minerals--all as tiny, generally equant grains (D.J. Grybeck, personal observation, 1996). Examination of waste dumps provide many samples that show all transitions from massive barite to layered pyrite(-sphalerite -quartz)-barite rock with the other sulfides noted previously that are disseminated though the rock in minor amount. The association of barite, layered sulfide-barite rocks, schistose metafelsite(?), and black carbonaceous, calcareous phyllite at the mine indicate that it is part of the Triassic Duncan Canal-Zarembo Canal belt of dismembered, volcanogenic massive-sulfide deposits described by Berg and Grybeck (1980) and Berg (1981).

The Castle Islands largely -- and the island on which the barite mine occurs specifically -- consist largely of Upper Triassic Hyd Group rocks which are dominantly felsic and intermediate volcanic flows and breccia, limestone and argillite. However, some of the islands of the Castle Islands also consist of Devonian limestone and Quaternary basalt whose relationship to the Hyd Group rocks is probably structurally complicated and largely hidden under water (Brew, 1997; Karl and others, 1999).

**Alteration:**

**Age of mineralization:**

Late Triassic based on the age of the host rock.

**Deposit model:**

Barite facies of a Kuroko massive-sulfide model (Cox and Singer, 1986; model 28a); alternatively a barite facies of a Sierran Kuroko model (Bliss, 1992; model 28a1).

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

28a or 28a1

**Production Status:** Yes, medium

**Site Status:** Inactive

**Workings/exploration:**

The Castle Island deposit was known before World War I. It was mined nearly continuously from 1966 to 1980 by a succession of companies: Alaska Barite Co from 1966 to 1969; Inlet Oil from from to 1975; and by Chromalloy America from 1975 to 1980. The mine closed in 1980 and all the mining equipment and buildings were removed from the island. The original deposit was a small outcrop at the northeast end of the island that was entirely removed by mining. Much of the mining was then done underwater from an offshore barge that used a dragline to recover ore that was fragmented by submarine blasting. Essentially, the mine was operated as a submarine open pit from a camp on the island. An earlier phase of drilling and sampling on the original barite outcrop that ultimately resulted in mining the deposit was documented by Race (1963 [PE 117-9]) and Williams and Decker (1932 [IR 117-1]).

**Production notes:**

The exact production was not systematically reported but total production was about three-quarters of a million tons of barite, most of which was mined from 1968 to 1980 as direct shipping ore. Swainbank and others (1995) indicate that the total production was 776,390 tonnes (865,000 tons) of raw and refined barite produced from 1963 to 1980. Still and others (2002) say that Alaska Barite Company produced 234,000 tons of barite by surface mining from 1966 to 1969 and that Inlet Oil and Chromalloy America produced another 552,888 tons of barite from 1970 to 1980 from the submarine portion of the barite lens.

**Reserves:**

In 1977, Carnes (1980) inferred that the deposit contained 390,000 tons of low-grade barite resources with a grade of 83 percent $BaSO_4$ and 315,000 tons of higher grade barite resources. In 1980, Holdsworth (1980) estimated that the deposit contained 69,600 tons of ore-grade material. (From 1977 to 1980, the mine produced about 35,000 tons of barite.) When it closed, the mine had little if any reserves that could be economically mined with then-current technology (oral and written communication, 1996, from David Carnes, U. S. Bureau of Mines, who was the mining engineer in charge of the mine over most of its life).

**Additional comments:**

**References:**

Burchard, 1914; Buddington, 1923; Buddington, 1925; Buddington and Chapin, 1929; Race, 1963 (DGGS PE 117-9); Williams and Decker, 1932 (DGGS IR 117-1); Cobb, 1972 (MF-415); Cobb, 1978 (OF 78-870); Carnes, 1980; Karl and others, 1980; Holdsworth, 1980; Berg and Grybeck, 1980; Berg, 1981; Grybeck, Berg, and Karl, 1984; Swainbank and others, 1995; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** This record

**Reporter(s):** H.C. Berg (Fullerton, California) and D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Helen S

**Site type:** Mine

**ARDF no.:** PE028

**Latitude:** 56.5687 **Quadrangle:** PE C-4

**Longitude:** 133.0676

**Location description and accuracy:**

The Helen S Mine is near the northwest corner of Woewodski Island, just inland from the shore and about 100 yards north of the mouth of the creek that drains Harvey Lake. It is in the southwest corner of section 22, T. 61 S., R. R 79 E. The mine is well known and easily accessible. Figure 15 of Still and others is a detailed map of the mine.

Note that there is a massive-sulfide deposit (PE093) that adjoins and/or overlaps the Helen S Mine; it is an entirely entirely different type of deposit and is described separately.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:**

**Ore minerals:** Arsenopyrite, galena, gold, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The gold-quartz veins of the Helen S mine were discovered in 1902 by a prospector (Wright and Wright, 1908; Buddington, 1923; Still and others, 2002, Roppel, 2005). Later that year, E.N. Harvey, who had taken over the management of the Hattie property (PE032) of the Olympic Mining Company about 2 miles south, largely moved the equipment of the Hattie to the Helen S. There was considerable activity on the Helen S in 1903 and 1904, including the construction of several buildings, setting up a boiler and hoist, sinking two shafts and driving 650 feet of drift out from them. The crew that averaged 31 people. In addition, the 20-stamp mill that was originally meant for the Hattie but had never been set up there was moved to the Helen S. In 1903 and/or 1904, the mill processed an unknown amount of ore that produced about $35,000 (probably mainly if not entirely in gold at $20.67 per ounce). By the end of 1904, however, the mine was in financial difficulties and mining ceased . The Helen S claim was patented in 1910 and Harvey continued to maintain the property as he tried to obtain funds for further work. However, there was little actual mining activity on the property and in 1915, the mine was assigned to a Petersburg bank as a result of a legal judgment against the Olympic Mining Company. The bank soon sold the property and the patented claims have been held since by a succession of private individuals; in 1978 it was sold to a group of residents of Petersburg. More recently, it was examined and sampled by Still and others (2002) as part of a regional mineral assessment by the Bureau of Land Management.

All the early production was from quartz veins of unknown orientation that contained sparse arsenopyrite, pyrite, galena, and sphalerite. There is little outcrop in the immediate vicinity of the workings. Those few and the material on the dumps is black, slate, greenstone, and felsic and intermediate metavolcanic rocks of the Triassic Hyd Group (Brew, 1997; Karl and others, 1999.) Still and others (2002) collected several samples from a 1.5-foot-thick quartz vein that is exposed just below the surface in the shaft about 400 feet north of the old mill site. A grab sample contained 0.328 ounce of gold per ton. Several quartz veins up to 2.3 feet thick are exposed in a small pit behind the cabin near the mouth of the small creek that runs along the west side of the mine. Still and others (2002) collected 6 samples there that contained up to 58 parts per billion gold, 573 parts per million (ppm) copper, and 2,870 ppm zinc.

Note that there is a distinctly different type of deposit, volcanogenic massive sulfides, adjacent to or overlapping the Helen S mine; that deposit is described separately (PE New B1035).

**Alteration:**
None specifically noted.

**Age of mineralization:**
The gold-quartz veins are Triassic or younger based on the age of the host rocks.

**Deposit model:**
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:** Active

**Workings/exploration:**
The gold-quartz veins of the Helen S mine were discovered in 1902 by a prospector (Wright and Wright, 1908; Buddington, 1923; Still and others, 2002, Roppel, 2005). Later that year, E.N. Harvey, who had taken over the management of the Hattie property (PE032) of the Olympic Mining Company about 2 miles south, largely moved the equipment of the Hattie to the Helen S. There was considerable activity on the Helen S in 1903 and 1904, including the construction of several buildings, setting up a boiler and hoist, sinking two shafts and driving 650 feet of drift out from them. The crew that averaged 31 people. In addition, the 20-stamp mill that was originally meant for the Hattie but had never been set up there was moved to the Helen S. In 1903 and/or 1904, the mill processed an unknown amount of ore that produced about $35,000 (probably mainly if not entirely in gold at $20.67 per ounce). By the end of 1904, however, the mine was in financial difficulties and mining ceased . The Helen S claim was patented in 1910 and Harvey continued to maintain the property as he tried to obtain funds for further work. However, there was little actual mining activity on the property and in 1915, the mine was assigned to a Petersburg bank as a result of a legal judgment against the Olympic Mining Company. The bank soon sold the property and the patented claims have been held since by a succession of private individuals; in 1978 it was sold to a group of residents of Petersburg. More recently, it was examined and sampled by Still and others (2002) as part of a regional mineral assessment by the Bureau of Land Management.

**Production notes:**
A small amount of ore with a grade of about 0.177 ounce of gold per ton was milled sometime between 1902 and 1915 but total production is uncertain and was probably small (Roehm, 1945). Roehm noted that the ore averaged $3.66 per ton (without specifying the price of gold). Roppel (2005) indicated that the mill processed an unknown amount of ore in 1903 and/or 1904 that produced $35,000 (probably mainly or nearly all in gold at $20.67 per ounce.)

**Reserves:**
None.

**Additional comments:**
All the workings are on a patented claim.

**References:**
Wright and Wright, 1908; Buddington, 1923; Roehm, 1945 (IR 195-37); Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Berg and Grybeck, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002; Roppel, 2005.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Lost Lake

**Site type:** Prospect

**ARDF no.:** PE029

**Latitude:** 56.5734 **Quadrangle:** PE C-4

**Longitude:** 133.0590

**Location description and accuracy:**

The Lost Lake prospect is on the north bank of the small lake, locally named 'Lost Lake' on northwestern Woewodski Island (lake '175' on the USGS 1:63,360-scale topographic map). The deposit is about 25 feet north of the lake; it extends extends east and west of a small creek that flows to the north from about the center of north shore of the the lake. Drilling pads and landing sites were visible in 1996 at the prospect and there was additional drilling in 2004. The prospect is near the center of section 22, T. 61 S., R. 79 E. The location is known to within 100 yards and easily located.

**Commodities:**

**Main:** Ag, Ba, Pb, Zn

**Other:** Au?

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

This prospect was found in the late 1970's and has been explored or examined by a number of companies since, including Cominco Exploration, Colony Pacific, Amselco, and Kennecott Exploration. In 1996, it was held by Westmin Resources Limited, who had other properties on Woewodski Island. In 2008, the prospect is held by Bravo Ventures Group. The deposit consists of massive sulfide layers that are covered by only a thin layer of vegetation at several outcrops beside the lake. They have been sampled several times in shallow pits but most of the area is covered by muskeg and vegetation. Several drilling sites were obvious at the prospect in 1996 (D. Grybeck, personal observation,) and at least 16 holes are said to have been drilled by then. Four more holes were drilled in 2004.

A resistant layer of cream- to light-gray colored schist about 10 feet thick dams in the north side of Lost Lake. The foliation strikes about N80E to S75E, i.e., roughly parallel to the north side of the lake, and dips about 70-85 S. The schist contains at least two layers of massive sulfides 8 inches to 16 inches thick that consist mainly of sphalerite with moderate amounts of pyrite and sparse galena (D.J. Grybeck, unpublished field notes,1996). Analyses of a number of samples of similar(?) schist sampled nearly by Newberry and Brew (1989) indicate that: 1) the schist is probably hydrothermally altered basalt, 2) the schist is geochemically analogous to schist at the Greens Creek mine on Admiralty Island, and 3) the deposit is probably Triassic in age.

Still and others (2002) sampled surface exposures of the bands of massive sulfides exposed at the surface. A 4.4-foot chip sample at one outcrop contained 153.8 parts per million (ppm) silver, 5,519 ppm lead, and 11.5 percent zinc. A 7.5-foot sample across another outcrop with two narrow bands of mineralization contained 83.9 ppm silver, 5,180 ppm led, and 4.5 percent zinc. A third outcrop that exposes a 1.1-foot-thick band of pyrite, sphalerite, and galena in schist contained 282 ppm silver, 2.79 percent lead, and 24.15 percent zinc.

Bravo Ventures Group (2008) reported that high grade zinc mineralization was intersected in two of the three holes drilled in 2004. Samples contained up to 70 grams of silver per ton and 13.6 percent zinc across 1.3 meters and 21 grams of silver per ton and 4.5 percent zinc across 5.9 meters.

Westmin Resources (1997) cited a 'geologic reserve' for the Lost Lake deposit as approximately 500,000 tonnes grading 8.1 percent zinc, 0.6 percent lead, and 77.76 grams of silver per ton.

**Alteration:**
The schist that host the massive sulfide layers is probably hydrothermally altered basalt.

**Age of mineralization:**
Probably Triassic based on geochemistry of the host rocks (Newberry and Brew, 1989), and the deposit's similarity to other deposits in the Triassic, Duncan Canal-Zarembo belt of massive sulfide deposits defined by Berg and Grybeck (1980) and Berg (1981).

**Deposit model:**
Barite facies of a Kuroko volcanogenic massive-sulfide model (Cox and Singer, 1986; model 28a). Alternatively a barite facies of a volcanogenic Sierran Kuroko model (Bliss, 1992; model 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a1

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**
This prospect was found in the late 1970's and has been explored or examined by a number of companies since, including Cominco Exploration, Colony Pacific, Amselco, and Kennecott Exploration. In 1996, it was held by Westmin Resources Limited, who had other properties on Woewodski Island. In 2008, the prospect is held by Bravo Ventures Group Several drilling sites were obvious at the prospect in 1996 (D. Grybeck, personal observation,) and at least 16 holes are said to have been drilled by then. Four more holes were drilled in 2004. Still and others (2002) sampled surface exposures which expose bands of massive sulfides.

**Production notes:**

**Reserves:**
Westmin Resources (1997) cited a 'geologic reserve' for the Lost Lake deposit as approximately 500,000 tonnes grading 8.1 percent zinc, 0.6 percent lead, and 77.76 grams of silver per ton.

**Additional comments:**

**References:**
Berg and Grybeck, 1980; Berg, 1981; Newberry and Brew, 1989; Westmin Resources, 1997; Karl and others, 1999; Still and others, 2002; Bravo Ventures Group, 2008.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (along Harvey Creek)

**Site type:** Mine

**ARDF no.:** PE030

**Latitude:** 56.5664 **Quadrangle:** PE C-4

**Longitude:** 133.0655

**Location description and accuracy:**
This small mine on northwestern Woewodski Island is about 900 feet east-southeast of the mouth of the creek that drains Harvey Lake; it is along a trail from saltwater to the Harvey Lake Forest Service cabin. There are several occurrences of mineralization along the creek from about 800 to 2,000 feet above its mouth. The coordinates are at the location of a small mine dump and mill that was active in the 1930's.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Arsenopyrite, gold, pyrite

**Gangue minerals:** Quartz

**Geologic description:**
The rocks in the area consist of silicified and pyritized phyllite and light greenish gray metatuff (?) that is part of the Triassic Hyd Group (Karl and others, 1999). Still and others (2002), guided by an unpublished 1930's-vintage report found several auriferous quartz stringers along about 800 feet of the creek banks and in nearby outcrops; their samples contained up to 1.89 ounce of gold per ton. There is also a small mill and dump and a small pelton wheel along the creek that probably date to the 1930's. Grab samples of the dump that they thought probably represented the mill feed, contained 5,482 to 7,944 parts per billion. Two shallow holes that were drilled near the dump in 1977 to test the mine did not reveal significant mineralization.

**Alteration:**
The Triassic phyllite and metatuff that host the deposit are silicified and pyritized in the area.

**Age of mineralization:**
Triassic or younger based on the age of the host rock.

**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:** Undetermined

**Workings/exploration:**
This mine was active in a small way in the 1930's; a small Pelton wheel and hammer mill remain by a small dump.

**Production notes:**
Production uncertain but a small amount of gold was probably recovered during the 1930's.

**Reserves:**

**Additional comments:**

**References:**
Wright and Wright, 1908; Buddington, 1923; Grybeck, Berg, and Karl, 1984; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Maid of Mexico

**Site type:** Mine

**ARDF no.:** PE031

**Latitude:** 56.5652

**Quadrangle:** PE C-4

**Longitude:** 133.0290

**Location description and accuracy:**

This is a well known mine on central Woewodski Island. It is about 0.5 mile north-northeast of the center of the east end of Harvey Lake and about 0.4 mile south-southeast of the center of section 23, T 61 S, R. 79E. In 1996, a trail was still passable from the center of the north shore of Harvey Lake, north to the mine, but in later years it was difficult to follow in the heavy timber and vegetation. The location is accurate.

**Commodities:**

**Main:** Au

**Other:** Ag, Cu, Pb, Zn

**Ore minerals:** Chalcopyrite, galena, gold, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The Maid of Mexico vein was discovered about 1902 and explored by more than 1000 feet of underground workings from several adits prior to World War II (Still and others, 2002) . A small mill was built on the property about 1920 and some production resulted, probably about 1,200 ounces from 1915 to 1938. Roppel (2005) recounts much historical detail about the early history of the Maid of Mexico, the personalities involved in it , and its changes in ownership until World War II. The property was active in 1979 and the owners had cleaned out the drifts in anticipation of production; apparently little has been done done. However, it was still held privately in 2002 according to Still and others. Williams(1953) noted that the Alaska Department of Mines had seven confidential maps dating from 1933 to 1935 of the underground workings in their files. He noted 130 feet of crosscut from 3 adits, 260 feet of drifting on the vein, and several raises and winzes.

The Maid of Mexico vein is about 2-6 feet thick, averaging about 4 feet. It can be traced for at least 1,000 feet on the surface but the underground working expose only a small portion of it (Still and others, 2002). The vein consists mainly of white quartz with sparse sphalerite, pyrite, galena, chalcopyrite, and free gold. It is mostly in black carbonaceous argillite associated with pyrite-bearing, calcareous felsic metatuff, felsic dikes, and minor limestone and mudstone. The black carbonaceous unit is overlain(?) by greenstone, greenschist, and marble. Several faults are known in the underground workings. Brew (1997) correlates the country rock with the Triassic Hyd Group, which in the Duncan Canal area typically consists of felsic and intermediate flows and breccia, argillite, and minor limestone.

Nine samples of the vein collected by Williams (1953) assayed trace to 0.64 ounces of gold per ton, a trace of silver, 0.20-0.68 percent lead, and 0.30 to 0.77 percent Zn. Using several old unpublished maps that date to the 1930's when the property was active, Still and others (2002) compiled a map of the surface workings, the three adits,and at least some of the underground workings. They also sampled a cut at the surface that exposes a quartz vein up to 1.8 feet thick. It contained from 5 to 1,351 parts per billion (ppb) gold. As reconstructed from the old maps, 69 samples taken underground along a 250-foot drift averaged 0.2 ounce of gold per ton across a widths of 1 to 4 feet; two of the raises averaged 0.3 ounce of gold per ton across a width of 1 to 4 feet. Another raise 80 feet long averaged 0.16 ounce of gold per ton, and a sample from raise another contained 2.80 ounce of gold per ton. Still and other also noted that the samples collected by Williams were considerably less rich than those cited on the old maps and the average grade of the ore that was being mined as noted by Buddington (1923 was about 1 ounce of gold per ton.

**Alteration:**
None specifically noted.

**Age of mineralization:**
Triassic or younger based on age of the host rock.

**Deposit model:**
Gold quartz vein (Cox and Singer, 1986; model 36a).

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

**Production Status:** Yes

**Site Status:** Active

**Workings/exploration:**
The deposit was explored by more than 1000 feet of underground workings from three adits prior to World War II. The property was active in 1979 and the owners had cleaned out the drifts in anticipation of production but apparently little has been done since (D.J. Grybeck, unpublished field notes). The mine was still held privately in 2002 according to Still and others. Williams(1953) noted that the Alaska Department of Mines had seven confidential maps dating from 1933 to 1935 of the underground workings in their files. He cited 130 feet of crosscut from the portal of the mine and 260 feet of drifting on the vein; also several raises and winzes. Using several old unpublished maps that date to the 1930's when the property was active, Still and others (2002) compiled a map of the surface workings, the three adits on the property, and at least some of the nearly thousand feet of underground workings.

**Production notes:**
Small test shipments were made as early as 1917 and the property produced ore during the 1930's. The remains of a small mill are still present on the property. Detailed production records are not available but Still and others (2002) indicate that about 1,200 ounces of gold was produced from 1915 to 1936.

**Reserves:**

**Additional comments:**

**References:**
Wright and Wright, 1908; Buddington, 1923; Roehm, 1945 (DGGS IR 195-37); Williams, 1953; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415);
Berg and Grybeck, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-J); Still and others, 2002; Roppel, 2005.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Hattie

**Site type:** Mine

**ARDF no.:** PE032

**Latitude:** 56.5320 **Quadrangle:** PE C-4

**Longitude:** 133.0477

**Location description and accuracy:**

The adit of the Hattie Mine is about 0.1 mile east of the shoreline near the southwest end of Woewodski Island. It it about 0.3 mile east-southeast of the southeast tip of Butterworth Island, near the northwest corner of section 2, T. 61 S., R. 79 E. The location is accurate. Figure 22 of Still and others is a map of the underground workings of the Hattie Mine.

**Commodities:**

**Main:** Au

**Other:** Cu, Pb, Zn

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The Hattie Mine dates to at least 1899 and by 1902, the Olympic Mining Company had driven several hundred feet of underground workings and had built a substantial camp and a mill building on the shore below the adit of the mine. Roppel (2005) documents much of the early history and personalities of the property and shows an early picture of the camp. Mill machinery was ordered and shipped to the property but never assembled at the Hattie Shortly thereafter the underground work proved disappointing and the operations of the company and the new mill equipment moved north on Woewodski Island to the Helen S Mine. (PE028) The Hattie camp burned in 1911 and there does not seem to have been any underground work on the property since. There is no documented production. However, there have been persistent rumors of at least a small test ore shipment in the early part of the century that was processed at the nearby Helen S mill with mixed results (Roehm, 1945). Since the 1970's, much of Woewodski Island has been covered by claims by a succession of companies: Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Westmin Resources, and currently (Feb 2008) the Bravo Venture Group. Many of the claims covered the Hattie property but other than geochemical sampling and routine sampling of the Hattie dump and underground workings for background, there has been no recent work on the Hattie itself. The underground workings were still accessible in the late 1990's when Still and others (2002) sampled them as part of a regional mineral assessment by the Bureau of Land Management. The workings consist of about 325 feet of drifts, a 65-foot raise, and a winze.

The rocks in the vicinity are mainly rusty-weathering, light-greenish gray calcareous metarhyolite that is part of the Triassic Hyd Group (Brew, 1997, Karl and others, 1999). The metarhyolite is intruded by Mesozoic epidote-hornblende gabbro and by fresh, medium-grained Cretaceous diorite.

Four brecciated quartz veins up to 10 feet thick cut sheared diorite in the mine workings (Still and others, 2002); they contain sparse to rare disseminated pyrite, and rare grains of chalcopyrite, galena, and sphalerite. Gold values are uncertain but probably low; the best assay from several samples collected by the USGS on the dump in the early 1980's was 0.05 ounce of gold per ton (Grybeck, Berg, and Karl, 1984). Roehm (1945) noted that the deposit had low silver and gold values. Of the 27 samples collected underground and from the dumps at the Hattie by Still and others (2002), the highest gold value was 134 parts per billion (ppb) gold and all the rest contained less than 37 ppb.

**Alteration:**

**Age of mineralization:**
Cretaceous or younger based on the age of the diorite host rock.

**Deposit model:**
Au-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:** Active?

**Workings/exploration:**
The Hattie Mine dates to at least 1899 and by 1902, the Olympic Mining Company had driven several hundred feet of underground workings and had built a substantial camp and a mill building on the shore below the adit of the mine. Roppel (2005) documents much of the early history and personalities of the property and shows an early picture of the camp. Mill machinery was ordered and shipped to the property but never assembled at the Hattie Shortly thereafter the underground work proved disappointing and the operations of the company and the new mill equipment moved north on Woewodski Island to the Helen S Mine. (PE028) The Hattie camp burned in 1911 and there does not seem to have been any underground work on the property since. Since the 1970's, much of Woewodski Island has been covered by claims by a succession of companies: Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Westmin Resources, and currently (Feb 2008) the Bravo Venture Group. Many of the claims covered the Hattie property but other than geochemical sampling and routine sampling of the Hattie dump and underground workings for background, there has been no recent work on the Hattie itself. The underground workings were still accessible in the late 1990's when Still and others (2002) sampled them as part of a regional mineral assessment by the Bureau of Land Management. The workings consist of about 325 feet of drifts, a 65-foot raise, and a winze.

**Production notes:**
There is no documented production. However, there have been persistent rumors of at least a small test ore shipment in the early part of the century that was processed at the nearby Helen S mill with mixed results (Roehm, 1945).

**Reserves:**
None.

**Additional comments:**

**References:**
Wright and Wright, 1905; Wright and Wright, 1908; Roehm, 1945 (IR 195-37); Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Berg and Grybeck, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002; Roppel, 2005.

**Primary reference:** Still and others, 2005; Roppel, 2005

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (in vicinity 'Brushy Creek')

**Site type:** Prospect

**ARDF no.:** PE033

**Latitude:** 56.5204 **Quadrangle:** PE C-4

**Longitude:** 133.0188

**Location description and accuracy:**

This prospect consists of several cuts in the banks of 'Brushy Creek' between elevations of 90 to 170 feet. Brushy Creek is the informal name given to the creek that flows southwest, about 1.3 miles northwest of the southern tip of Woewodski Island. The coordinates are at about the center of the workings which trend southwest through the southwest quarter of section 1, T. 61 S., R. 79 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Pb, Zn

**Other:**

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

During the middle 1990's, Westmin Resources was active on Brushy Creek near the southern tip of Woewodski Island.). They excavated a series of cuts along the creek bank for about 3,000 feet between elevations of 90 to 170 feet and collected gridded soil samples over the area.

The rocks in the area are greenstone and greenschist of the Triassic Hyd Formation (Brew, 1997; Karl and others, 1999). Still and others (2002) collected samples in the cuts of iron-stained silicified volcanic rocks with thin bands of and disseminated pyrite, sphalerite, and galena. The best, a 2-foot chip sample, contained 423 parts per billion gold, 27.9 parts per million (ppm) silver, 7,380 ppm lead, and 2.6 percent zinc. Six others contained 1,731 ppm to 2.2 percent zinc.

**Alteration:**

Volcanic rocks near the mineralization are silicified.

**Age of mineralization:**

Late Triassic based on the age of the host rock and similarities to massive sulfide deposits in the Duncan-Zarembo belt of mineralization.

**Deposit model:**

Volcanogenic massive sulfide deposit.

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

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**

During the middle 1990's, Westmin Resources was active on Brushy Creek near the southern tip of Woewodski Island.). They excavated a series of cuts along the creek bank for about 3,000 feet between elevations of 90 to 170 feet and collected gridded soil samples over the area. Still and others (2002) sampled the area as part of a regional mineral assessment for the Bureau of Land Management.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (east of Harvey Lake)

**Site type:** Prospects

**ARDF no.:** PE034

**Latitude:** 56.5587 **Quadrangle:** PE C-4

**Longitude:** 133.0245

**Location description and accuracy:**

These prospects are scattered throughout a heavily forested area somewhat larger than 1,000 feet in diameter, centered about 0.5 mile east of the east end of Harvey Lake. The center of the area is about 0.5 mile west-northwest of the center of section 25, T 61 S, R. 79 E. Figure 18 of Still and others (2002) show the location of 9 holes drilled in 1999 and the location of the several samples they collected.

**Commodities:**

**Main:** Zn

**Other:**

**Ore minerals:** Sphalerite

**Gangue minerals:**

**Geologic description:**

At various times from the 1970's to 2008, much of central Woewodski Island was staked by a succession of companies; these include Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Houston Oil and Minerals, Westmin Resources, and the Olympic Resources Group. During the late 1980's and early 1990, there was considerable geochemical sampling in this area and a hole was drilled sometime before 1998 that was reported to intersect notable zinc values (Still and others (2002). In 1999, P. Beardslee of Petersburg drilled 9 shallow holes in the area that intersected thin bands of massive pyrite. Still and others (2002) found several outcrops in the thick vegetation that covers the area. One outcrop of iron-stained schist with 10 percent disseminated and banded pyrite did not contain significant metal values. However a sample with 0.4 feet of massive pyrite that was collected near a small landslide contained 1,023 parts per million zinc. Brew (1997) correlates the country rocks in this area with the Triassic Hyd Group which in the Duncan Canal area typically consists of felsic and intermediate flows and breccia, argillite, and minor limestone in the Duncan Canal area.

**Alteration:**

None noted specifically.

**Age of mineralization:**

Triassic or younger based on age of the host rock.

**Deposit model:**

Kuroko massive sulfide (Cox and Singer, 1986; model 28a).

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

28a

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**

At various times from the 1970's to the present, much of central Woewodski Island was staked by a succession of companies. These include Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Houston Oil and Minerals, Westmin Resources, and the Olympic Resources Group. During the late 1980's and early 1990's, there was considerable geochemical sampling in this area and a hole was drilled sometime before 1998 that was reported to intersect notable zinc values (Still and others (2002). In 1999, P. Beardslee of Petersburg drilled 9 shallow holes in the area that intersected thin bands of massive pyrite. Still and others (2002) found several outcrops in the thick vegetation that covers the area and sampled them.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

Area covered by active claims in 2008.

**References:**

Brew, 1997 (OF 97-156-J); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Mad Dog; Fortune

**Site type:** Prospect

**ARDF no.:** PE035

**Latitude:** 56.5321 **Quadrangle:** PE C-4

**Longitude:** 133.0555

**Location description and accuracy:**

This prospect is at the southeastern tip of Butterworth Island next to the south end of Whiskey Pass, which is the channel between Woewodski Island and Butterworth Island. The deposit extends out into the flat that uncovers at low tide between Butterworth Island and the small unnamed island off its south tip. It is near the northeast corner of section 3, T. 62 S, R. 79 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Pb, Zn

**Other:**

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Barite?

**Geologic description:**

The Mad Dog prospect has been known since at least 1978 and has been examined and sampled by a succession of companies: Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, and Westmin Resources. It currently (2008) is held by the Bravo Venture Group. Several holes have been drilled over the years; most recently Bravo drilled 4 holes in 2004. Some of the better mineralization is in the intertidal zone and only uncovers at low tide. The mineralization does not appear to extend onto Woewodski Island.

The host rocks on the southern tip of Butterworth Island are greenschist and greenstone of the Triassic Hyd Group (Brew, 1997; Karl and others, 1999). However, most of the island is Upper Cretaceous hornblende diorite.

The deposit consists of volcanogenic massive sulfide layers and lenses in Triassic Hyd Group rocks analogous to other similar deposits in the Duncan-Zarembo mineral belt (Berg and Grybeck, 1980; Berg,1981). The massive sulfide layers and lenses are from about 0.1 to 1 foot thick , follow the layering in greenschist and phyllite, and consist mainly of pyrite, black sphalerite, and galena. The bands have an unusually high silver content relative to other massive sulfide deposits in the area. One of the better exposed zones of mineralization at the tip of Butterworth Island shows sulfide bands and lenses across 15 feet that extend for about 160 feet along strike. More mineralization was found near the tip of the small unnamed island south of Butterworth Island but it is exposed only at low tide. Still and others (2002) collected 15 samples of the richer portions of the mineralization. They contained from 58 to 3,927 parts per billion gold, 43 to 630.4 parts per million (ppm) silver, 341 to 9.76 percent lead, and 3,951 ppm to 20.1 percent zinc.

In their 2004 drilling, Bravo Venture Group (2008) cut a 20-meter-thick mineralized zone. One intercept 3.8 meters long contained 16.4 ounces of silver per ton, 2.8 percent lead, and 22.4 percent zinc, and several other intercepts contained 131 to 437 grams of silver per ton, 0.59 to 5.03 percent lead, and 10.95 to 20.2 percent zinc.

**Alteration:**

None specifically noted.

**Age of mineralization:**

Upper Triassic based on similarity to other volcanogenic massive sulfide deposits in the area.

**Deposit model:**
Barite facies of a Kuroko volcanogenic massive-sulfide model (Cox and Singer, 1986m, model 28a). Alternatively a barite facies of a volcanogenic Sierran Kuroko model (Bliss, 1992, model 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a1

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
The Mad Dog prospect has been known since at least 1978 and has been examined and sampled by a succession of companies: Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, and Westmin Resources. It currently (2008( is held by the Bravo Venture Group. Several holes have been drilled over the years; most recently Bravo drilled 4 holes in 2004.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Berg and Grybeck, 1980; Berg, 1981; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002; Bravo Venture Group, 2008.

**Primary reference:** Still and others, 2002; Bravo Venture Group (2008)

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Lake; Margery Group

**Site type:** Mine

**ARDF no.:** PE038

**Latitude:** 56.4737 **Quadrangle:** PE B-1

**Longitude:** 132.0958

**Location description and accuracy:**

The location of this mine as shown in Gault and others (1953). It is about two miles east of the east end of Virginia Lake at an elevation of about 1,450 feet and about 0.5 mile southeast of the center of section 23, T. 62 S., R. 86 E. The location is accurate.

**Commodities:**

**Main:** Ag, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Calcite, quartz

**Geologic description:**

The Lake mine was first staked in 1905 as the Margery claims and by 1908 was exposed in several open cuts and short tunnels (Wright and Wright, 1905, 1908). One ton of ore was shipped in 1920 (Gault and others, 1953). It was still active in 1925 when it was restaked as the Lake claims and was active until at least 1927 (Buddington, 1926, Smith 1930a, Smith 1930b). It was restaked in 1965 and then again in 1978 by the Pacific Coast Molybdenum Co. who held the claims until 1986 (Still and others, 2002). The workings consist of three adits, numerous trenches, and surface stripping; most probably date to before 1927.

The mineralization occurs along a major fault zone that strikes N25 to 35 E and dips 70 to 90 degrees to the southeast (Gault and others, 1953; Still and others, 2002) The rocks in the vicinity are dark-colored phyllite and slate, quartzite, chlorite schist, and biotite schist that are about 2000 feet west of large Cretaceous biotite tonalite to granodiorite pluton (Gault and others, 1953; Brew, 1997). The fault zone is 5 to 12 feet wide and has been exposed in the adits and numerous trenches and pits for about 1,450 feet. The mineralization is all within the fault zone and consists of quartz breccia with major galena and lesser sphalerite, pyrite, and chalcopyrite, as well as as massive sulfide bands up to 0.5 feet thick, and sulfide-bearing quartz veinlets and pods.

Still and others (2002) collected several samples. A sample in a narrow vein of galena and sphalerite in Adit 1 (of Gault and others, 1953) contained 161 parts per million (ppm) silver, 8.54 percent lead, and 2.10 percent zinc. A 4.6-foot sample across the face of Adit 2 contained 10.3 ppm silver, 1.058 percent lead, and 1.3 percent zinc; a select dump sample from this adit contained 4.73 ounces of silver per ton, 10.5 percent lead, and 6.60 percent zinc. Still and others also sampled several trenches and pits; the samples contained 178 to 411 ppm silver, 2,049 to 3,266 ppm copper, 7.89 to 25.1 percent lead, and 3.60 to 16.4 percent zinc.

**Alteration:**

**Age of mineralization:**

**Deposit model:**

Sulfide bearing quarts breccia along a regional fault.

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

**Production Status:** Yes; small

**Site Status:** Probably inactive

**Workings/exploration:**

The Lake mine was first staked in 1905 as the Margery claims and by 1908 was exposed in several open cuts and short tunnels (Wright and Wright, 1905, 1908). One ton of ore was shipped in 1921 (Gault and others, 1953); It was still active in 1925 when it was restaked as the Lake claims and was active until at least 1927 (Buddington, 1926, Smith 1930a, Smith 1930b). It was restaked in 1965 and again in 1978 by the Pacific Coast Molybdenum Co. who held the claims until 1986 (Still and others, 2002). The workings consist of three adits, numerous trenches, and surface stripping; most probably date to before 1927.

**Production notes:**

One ton of ore shipped to smelter in 1920 (Gault and others, 1953).

**Reserves:**

None.

**Additional comments:**

**References:**

Wright and Wright, 1905; Wright and Wright, 1908; Buddington, 1923; Gault and others, 1953; Cobb, 1972 (MF-415); U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-C); Smith, P.S., 1930 (B 810); Smith, P.S., 1930 (B 813-A); Still and others, 2002.

**Primary reference:** Gault and others, 1953; Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Groundhog Basin

**Site type:** Prospects

**ARDF no.:** PE040

**Latitude:** 56.5140 **Quadrangle:** PE C-1

**Longitude:** 132.0632

**Location description and accuracy:**

The coordinates are near the center of a group of adits and other workings that extend for nearly a mile on the east side of upper Groundhog Basin The prospect is is in the NW1/4, section 7, T. 62 S., R. 86 E. between elevations of 2,000 and 2,500 feet. Gault and others (1953) includes an excellent detailed geologic map of the prospects, as do Still and others (2002).

**Commodities:**

**Main:** Ag, Pb, Sn, Zn

**Other:** Au, Cu, Mo, Sn

**Ore minerals:** Arsenopyrite, cassiterite, chalcopyrite, cubanite(?), fluorite, galena, magnetite, pyrite, pyrrhotite, sphalerite, tetrahedrite-tennanite

**Gangue minerals:** Quartz, pyroxene, various calc-silicate skarn minerals

**Geologic description:**

The country rocks in the area of the Groundhog Basin base-metal deposits are Tertiary to Cretaceous biotite schist, biotite-garnet-quartz schist, quartzofeldspathic gneiss, and minor marble and calc-silicate gneiss, all metamorphosed from Mesozoic or Paleozoic protoliths (Gault and others, 1953; Brew, 1997; Still and others, 2002). The metamorphic rocks near the prospects are cut by several large Tertiary felsic dikes and sills that are related to a biotite granite stock that is well exposed about a mile northeast of the belt of mineralization that contains this deposit. The granite has been dated at 16.3 Ma. Newberry and Brew (1989) classify this stock as a 'zinnwaldite' or 'tin' granite and they genetically relate this granite to the base metal prospects in Groundhog Basin and also the nearby porphyry molybdenum deposit (PE102) . A large Cretaceous tonalite pluton intrudes the metamorphic rocks less than 3,000 feet west of the Groundhog Basin deposits.

The Groundhog Basin deposits were discovered in 1904 and were extensively explored in 1916-1917. Four claims were patented over the mineralization in 1930. In the early 40's, Ventures Ltd. did considerable surface trenching, drove about 450 feet of underground workings from four adits, and drilled three holes, 107 to 335 feet deep. Gault and others (1953) described much of this early work and did considerable geologic mapping in the area. In 1976, Bunker Hill Mining Company optioned this property and a large block of claims around it (Still and others, 2002). They collected surface samples and drilled 24 holes, 25 to 350 feet deep, but dropped the property at the end of the field season. From 1968 through 1981, Groundhog Basin and the surrounding area was optioned by a succession of companies--Humble Oil and Refining Co., El Paso Natural Gas Co. and AMAX Exploration Inc.--but they did little work specifically on the Groundhog Basin deposits. In 1983, Houston Oil and Minerals Exploration Company sampled the deposits. In 1988, Newberry and Brew (1989) studied the core from previous drilling and the company reports on the Groundhog Basin prospects; they were the first to publicly report on the tin content of the mineralization. The deposit has undoubtedly been examined by numerous companies since but there has been no extensive work since about 1990.

Four distinct steeply-dipping 'ore beds' have been defined, which collectively extend for nearly a mile and parallel the strike of the metamorphic host rocks. The most extensive and thickest, beds 3 and 4, extend horizontally for about 3,700 feet through a vertical distance of about 1,500 feet (Gault and others, 1953;

Still and others, 2002) The ore beds consist of a) masses of ore minerals up to several feet thick, mainly of sphalerite, pyrite, pyrrhotite, galena, chalcopyrite, magnetite, and cubanite(?); and b) layers containing the same assemblage of ore minerals disseminated through the metamorphic host rock. The ore beds are interlayered with steeply-dipping, medium- to high-grade pelitic and quartzofeldspathic schist and gneiss, and locally with banded calc-silicate gneiss. Garnet, pyroxene, and epidote are common near the ore beds in the calcareous rocks and locally form massive skarns. (There is considerable detail available that can be found in Gault and others (1953) and Still and others (2002) on the geometry and sampling of the ore beds that is only summarized here.)

Newberry and Brew (1989) identified tin in cassiterite as a major constituent of the ore beds and has classified the deposits as Ag-Sn-Pb-Zn skarns that replace calcareous beds in the schist and gneiss. They genetically tie the skarns to a 16.3 Ma zinnwaldite 'tin' granite that crops out north of the deposits. Near this zinnwaldite granite, massive sulfide samples commonly contain several percent tin and selected samples contain up to 18%. They interpreted the mineral paragenesis as: 1) formation of pervasive albite-zinnwaldite gneiss in the cupola of an evolving granite with formation of pyroxene-garnet in adjacent biotite schist and mafic dikes; 2) deposition of lower temperature zinnwaldite-sphalerite-cassiterite veins in the granite and formation of the Ag-Sn-Pb-Zn ore bodies in Groundhog Basin by replacement of calcareous layers in the schist and gneiss; and 3) peripheral sphalerite-galena-fluorite veins as distal, lower temperature manifestation of the granite-related hydrothermal system.

Gault and others (1953), document various attempts to define the ore reserves and resources of the deposit and to quantify the size and grade of certain portions of the 'ore beds.' They conclude, however, that there is insufficient information to justify making detailed estimates of the ore reserves in Groundhog Basin. However, in summary, they state, '...it appears reasonably certain that several hundred thousand tons each of solid and disseminated ore are present.' There solid ore contains about 8 percent zinc, 1.5 percent lead, and 1.5 ounces of silver per ton. The disseminated ore contains about 2.5 percent zinc and 1 percent lead.

Newberry and Brew (1989) estimated that the deposit contains about 1 million tonnes of ore containing 0.8 percent tin but emphasize the great uncertainty of their estimate. Still and others (2002) note several other estimates of the reserves or resources of the Groundhog Basin deposit. They conclude that the best mineralization is the 'solid ore' in beds 3 and 4 as exposed on the surface, in underground workings, and in drill holes. They estimate that those beds contain about 466,000 tons of 'indicated and inferred resources' with an average grade of 8 percent zinc, 3.5 percent lead, 1 ounce of silver per ton, and 0.39 percent copper.

The molybdenite-fluorite deposits that overlap this site are described separately (PE102).

**Alteration:**

Deposit associated with formation of pyroxene-epidote-garnet skarn in the host rocks.

**Age of mineralization:**

16.3 Ma based on a genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**

Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** No

**Site Status:** Active?

**Workings/exploration:**

The Groundhog Basin deposits were discovered in 1904 and were extensively explored in 1916-1917. Four claims were patented over the mineralization in 1930. In the early 40's, Ventures Ltd. did considerable surface trenching, drove about 450 feet of underground workings from four adits, and drilled three holes, 107 to 335 feet deep. Gault and others (1953) described much of this early work and did considerable geologic mapping in the area. In 1976, Bunker Hill Mining Company optioned this property and a large block of claims around it (Still and others, 2002). They collected surface samples and drilled 24 holes, 25 to 350 feet deep, but dropped the property at the end of the field season. From 1968 through 1981, Groundhog Basin and the surrounding area was optioned by a succession of companies--Humble Oil and Refining Co., El Paso Natural Gas Co. and AMAX Exploration Inc.--but they did little work specifically on the Groundhog Basin deposits. In 1983, Houston Oil and Minerals Exploration Company sampled the deposits. In 1988, Newberry and Brew (1989) studied the core from previous drilling and the company reports on the Groundhog Basin prospects; they were the first to publicly report on the tin content of the mineralization. The deposit has undoubtedly been examined by numerous companies since but there has been no extensive work since about 1990.

**Production notes:**

**Reserves:**

Gault and others (1953), document various attempts to define the ore reserves and resources of the deposit and to quantify the size and grade of certain portions of the 'ore beds.' They conclude, however, that there is insufficient information to justify making detailed estimates of the ore reserves in Groundhog Basin. However, in summary, they state, '...it appears reasonably certain that several hundred thousand tons each of solid and disseminated ore are present.' There solid ore contains about 8 percent zinc, 1.5 percent lead, and 1.5 ounces of silver per ton. The disseminated ore contains about 2.5 percent zinc and 1 percent lead.

Newberry and Brew (1989) estimated that the deposit contains about 1 million tonnes of ore containing 0.8 percent tin but emphasize the great uncertainty of their estimate. Still and others (2002) note several other estimates of the reserves or resources of the Groundhog Basin deposit. They conclude that the best mineralization is the 'solid ore' in beds 3 and 4 as exposed on the surface, in underground workings, and in drill holes. They estimate that those beds contain about 466,000 tons of 'indicated and inferred resources' with an average grade of 8 percent zinc, 3.5 percent lead, 1 ounce of silver per ton, and 0.39 percent copper.

**Additional comments:**

The Groundhog Basin prospect is covered by 4 patented claims.

**References:**

Wright and Wright, 1908; Buddington, 1923; Gault and others, 1953; Cobb, 1972 (MF-415); George and Wyckoff, 1973; Cobb, 1978 (OF 78-870); Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Gault and others, 1953; Newberry and Brew, 1989

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (in Glacier Basin)

**Site type:** Prospects

**ARDF no.:** PE041

**Latitude:** 56.4779 **Quadrangle:** PE B-1

**Longitude:** 132.0264

**Location description and accuracy:**

The coordinates are at the lower of two adits in an elongate mineralized area that extends southeast from Marsha Peak to Glacier Basin. The adit is near the center of section 20, T. 62 S., R. 86 E.; it includes several small mineral occurrences and two prospects that are mapped in detail on Plate 9 of Gault and others (1953).

**Commodities:**

**Main:** Ag, Au, Be, Pb, Zn

**Other:** Mo?

**Ore minerals:** Beryl, galena, magnetite, sphalerite

**Gangue minerals:** Calc-silicate minerals, fluorite, quartz

**Geologic description:**

The mineralization on the north side of Glacier Basin was first discovered in 1898 and by 1943 was prospected by three short adits and numerous cuts and pits (Gault and others, 1953; Still and others, 2002). Several companies were active in the area from 1964 to the early 1980's but most of their work was to the north and they probably did little on this prospect beyond general reconnaissance.

The Glacier Basin prospects contain two distinct types of deposits that may be genetically related (Gault and others, 1953; Newberry and Brew, 1989; Still and others, 2002). The first consists of small, discontinuous, banded galena-sphalerite-magnetite lenses and layers that are probably continuous with those in Groundhog Basin (PE040) These deposits are relatively small and more scattered as compared to those in Groundhog Basin, but are essentially the same in mineralogy and origin. The host rocks are gneiss and schist that consists mainly of interlayered amphibolite, marble, and calc-silicate units. Four of these layers have been identified north of Glacier Basin below 3,000 feet in elevation. At the surface, they extend for up to 2,000 feet; they strike north-northwest and dip 50 to 60 degrees southwest. They are interpreted as replacement deposits with skarn affinities. The second type of deposit consists of quartz-fluorite veins and breccia with galena; they are exposed in two small adits where they cut a Tertiary rhyolite sill. Berryhill (1964) sampled these occurrences; he found and found found 5 widely spaced fluorite breccias north of Glacier Basin that contain beryllium which occurs as amorphous blebs of pale blue or creamy white beryl The veins average about 0.1 percent beryllium. Several other rhyolite bodies are nearby; most are conformable with the foliation of the metamorphic rocks. The rhyolite sills and dikes are probably cogenetic with the 20 Ma or younger bodies associated with the molybdenite deposits in the area (see PE043) and/or with the 15-17 Ma zinnwaldite 'tin' granite associated with the Groundhog Basin lead-zinc-silver deposits.

Newberry and Brew (1989) provide analytical data for the tin content of several sulfide-rich occurrences at this site. The tin content is distinctly lower than ore samples from Groundhog Basin and their conclusion is that the Glacier Basin deposits are farther from the source of the hydrothermal fluids that formed them, i. e. from the zinnwaldite 'tin' granite at the north end of Groundhog Basin. Still and others (2002) collected several samples at the lower adit of disseminated and massive sulfides at the contact of a quartz rhyolite sill and gneiss; the best contained 3.97 to 7.98 ounces of silver per ton, 4.64 to 33.4 percent lead, and 4.32 to 7.9 percent zinc. Several samples farther north of the quartz-fluorite veins contained up to 611 parts per billion gold, 1,378 parts per million (ppm) lead, and 2,061 ppm zinc.

**Alteration:**
Deposits locally associated with development of pyroxene-epidote-garnet skarn.

**Age of mineralization:**
Probably related to nearby 15-20 Ma rhyolite sills and dikes.

**Deposit model:**
Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers; (Be-)fluorite-galena veins and breccia.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
The mineralization on the north side of Glacier Basin was first discovered in 1898 and was prospected by three short adits and numerous cuts and pits by 1943 (Still and others, 2002). Several companies were active in the area from 1964 to the early 1980's but most of their work was to the north and they apparently did little on this prospect beyond general reconnaissance.

**Production notes:**

**Reserves:**
None.

**Additional comments:**
Gault and others, (1953) provide detailed maps of the underground workings as well as a detailed surface geologic map that covers Groundhog Basin and extends southward to Glacier Basin to include this this site.

**References:**
Wright and Wright, 1908; Gault and others, 1953; Berryhill, 1964; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Grybeck, Berg, and Karl, 1984; Roppel, 1987; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-C); Still and others, 2002.

**Primary reference:** Gault and others, 1953

**Reporter(s):** H.C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA).

**Last report date:** March 4, 2008

# Site name(s): Berg Basin

**Site type:** Prospect

**ARDF no.:** PE042

**Latitude:** 56.4468 **Quadrangle:** PE B-1

**Longitude:** 132.0108

**Location description and accuracy:**

This is a well documented prospect on a unnamed south-flowing tributary to the north end of Berg Creek. However, an extended ground and air search for the prospect by Jan Still of BLM and D. J. Grybeck of the USGS in 1996 showed that the area was covered with thick vegetation and talus; the adit was only seen from the air and difficult of access. The prospect is at an elevation of about 1,780 feet at the top of a steep talus slope about 0.5 mile southwest of the center of section 32, T. 63 S., R. 86 E.

**Commodities:**

**Main:** Ag, Au, Pb, Zn

**Other:** Cu

**Ore minerals:** Chalcopyrite, galena, native gold, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

This prospect was discovered in 1907. It was explored by several surface pits, a tunnel about 800 feet long, and several hundred feet of diamond drilling in 1947 and 1948 (Fowler, 1950) Seven men were working at the property then but apparently there has been no work since.

The country rocks in the area are biotite schist and subordinate marble and calc-silicate rocks that are intruded by Eocene tonalite and granodiorite and by younger dikes and sills of rhyolite, basalt, and pegmatite (Brew and others, 1984).

The deposit consists of a stockwork of quartz veinlets carrying pyrite, galena, and sphalerite, and of sporadic small masses of sphalerite and galena (Gault and others, 1953; Still and others, 2002). Some of the veins contain moderate values of gold and silver. The small sulfide masses occur in a composite basaltic dike, in thin breccia zones along the contacts of basalt and rhyolite dikes and sills, along contacts of basalt dikes with schist near rhyolite, and disseminated in the rhyolite. One diamond drill hole intersected 5 feet of solid and disseminated galena. No galena or sphalerite have been found except where basaltic dikes are associated with rhyolite sills and dikes. The galena contains up to 28 ounces of silver per ton. A quartz vein reported to carry about 0.68 ounce of gold per ton crops out at the surface but could not be found in the underground workings.

**Alteration:**

**Age of mineralization:**

The age of the deposit is inferred to be mid-Cenozoic, based on its spatial and apparently genetic association with dikes and sills that cut the Eocene tonalite.

**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:** Undetermined

**Workings/exploration:**

This prospect was discovered in 1907. It was explored by several surface pits, a tunnel about 800 feet long, and several hundred feet of diamond drilling in 1947 and 1948 (Fowler, 1950) Seven men were working at the property then but apparently there has been no work since.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Chapin, 1918; Buddington, 1923; Fowler, 1950 (IR 195-6); Gault and others, 1953; Cobb, 1972 (MF-415); Cobb, 1978 (OF 78-870); Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Still and others, 2002.

**Primary reference:** Gault and others, 1953

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Unnamed (near Point St. Albans)

**Site type:** Occurrence

**ARDF no.:** PE045

**Latitude:** 56.1097 **Quadrangle:** PE A-6

**Longitude:** 133.9587

**Location description and accuracy:**
The veins at this occurrence are exposed on a bedrock bench on the intertidal zone about 2.0 mile north of Point St. Albans. The deposit is about 350 yards southwest of triangulation station 'June' shown on the current (1968) 1:63,360 topographic map, near the northeast corner of section 33, T. 66 S., R. 74 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:** As, Sb

**Ore minerals:** Arsenopyrite, berthierite (FeSb2S4), chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Calcite, quartz

**Geologic description:**
The veins here were first noted by Houston and others (1958) in their work on the uranium resources of Alaska; they provide little information other than they contain less than 0.0001 equivalent uranium and sphalerite. A claim was staked on the deposits in 1954 but Still and others note that as of 2002, there are no claims on the deposit. This description of the occurrence is largely based on field work in the early 1980's during a mineral resource assessment of the Petersburg quadrangle (Grybeck and others, 1984) and later work by Still and others (2002), all of whom examined the deposit as part of government programs.
Several quartz-calcite veins and lenses up to 6 feet thick and up to a hundred feet long are exposed in rocks exposed in the intertidal zone; they contain abundant sphalerite, galena, pyrite, arsenopyrite, and berthierite (FeSb2S4) (Grybeck, Berg, and Karl, 1984). The veins cut the periphery of a Cretaceous hornblende diorite pluton, which intrudes turbidites of the Silurian Bay of Pillars Formation (Brew, and others, 1984). Selected samples of the veins contain up to 0.5 parts per million (ppm) gold, 300 ppm silver, 360 ppm copper, about 2 percent lead, and 14 percent zinc. As described by Still and others (2002), the quartz-calcite veins are widely spaced and contain spotty, high-grade mineralization across narrow widths. The highest gold values were 8,767 and 5,839 parts per billion; four of the samples contained high silver values of from 126 to 342 ppm. Their samples also contained up to 9.9 percent, zinc, up to 8.15 percent lead, and high contents of mercury, arsenic, and antimony. A sample of massive pyrrhotite and pyrite with interstitial quartz contained 3,094 ppm copper.

**Alteration:**
None or minor.

**Age of mineralization:**
Veins cut Cretaceous hornblende diorite.

**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:** Undetermined

**Workings/exploration:**

First noted by Houston and others (1958, p. 24) in their work on the uranium resources of Alaska; they provide little information about the veins other than they contain less than 0.0001 equivalent uranium and sphalerite. A claim had been staked on the deposits in 1954 but Still and others note that as of 2002, there are no claims on the deposit,. The description of this site is largely based on field work in the early 1980's during a mineral resource assessment of the Petersburg quadrangle (Grybeck, Karl, and Berg, 1984) and later work by Still and others (2002), all of whom examined the deposit as part of government programs.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Houston and others, 1958; Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415);
U.S. Bureau of Mines, 1980; Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** H. C. Berg (Fullerton, California); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Frenchie; BP Adit

**Site type:** Prospect

**ARDF no.:** PE058

**Latitude:** 56.4187 **Quadrangle:** PE B-3

**Longitude:** 132.9548

**Location description and accuracy:**
The Frenchie prospect is at an elevation of less than 100 feet on the south bank of an unnamed creek about one-half mile south of the head of St. John Harbor. It is near the center of the SE1/4, section 8, T. 63 S., R. 80 E. The location is accurate.

**Commodities:**

**Main:** Au, Cu, Pb, Zn

**Other:** Ba

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**
The Frenchie deposit was first described as a gold prospect by Buddington in 1923. In 1978, BP Alaska Exploration staked 34 claims on the prospect, mapped and sampled it, conducted airborne and ground geophysical surveys, did stream sediment and soil geochemistry in the area, and recognized it as a volcanogenic massive sulfide deposit (Brewer, 1979). In 1979, geologists from the U.S. Geological Survey examined the thick layer of pyrite that is the most prominent outcrop of the prospect (Berg and Grybeck, 1980) and recognized as one of the deposits along the Duncan Canal-Zarembo belt of Upper Triassic volcanogenic, massive sulfide deposits. Three holes were drilled in 1984 and five more were drilled in 1966 by Westmin Resources (Rockingham, 1996). As of 2007, the property is again active (Mark Robinson, oral communication, 2007). Buddington (1923) describes a 100-foot adit in the pyrite bed and a shaft that was sunk about 100 feet north of the adit. (The shaft could not be located by Still and others, 2002).

The main massive sulfide layer is up to 6 feet thick and and crops out for at least 600 feet along the creek bank (Brewer, 1979; Berg and Grybeck, 1980; Still and others, 2002). This layer consists of 50-75 percent massive sulfides in a siliceous matrix. The sulfides are chiefly pyrite, accompanied by minor sphalerite, chalcopyrite, and galena that form lenses, bands, and knots in the massive pyrite. The hanging wall of the deposit consists of a thin layer of black phyllite above the massive sulfide layer, about 18 inches of siliceous argillite and chert with up to 10 percent pyrite and sphalerite above that, and then about 13 feet of pyritized argillite and schist to the top of the outcrop in the cliff beside the creek. The footwall consist of siliceous, quartz-muscovite phyllite. All are intruded by Tertiary(?) andesite dikes. The massive sulfide layer is cut by several faults but none dislocates the layer significantly. The deposit disappears under surficial material to the west and it truncated by a fault to the east. Karl and others (1999) map the rocks in the area as part of the Upper Triassic Hyd Group that is the host of many of the massive sulfide deposits to the north along the Duncan Canal-Zarembo mineral belt.

Thirteen samples were collected by Brewer (1979) across the main massive sulfide layer; they averaged 0.047 ounce of gold per ton, 0.42 ounce of silver per ton, 0.55 percent copper, 0.08 percent lead, and 1.48 percent zinc, and 5 to 20 percent barite. Still and others (2002) also sampled the deposit. Eight chip samples across the main layer of massive sulfides contained 0.019 ounce of gold per ton, 0.32 ounce of silver per ton, 0.25 percent copper, 0.16 percent lead, 2.4 percent zinc, and 0.08 percent arsenic.

**Alteration:**

**Age of mineralization:**
Late Triassic as part of the Duncan-Zarembo Island mineral belt defined by Berg and Grybeck (1980) and Berg (1981).

**Deposit model:**
Kuroko volcanogenic massive sulfide deposit (Singer and Cox, 1986; model 28a ), or Sierran Kuroko volcanogenic massive sulfide deposit (Bliss, 1992; model 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a.1

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
The Frenchie prospect was first described as a gold prospect by Buddington in 1923. In 1978, BP Alaska Exploration staked 34 claims on the prospect, mapped and sampled it, conducted airborne and ground geophysical surveys, carried out stream sediment and soil geochemistry surveys in the area, and recognized it as a volcanogenic massive sulfide deposit (Brewer, 1979). Examined by the U.S. Geological Survey in 1979 (Berg and Grybeck, 1980). Three holes were drilled in 1984 and five more were drilled by Westmin Resources in 1996 (Rockingham, 1996). In 2007, the property is again active (Mark Robinson, oral communication, 2007). Buddington (1923) describes a 100-foot adit into the main massive sulfide layer and a shaft that was sunk about 100 feet north of the adit. (The shaft could not be located by Still and others, 2002).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Buddington, 1923; Brewer, 1979; Berg and Grybeck, 1980; Berg, 1981; Grybeck, Berg, and Karl, 1984; Rockingham, 1996; Brew, 1997 (OF 97-156-E); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (along Snow Passage)

**Site type:** Occurrences

**ARDF no.:** PE060

**Latitude:** 56.2729 **Quadrangle:** PE B-3

**Longitude:** 132.9360

**Location description and accuracy:**
There are several occurrences of fluorite for about 1,200 feet of the shoreline of Zarembo Island opposite the east side of Bushy Island. The occurrences are mostly in section 33, T. 64 S., R. 80 E.

**Commodities:**

**Main:** F

**Other:** Au, Ba, Ce, La

**Ore minerals:** Fluorite

**Gangue minerals:** Chalcedony, quartz

**Geologic description:**
Sparse fluorite occurs in Tertiary or Quaternary rhyolite for along 1,200 feet of the shoreline of Zarembo Island opposite Bushy Island (Karl and others, 1999; Still and others, 2002). The fluorite occurs as fillings in narrow, vuggy fracture zones, as a coating on chalcedony- or quartz-encrusted fragments in breccia zones, and as geode-like bodies commonly called 'thunder eggs' (Buddington, 1923). Philpotts and Evans (1992) illustrate the geodes and provide a detailed study of their REE content and mineralogy. Although mineralogically interesting, the site as now known is little more than a mineral occurrence. Now and then, specimens of Zarembo fluorite are offered to mineral collectors by dealers. A few brecciated fracture zones up to 3 feet thick and 100 feet long are filled with cream-colored chalcedony. Still and others (2002) sampled the geodes, silicified zones, and fluorite; their samples contained up to 291 parts per billion (ppb) gold, 1,768 parts per million (ppm) barium, 65 ppm cerium, and 38 ppm lanthanum. The fluorite is probably formed by degassing during cooling of the rhyolite in which it occurs.

**Alteration:**
Fluorite formed during degassing of the Tertiary or Quaternary host rock.

**Age of mineralization:**
Tertiary or Quaternary based on the age of the host rock.

**Deposit model:**
Fluorite in rhyolite.

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

**Production Status:** No

**Site Status:** Probably inactive

**Workings/exploration:**
Long known in good exposures along the coast; to date of more interest to mineral collectors than as a viable prospect to the mining industry.

**Production notes:**

As now known, appears to be no more than an interesting mineralogical occurrence. Some specimens of this fluorite have been sold to mineral collectors.

**Reserves:**

**Additional comments:**

**References:**

Buddington, 1923; Cobb, 1972 (OF 78-870); Grybeck, Berg, and Karl, 1984; Philpotts and Evans, 1992; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Philpotts and Evans, 1995

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Lost Zarembo

**Site type:** Occurrence

**ARDF no.:** PE062

**Latitude:** 56.3807 **Quadrangle:** PE B-3

**Longitude:** 132.9007

**Location description and accuracy:**

This occurrence is well exposed on the north wall of a rock quarry adjacent to a logging road; the quarry is shown by symbol of the 1:63,360-scale topographic map in the NE1/4, section 27, T. 63 S., R. 80 E. It is at an elevation of about 600 feet about 4.0 mile southeast of the Zarembo Spring at the head of St. Johns Harbor.

**Commodities:**

**Main:** Ag, Au, Ba, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

Grybeck, Berg, and Karl (1984) describe this deposit as three, massive sulfide layers in orange-weathering, greenish-gray metarhyolite along the west wall of a quarry. The most prominent exposure of the sulfides is a 4-foot-thick layer that crops out for about 50 feet and is truncated at both ends by faults. Selected portions of the massive sulfide layers contain up to 30 percent sulfides, mainly sphalerite, accompanied by minor pyrite, chalcopyrite, and galena; the matrix is fine-grained silica and barite. Analyses of selected grab samples show up to 0.55 parts per million (ppm) gold, about 8 percent zinc, 0.25 percent lead, 0.39 percent copper, 30 ppm or less silver, and up to 5,000 ppm barium. The occurrence forms a wedge-shaped, fault-bounded outcrop about 30 by 100 feet in size that abuts steeply-dipping Tertiary basalt, diabase, and rhyolite dikes. The outcrop of the massive sulfide deposit is small and the quarry walls are dominated by the steeply dipping Tertiary dikes. The association of massive sulfides interbedded with metarhyolite indicates that this occurrence is part of the Duncan Canal-Zarembo belt of dismembered, Upper Triassic volcanogenic massive sulfide deposits described by Berg and Grybeck (1980) and Berg (1981). Karl and others (1999) map the rocks in this area as part of the Triassic Hyd Group which is the host for most of the other massive sulfide deposit along this mineralized belt.

The occurrence was examined and sampled by Still and others (2002). Their samples across the sulfide layers contained 8.3 to 27.6 parts per million (ppm) silver, 966 to 3,781 ppm copper, 818 to 3,567 ppm lead, 1.9 to 4.6 percent zinc, and 1.53 to 10.10 percent barium.

**Alteration:**

Outcrop is iron-stained, probably from weathering of sulfides.

**Age of mineralization:**

As now known, this deposit marks the southern end of the Upper Triassic Duncan-Zarembo volcanogenic mineral belt defined by Berg and Grybeck (1980) and Berg (1981).

**Deposit model:**

Kuroko volcanogenic massive-sulfide deposit (Cox and Singer, 1986; model 28a); alternatively a Sierran Kuroko volcanogenic massive sulfide deposit (Bliss, 1992; model 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a.1

**Production Status:** No

**Site Status:** Inactive

**Workings/exploration:**
Originally found by the USGS in the late 70's. Examined and sampled by Still and others (2002).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Berg and Grybeck, 1980; Berg, 1981; Grybeck, Berg, and Karl, 1984; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Grybeck, Berg, and Karl, 1984

**Reporter(s):** D.J. Grybeck (USGS)

**Last report date:** 4/8/2007

# Site name(s): Wally Gator

**Site type:** Prospect

**ARDF no.:** PE063

**Latitude:** 56.2797 **Quadrangle:** PE B-3

**Longitude:** 132.7048

**Location description and accuracy:**

The coordinates for this prospect are at the site of the best known mineralization in three claim blocks that total 386 claims. The site is about 1.8 miles west-northwest of Round Point on Zarembo Island at an elevation of about 1500 feet. It is about 0.2 mile northwest of the center of section 36, T. 64 S., R. 82 E. The claim blocks extend over much of the ridge northwest of Round Point, i.e. much of the southeastern third of T. 64 S., R. 82 E.; see Grybeck, Berg, and Karl (1984) for the outline of these claim blocks as of 1980.

**Commodities:**

**Main:** Ag, Ba, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

In 1978, Mapco Inc. staked three claim blocks totaling 386 claims on Zarembo Island that covered much of section 36, T. 64 S., R. 82 E., and the area to the southeast of the creek that flows into the south end of Meter Bight. The claims were staked for molybdenum, fluorine, and uranium (although there is no evidence that any of these particular commodities were found in the succeeding exploration or in the samples that have been analyzed). As briefly examined in 1979 with company geologists, the mineralization then being explored was at an elevation of about 1000 feet near the creek that flows southeast across section 36 (Donald Grybeck, unpublished field observations, 1979). The mineralized exposure consisted of rusty-weathering, light green-gray felsic metavolcanic rocks with small lenses, pods, and layers up to a foot thick that contain disseminated sulfides, mainly pyrite and possibly sphalerite and chalcopyrite. The felsic metavolcanic rocks are interbedded with light gray, silicified limestone and dark gray argillite. Mapping by Karl and others (1999) indicates that much of the area of section 36 consists of the Triassic Hyd Group which hosts most of the volcanogenic massive sulfide deposits in the Duncan-Zarembo belt (Berg and Grybeck, 1980). Grab samples contained less than 5 parts per million (ppm) copper, 50 to 150 ppm lead, 200 to 11,000 ppm zinc, and 150 to 5,000 ppm barium.

ATNA Resources Inc. did considerable work in the late 1980's on this prospect which that they called the 'Wally Gator' (DeLancey, 1990). They apparently concentrated their work along the creek that flows through the middle of section 36. They located three massive sulfide showings over a distance of about 800 feet. Samples from a 5-foot-thick layer in quartz-sericite schist--their most impressive mineralization-- contained up to 5.5 percent zinc, 1.3 percent lead, 0.3 ounce of silver per ton, and 5.9 percent barium. Samples from a 3-foot-thick section of siliceous quartz-sericite schist contained up to 3.4 percent copper, 1.6 percent zinc, 2.0 ounces of silver per ton, and 2.1 percent barium. ATNA put down two 'Winkie'-drill holes here. The lowest mineralization was in chlorite schist that had chalcopyrite and pyrite in bands in the schist and along fractures. Samples contained up to 3.2 percent copper, and 2.4 percent zinc. They also did a geochemical soil survey in the area that identified soils with up to 1,396 parts per million (ppm) zinc and 16,960 ppm barium. Still and others (2002) also visited this location; their samples generally reflect about the same metal values as the ATNA work.

**Alteration:**

**Age of mineralization:**
Upper Triassic based on the age of the host rocks.

**Deposit model:**
Kuroko volcanogenic massive-sulfide deposit (Cox and Singer, 1986; model 28a); alternatively a Sierran Kuroko volcanogenic massive sulfide deposit (Bliss, 1992; model 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a1

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
In 1978, Mapco Inc. staked three claim blocks totaling 386 claims that covered much of section 36, T. 64 S., R. 82 E., and the area to the southeast of the creek that flows into the south end of Meter Bight. In the late 1980's, ATNA Resources Inc. did considerable work at this prospect which they called the 'Wally Gator' in the late 1980's (DeLancey, 1990). They apparently concentrated their work along the creek that flows through the middle of section 36. Still and others (2002) also visited this location and their samples generally reflected about the same metal values as the ATNA work.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Berg and Grybeck, 1980; Grybeck, Berg, and Karl, 1984; DeLancey, 1990; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Grybeck, Berg, and Karl, 1984

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Gallavantin

**Site type:** Prospect

**ARDF no.:** PE066

**Latitude:** 56.4148 **Quadrangle:** PE B-2

**Longitude:** 132.6312

**Location description and accuracy:**
This prospect cover three claims named the Gallavantin 1-3 that cover an area about 0.4 mile by 0.8 mile in size near the shore at the north end of the entrance to Deep Bay. The center of the claims is near the southwest corner of section 9, T. 63 S., R. 82 E.

**Commodities:**

**Main:** Cu, Fe

**Other:**

**Ore minerals:** Chalcopyrite, magnetite, pyrite

**Gangue minerals:**

**Geologic description:**
Three claims were staked at this site for iron and copper in 1974. Karl and others (1999) map a small Cretaceous gabbro pluton here that is probably the bedrock under all of the claims. Still and others (2002) classified much of the pluton as hornblendite in which they discovered disseminated chalcopyrite, pyrite, and magnetite at several localities along the shoreline and on a logging road which crosses the area. A sample of the best mineralization contained 2,760 parts per million (ppm) copper, 10 parts per billion (ppb) platinum, and 28 ppb palladium. The best sample collected along the road contained 1,172 ppm copper, 10 ppb platinum and 7 ppb palladium.

**Alteration:**

**Age of mineralization:**
Cretaceous or younger based on the age of the host rock.

**Deposit model:**
Disseminated chalcopyrite, magnetite, and pyrite in hornblendite.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
A block of three claims was staked at this site in 1974. Examined and sampled by government geologists in the late 1990's.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-D); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Exchange

**Site type:** Prospect

**ARDF no.:** PE067

**Latitude:** 56.4219 **Quadrangle:** PE B-2

**Longitude:** 132.5338

**Location description and accuracy:**
This long-known prospect is in and just above the intertidal zone near Wedge Point on Woronkofski Island. It is about 0.6 mile west of the center of section 7, T. 63 S., R. 84 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Pb

**Other:**

**Ore minerals:** Galena, gold, pyrite

**Gangue minerals:** Quartz

**Geologic description:**
The Exchange prospect was first staked in 1900 and has been described several times in similar terms (Wright and Wright, 1908; Roehm, 1945; Still and others, 2002). The workings include open cuts and two short adits. Two of the claims were restaked in 1974, were active through at least 1982, and were probably still active in 1996. Karl and others (1999) map the rocks in the area as part of the Jurassic or Cretaceous Seymour Canal Formation which is mainly graywacke. However, the prospect is in intrusive rocks that are probably similar to the Cretaceous tonalite that makes up much of Woronkofski Island (Still and others, 2002). The deposit consists of an irregular quartz vein that strikes north and dips 30W; it is up to 16 feet thick and can be traced for 250 feet. The vein contains small amounts of galena and pyrite. Still and others (2002) collected nine samples. The highest grade was a 5-foot sample across the vein; it contained 923 parts per billion gold, 26.6 parts per million (ppm) silver, and 944 ppm lead.

**Alteration:**

**Age of mineralization:**
Probably Cretaceous or younger based on the probably age of the intrusive host rocks.

**Deposit model:**
Gold-quartz vein.

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

**Production Status:** None

**Site Status:** Active?

**Workings/exploration:**
The property was first staked in 1900 and developed by surface trenches and two short adits. Two of the claims were restaked in 1974, were active through at least 1982, and were probably still active in 1996.

**Production notes:**

No record of production.

**Reserves:**

**Additional comments:**

**References:**

Wright and Wright, 1905; Wright and Wright, 1908; Roehm, 1945 (IR 195-37); Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-D); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Unnamed (near Elephants Nose)

**Site type:** Prospect

**ARDF no.:** PE068

**Latitude:** 56.4316 **Quadrangle:** PE B-2

**Longitude:** 132.5117

**Location description and accuracy:**
The coordinates are at the approximate location of a single claim staked in 1955 and apparently not active since (U.S. Bureau of Mines, 1980). The claim is near the shoreline northwest of Elephants Nose in section 6, T. 63 S., R. 83 E.

**Commodities:**

**Main:** Th, U

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
There is no information on this prospect other than that a claim was staked here for thorium and uranium in 1955 and apparently has not been active since. The rocks in the area are hornfelsed graywacke of the Jurassic and Cretaceous Seymour Canal Formation (Brew, 1997 [OF 97-156-D]; Karl and others, 1999).

**Alteration:**

**Age of mineralization:**
Jurassic or younger based on the age of the host rock.

**Deposit model:**

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

**Production Status:** No

**Site Status:** Probably inactive

**Workings/exploration:**
There is no information on this prospect other than that a claim was staked here for thorium and uranium in 1955 and apparently has not been active since.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-D); Karl and others,

1999.

**Primary reference:** U.S. Bureau of Mines, 1980

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Keating Range)

**Site type:** Prospect

**ARDF no.:** PE072

**Latitude:** 56.1462 **Quadrangle:** PE A-2

**Longitude:** 132.6265

**Location description and accuracy:**
The coordinates are at the approximate center of block of forty-seven lode claims on the northern part of the Keating Range, western Etolin Island. The claims were staked in 1978 and were active through at least 1981 (U.S. Bureau of Mines, 1980). The site is in section 18, T. 66 S., R. 83 E.

**Commodities:**

**Main:** Unknown

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
A block of forty-seven lode claims was staked in 1978 by MAPCO, Inc. and were active through at least 1981 (U.S. Bureau of Mines, 1980). The rocks in the vicinity consist of augite-bearing flows, volcanic breccia, tuff, graywacke, phyllite, and slate of the Jurassic or Cretaceous Stephens Passage Group and their hornfelsed equivalents across the Mosman fault (Brew, 1997 [OF 97-156-A]; Karl and others, 1999). Still and others (2002) briefly visited the area but found no evidence of mineralization.

**Alteration:**

**Age of mineralization:**

**Deposit model:**

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

**Production Status:**

**Site Status:**

**Workings/exploration:**
A block of forty-seven lode claims was staked in 1978 by MAPCO, Inc. and were active through at least 1981 (U.S. Bureau of Mines, 1980).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-A); Karl and others, 1999; Still and others, 2002.

**Primary reference:** U.S. Bureau of Mines, 1980

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Steamer Bay)

**Site type:** Occurrences

**ARDF no.:** PE073

**Latitude:** 56.1388 **Quadrangle:** PE A-2

**Longitude:** 132.6570

**Location description and accuracy:**
The coordinates are at about the center of a block of 26 claims staked near the south end of Steamer Bay in 1972 and held through 1973. The center is about 0.4 mile north of the center of section 24, T. 65 S., R. 82 E.

**Commodities:**

**Main:** Ag, Cu, Pb, Zn

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
A block of 26 claims was staked in 1972 near the south end of Steamer Bay and they were active through 1973; apparently they have not been active since (U.S. Bureau of Mines, 1980; Still and others, 2002). Rocks in the area consist of massive and pillowed greenstone, pillow breccia, and tuff of the Seymour Canal Formation of Jurassic and Cretaceous age (Brew, 1997 [OF 97-156-A]; Karl and others, 1999). Still and others (2002) traversed two streams for a short distance but did not find any outcropping mineralization. They collected two float samples , the best of which, a piece of silicified breccia, contained 10.9 parts per million (ppm) silver, 1,408 ppm copper, 1.01 percent lead, and 1.9 percent zinc.

**Alteration:**

**Age of mineralization:**
Jurassic or younger based on the age of the rocks in the area.

**Deposit model:**

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
A block of 26 claims was staked in 1972 and they were active through 1973; apparently they have not been active since (U.S. Bureau of Mines, 1980; Still and others, 2002). Still and others (2002) traversed two streams for a short distance but did not find any outcropping mineralization or signs of exploration; they did find two float samples with metal values.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

U.S. Bureau of Mines, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-A); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (on Niblack Islands)

**Site type:** Occurrences

**ARDF no.:** PE077

**Latitude:** 56.0392 **Quadrangle:** PE A-1

**Longitude:** 132.1031

**Location description and accuracy:**
The coordinates are at the approximate center of ten claims at five locations that were staked for copper in 1956; apparently they have not been active since.

**Commodities:**

**Main:** Cu

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
Ten claims at five locations were staked for copper in 1956 on the Niblack Islands in Ernest Sound; apparently they have not been active since (U.S. Bureau of Mines, 1980). A brief examination by the USGS in 1979 did not reveal any signs of mineral deposits (Grybeck, Berg, and Karl, 1984, locality 79). Rocks in the vicinity consist largely of migmatite and granite (Brew and others, 1984). The islands were also searched for indications of mineralization by Still and others, 2002; they found nothing other than a sample of granite that may have had a copper content a bit above background.

**Alteration:**

**Age of mineralization:**

**Deposit model:**

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
Ten claims at five locations were staked for copper in 1956 on the Niblack Islands in Ernest Sound; apparently they have been not active since (U.S. Bureau of Mines, 1980). Several attempts by government geologists and engineers to find evidence of mineralization have been fruitless.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
U.S. Bureau of Mines, 1980; Brew and others, 1984; Grybeck, Berg, and Karl, 1984; Still and others, 2002.

**Primary reference:** U.S. Bureau of Mines, 1980

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Unnamed (near Kake)

**Site type:** Occurrence

**ARDF no.:** PE078

**Latitude:** 56.9889 **Quadrangle:** D-6

**Longitude:** 133.9636

**Location description and accuracy:**
This occurrence is in a rock pit about a mile northwest of the town of Kake. It is about 0.5 mile, west-northwest of the center of section 27, T. 56 S., T. 72 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Zn

**Other:**

**Ore minerals:** Chalcopyrite, pyrite, sphalerite

**Gangue minerals:** Calcite

**Geologic description:**
This occurrence was found in a reconnaissance of logging roads on northwest Kupreanof Island by Still and others (2002) during a Bureau of Land Management mineral assessment. The occurrence consists of two or three calcite veins with pyrite, sphalerite, and chalcopyrite in siliceous argillite. The veins are about 1 inch thick and extend for about 20 feet where they are cut off by a fault. The rocks in the area consist of argillite and graywacke of the Mississippian and Devonian Cannery Formation and Mesozoic phyllite and slate (Brew and other, 1984). A representative sample of the veins contained 1,135 parts per billion gold, 30.5 parts per million (ppm) silver, 7,327 ppm copper, and 5.4 percent zinc.

**Alteration:**

**Age of mineralization:**
Mississippian or younger based on the age of the host rocks.

**Deposit model:**
Thin calcite veins with pyrite, sphalerite, and chalcopyrite.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
Only limited sampling by government geologists.

**Production notes:**

**Reserves:**

**Additional comments:**

This occurrence is on lands that belong to the Kake Village Corporation.

**References:**
Brew and others, 1984; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near head of Portage Bay)

**Site type:** Occurrence

**ARDF no.:** PE079

**Latitude:** 56.9147

**Quadrangle:** PE D-4

**Longitude:** 133.2689

**Location description and accuracy:**

This occurrence is in a borrow pit about 0.5 mile south of the head of Portage Bay; it is near the center of section 22, T. 57 S., R. 77 E. The location is accurate.

**Commodities:**

**Main:** Au, Ag, Cu, Mo, Ni, Pb, Zn

**Other:**

**Ore minerals:** Arsenopyrite, chalcopyrite, galena, molybdenite, pyrite, pyrrhotite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

This mineralization was discovered by Still and others (2002). The rocks in this borrow pit consist mainly of fine- to medium-grained gray to dark green diorite. Intrusive rocks were previously unknown at this site although intermediate intrusive rocks of Cretaceous age have been mapped to the north and south of the pit (Brew and others, 1984). Pyrrhotite makes up 1-2 percent of the diorite and fine-grained chalcopyrite is common in the pit. The sulfides occurs as thin coatings along fractures. Rare molybdenite was also identified. The intrusive in the pit is cut by several faults and the sulfides are commonly localized along them. One of the faults contains bands of sulfides, mainly pyrrhotite with chalcopyrite, sphalerite, galena, arsenopyrite, and pyrite. Hornfels, probably metamorphosed from Cretaceous phyllite, is exposed north of the pit (Brew and others, 1984).

Still and others (2002) collected 12 samples from 8 to 20 feet long in the pit. They averaged 163 parts per million (ppm) copper. A select sample of sulfide-rich material contained 3,271 parts per billion (ppb) gold, 12.9 ppm silver, 3.025 ppm copper, 4,708 ppm lead, 1.4 percent zinc, and 9,762 ppm arsenic. Other samples contained up to 855 ppm molybdenum and 1,365 ppm nickel.

**Alteration:**

**Age of mineralization:**

Cretaceous(?) or younger based on the age of nearby intrusive rocks.

**Deposit model:**

Porphyry copper?

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**

Sampling by Bureau of Land Management geologist in borrow pit.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Brew and others, 1984; Still and others, 2002.

**Primary reference:** Still and Bittenbender, 2002

**Reporter(s):** Donald Grybeck ((Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Portage Mountain Group

**Site type:** Prospect

**ARDF no.:** PE080

**Latitude:** 56.8750 **Quadrangle:** PE D-4

**Longitude:** 133.2439

**Location description and accuracy:**

There is some confusion in the old literature about the location and geology of two prospects in the area between Portage Mountain and the North Arm of Duncan Canal. Still and others (2002) spent considerable time in the field and library trying to decipher their location and descriptions. They concluded that the Portage Mountain Group consisted of 4 quartz-calcite veins that are at an elevation of between 2,000 and 3,000 feet on the west side of Portage Mountain. They could not find the old workings that they think are in the NE 1/4, NW 1/4, section 2, T. 58 S., R. 77 E. The coordinates above reflect their preferred location (The other prospect is the Silver Star prospect which consists of hornblendite with sulfides is at an elevation of about 400 feet, about 1.6 mile west-southwest of Duncan Peak; it is ARDF PE009.)

**Commodities:**

**Main:** Ag, Au, Cu

**Other:**

**Ore minerals:** Bornite, chalcopyrite, pyrite, pyrrhotite tetrahedrite

**Gangue minerals:** Calcite, quartz

**Geologic description:**

As described by Wright and Wright (1905, 1908) and Roehm (1945), the deposit consists of four, thin northeast-striking quartz-calcite veins with pyrite, pyrrhotite, chalcopyrite, bornite, and tetrahedrite. Samples of the veins contained up to 0.4 ounce of gold per ton and 2 ounces of silver per ton. The rocks have been variously mapped as metasedimentary rocks of the Jurassic to Cretaceous Seymour Canal Group by Karl and others (1999) or Cretaceous Stephens Passage Group by Brew (1997) that have been intruded by Cretaceous diorite. Roehm (1945) noted that the workings included a 130-foot adit and open cuts. However, Still and others (2002) could not locate the prospect in spite of a diligent search.

**Alteration:**

**Age of mineralization:**

Too little evidence to determine.

**Deposit model:**

Polymetallic quartz-calcite veins.

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**

Roehm (1945) noted that the workings included a 130-foot adit and open cuts. However, Still and others

(2002) could not locate the prospect in spite of a diligent search.

**Production notes:**

**Reserves:**

**Additional comments:**

This prospect is now in the Petersburg Creek-Duncan Salt Chuck Wilderness which is closed to mineral exploration and mining.

Some recent U.S. Geological Survey publications including Cobb (1978) Cobb (1972), Berg and Cobb (1967), and an earlier generation of ARDF probably combine two different prospects on the west side of Portage Mountain that are described separately in ARDF as this prospect and PE 009.

**References:**

Wright and Wright, 1905; Wright and Wright, 1908; Roehm, 1945 (DGGS IR 195-37); Berg and Cobb, 1967; Cobb, 1972 (MF-415); Cobb, 1978 (OF 78-870); Brew, 1997 (OF 97-156-L); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** Donald Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (on Towers Creek)

**Site type:** Prospect

**ARDF no.:** PE081

**Latitude:** 56.8578 **Quadrangle:** PE D-5

**Longitude:** 133.4017

**Location description and accuracy:**
This prospect is on Towers Creek at an elevation of about 170 feet, about about 1.5 miles from the head of Towers Arm. It is near the center of section 11, T. 58 S., R. 76 E.

**Commodities:**

**Main:** Cu

**Other:**

**Ore minerals:** Chalcopyrite, pyrite

**Gangue minerals:**

**Geologic description:**
Still and others (2002) sampled this prospect which consists of an outcrop/boulder in Towers Creek of iron-stained, calcareous, silicified schist with disseminated and narrow bands of pyrite with sparse chalcopyrite. The country rock is Devonian schist near the contact with Triassic argillite of the Hyd Group (Karl and others, 1999). Six samples across the schist and the sulfide bands contained 175 to 713 ppm copper. This prospect was one of the discoveries by Amoco Minerals in 1978 and 1979. This work included airborne and ground geophysics, geologic mapping, soil and stream geochemical samples, and core drilling on a large block of claims covering the Tower Creek prospect.

**Alteration:**

**Age of mineralization:**

**Deposit model:**
Volcanogenic massive sulfide deposit?

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
This prospect was one of the discoveries by Amoco Minerals in 1978 and 1979. This work included airborne and ground geophysics, geologic mapping, soil and stream geochemical samples, and core drilling on a large block of claims covering the Tower Creek prospect.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** Donald Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Salt Chuck

**Site type:** Prospect

**ARDF no.:** PE082

**Latitude:** 56.8408 **Quadrangle:** PE D-4

**Longitude:** 133.3226

**Location description and accuracy:**

This prospect is near the center of the peninsula that separates North Arm from Towers Arm at the head of Duncan Canal. It is near the center of section 17, T. 58 S., R 77 E. The location is accurate.

**Commodities:**

**Main:** Ag, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

The Salt Chuck prospect was found in late 1978 when Amoco Minerals Co. carried out a major exploration program at the head of Duncan Canal that included aerial and ground geophysics, geologic mapping, soil and stream sediment geochemistry, and diamond core drilling over many hundreds of claims (AMOCO Mineral Company, 1979; Zelinska, 1979).

At Salt Chuck, airborne electromagnetic anomalies followed ground electromagnetic and soil geochemistry surveys. The prospect is tied to an 8,000-foot-long anomaly defined by airborne and ground geophysics and by five diamond drill holes that were drilled to test this anomaly. The holes were drilled to a depth of 600 to 1,000 feet along about 5,000 feet of the anomaly. Several massive-sulfide bands were cut in the drilling but they were thin, discontinuous and generally low grade. The best intersections were one that was 1.7 feet long and averaged 1.86 percent copper and another that was 10 feet long and averaged 0.877 percent copper.

The rocks in the vicinity of the Salt Chuck prospect are Devonian phyllite, schist, and greenstone (Karl and others, 1999).

Amoco geologists also located several outcrops of mineralization in this area (AMOCO Mineral Company, 1979; Zelinska, 1979). The westernmost is about 3 miles north of the tip of the peninsula between Towers Arm and North Arm and 0.6 mile inland from North Arm. The mineralization there is an outcrop 10 feet long by 5 feet wide that consists of a band of chalcopyrite-rich massive sulfides in rhyolite. Samples averaged 6.3 percent copper, 0.02 percent zinc, and 0.32 ounce of silver per ton. Another mineralized zone is about 2,000 feet to the east where three sulfide bands, each less than 6 inches thick, are exposed along the beach. The bands consist of chalcopyrite, sphalerite, and galena, in rhyolite. Samples contain 0.01 to 0.13 percent copper, 0.10 to 25.3 percent lead, 0.15 to 7.8 percent zinc, and 0.2 to 13.62 ounces of silver per ton. These outcrops of mineralization were examined and sampled by Still and others (2002); their analyses were generally similar to those done by Amoco. They also suggested that the prospects were likely to be replacement deposits rather than volcanogenic massive sulfide deposits.

**Alteration:**

**Age of mineralization:**

Devonian or later based on the age of the host rocks.

**Deposit model:**
Volcanogenic massive sulfide deposit? Replacement deposits?

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

**Production Status:**

**Site Status:** Probably inactive

**Workings/exploration:**
The Salt Chuck prospect was found in the late 1978 when Amoco Mineral Company Company carried out a major exploration program at the head of Duncan Canal that included aerial and ground geophysics, geologic mapping, soil and stream sediment geochemistry, and diamond core drilling over many hundreds of claims. At the Salt Chuck prospect, airborne electromagnetic anomalies were followed by ground electromagnetic and soil geochemistry surveys. The prospect is tied to an 8,000-foot-long anomaly defined by airborne and ground geophysics and by five diamond drill holes that were drilled to test this anomaly. The holes were drilled to a depth of 600 to 1,000 feet along about 5,000 feet of the anomaly.

**Production notes:**

**Reserves:**

**Additional comments:**
This prospect is now within the Petersburg Creek-Duncan Salt Chuck Wilderness which is closed to mineral exploration and mining.

**References:**
Zelinski, 1979; Amoco Mineral Company, 1979; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): RD8

**Site type:** Occurrences

**ARDF no.:** PE083

**Latitude:** 56.8384 **Quadrangle:** PE D-5

**Longitude:** 133.5709

**Location description and accuracy:**

This record covers a scattering of several occurrences in an area about 5 miles by 2 1/2 mile in size with the long dimension oriented north. The center of the area is east of the head of Big John Creek near hill 1908 which is southwest of Towers Lake and about 0.3 mile southwest of the center of section 14, T. 58 S., R. 74 E.

**Commodities:**

**Main:** Au, Ba, Co, Zn

**Other:** As,Cu, Hg, Ni, Pb, Sb

**Ore minerals:** Pyrite

**Gangue minerals:** Quartz

**Geologic description:**

This site was originally of interest because of widespread geochemical anomalies in a large suite of elements, zinc in particular. The samples commonly contain anomalous copper, molybdenum, and nickel, and various samples were anomalous in silver, lead, cadmium, manganese, mercury, arsenic, and antimony (Bittenbender and others, 2001). Still and others (2002) indicate that the suite suggests the presence of volcanogenic massive sulfide deposits. In following up these anomalies, they found several occurrences of mineralization in scattered borrow bits and road cuts. None seemed to explain the magnitude of the widespread geochemical anomalies but they do lend support to the concept of massive sulfide mineralization in the area.

The rocks in the area are part of the Cannery Formation of Permian and Mississippian age (Karl and others, 1999); they are a heterogeneous unit of chert, cherty argillite, silicified limestone, siltstone, and graywacke, with minor conglomerate, tuff, and volcanic rocks. In the three most notable areas of outcrop where the mineralization was found, it consists of: 1) pyrite in seams and layers in a 20-foot-thick unit of silicified schist, chert, and graphitic schist, 2) seams and patches of fine-grained to crystalline pyrite in quartz veins and silicified schist and slate, and 3) layers of pyrite up to 2 inches thick in a layer of silicified schist at least 10 feet thick in a unit of argillite. Numerous samples were collected and analyzed. None had high values in any of the common ore elements but many had values above background. The highest values were 136 parts per billion gold, 1,762 parts per million (ppm) zinc, 0.9 ppm silver, 166 ppm copper, 920 ppm lead, 727 ppm arsenic, 486 ppm nickel, and 9,176 ppm barium.

**Alteration:**

The schists is commonly silicified.

**Age of mineralization:**

Probably contemporaneous with the Permian and Mississippian host rocks.

**Deposit model:**

Volcanogenic massive sulfide deposit.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
The only work was sampling by the Bureau of Land Management during a regional mineral assessment.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Bittenbender and others, 2001; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** Donald Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Taylor Creek)

**Site type:** Prospect

**ARDF no.:** PE084

**Latitude:** 56.7961 **Quadrangle:** D-5

**Longitude:** 133.3832

**Location description and accuracy:**
This prospect which was first located in 1997, is south of the middle part of Taylor Creek and about 0.6 mile north of hill 1606. It is about 0.4 mile west-southwest of the center of section 36, T. 59 S., R. 76 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Pb, Zn

**Other:**

**Ore minerals:** Pyrite

**Gangue minerals:**

**Geologic description:**
This prospect was first staked by Kennecott Exploration Company in 1997 based on geophysical and geophysical anomalies and they drilled five holes in 2000. Still and others (2002) examined the property and collected several samples. The rocks in the area consist of calcareous chlorite schist interbedded with calcareous graphitic slate; they are part of the Triassic Hyd Group as mapped by Karl and others (1999). At the surface, the mineralization consists of massive to semi-massive layers of pyrite parallel to the foliation of the host rocks and most of the layers are about an inch thick. Four samples were collected by Still and others (2002). One sample across a 3.0-foot layer of semi-massive pyrite contained 197 parts per billion (ppb) gold, 19.2 parts per million (ppm) silver, 335 ppm lead, and 479 ppm zinc. Another sample across a 0.6-foot layer of semi-massive pyrite in slate contained 453 ppm lead and 2,518 ppm zinc. They considered the deposit to be a volcanogenic massive sulfide deposit similar to others in the area.

**Alteration:**

**Age of mineralization:**
Contemporaneous with the Triassic host rock.

**Deposit model:**
Volcanogenic massive sulfide deposit.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
Staked in 1997 and 5 holes were drilled by Kennecott in 2000. Sampled by the Bureau of Land Management in the late 1990's.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** Donald Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near mouth of Port Camden)

**Site type:** Occurrence

**ARDF no.:** PE085

**Latitude:** 56.7950 **Quadrangle:** D-6

**Longitude:** 133.9434

**Location description and accuracy:**
This occurrence is along the west shore of Camden Bay about 0.6 mile southeast of the point between the mouth of Camden Bay and Kadake Bay. It is about 2.3 miles west-southwest of Port Camden and about 0.3 mile southeast of the center of section 32, T. 58 S., R. 73 E. The location is accurate.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
The Kuiu 1-9 claims were staked for gold at this site in 1976 and Mapco Inc. staked the Krista claims in 1979 (Still and others, 2002). There is no documentation of any work by industry since. The rocks in the area are non-marine sandstone, part of the Tertiary Kootznahoo Formation, intruded by gabbro (Muffler, 1967). This section of coast was also examined in conjunction with the investigation of the uranium deposits about 0.5 mile to the north (PE001); both are in the same formation . The Bureau of Land Management collected a panned-concentrate sample and eight stream samples from streams draining into Port Camden along about 0.3 mile of the shore line here (Still and others, 2002). The panned-concentrate sample contained 2,255 parts per billion (ppb) gold; the stream sediment samples contained up to 24 ppb gold.

**Alteration:**

**Age of mineralization:**
Tertiary or younger based on the age of the host rocks.

**Deposit model:**

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
There were two generations of claims staked here in the 1970's; more recently the Bureau of Land Management collected several samples.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Muffler, 1967; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** Donald Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Spruce Creek

**Site type:** Prospect

**ARDF no.:** PE086

**Latitude:** 56.6647 **Quadrangle:** PE C-4

**Longitude:** 133.0303

**Location description and accuracy:**
The Spruce Creek prospect is about 1.1 mile east of hill 2030 and about 1.1 mile north-northeast of hill 2605, both high points on the ridge that borders the east side of Duncan Canal opposite the Castle Islands. The prospect has three areas of mineralization and the coordinates are at the center of them near the middle of the south boundary of section 18, T. 60 S., R. 79 E.

**Commodities:**

**Main:** Ag, Au, Pb, Zn

**Other:**

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Calcite, quartz

**Geologic description:**
As described by Still and others (2002), The Spruce Creek prospects were discovered and staked in 1983. The claims were optioned to Westmin Resources, Ltd. in 1992 and they carried out geophysical surveys and soil geochemistry and mapped the mineralization before dropping the prospect in 1993. Paul Pieper who discovered the prospect drilled several shallow holes on the mineralization and held 10 claims as of 2002.
As mapped by Karl and others (1999), the rocks in the area are part of the Permian and Mississippian Cannery Formation that are in fault contact with volcanic and sedimentary rocks of the Triassic Hyd Group.
Still and others (2002) found three areas of mineralization. One in greenstone schist near a borrow pit consists of a 0.3-foot-thick quartz vein with pyrite, galena, and sphalerite. A sample across the vein contained 213 parts per billion (ppb) gold, 1,690 parts per million (ppm) lead, and 4,163 ppm zinc. Paul Pieper, the claim owner drilled a 19-foot hole there in 1996. Another occurrence of mineralization near a waterfall consists of gray bands of fine-grained sulfides in limestone. A 1.4-foot sample across the sulfide bands contained 416 ppb gold, 14.9 ppm silver, 820 ppm lead, and 5,221 ppm zinc. The third location is in a clearcut and consists of a 4-foot-thick bed of marble in greenstone. A sample taken in the marble of a 0.4-foot-thick band with galena and sphalerite contained 779 ppb gold, 59.1 ppm silver, 5.6 percent lead, and 2.1 percent zinc.

**Alteration:**

**Age of mineralization:**

**Deposit model:**
Thin quartz veins with sulfides and bands of mineralization in marble.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

Claims have been held on the property since 1983. Westmin Resources Ltd. had an option on the prospect from 1992 to 1993 and did considerable mapping, geochemistry, and ground geophysics. The owner has drilled several shallow holes on the mineralization prior to 2002.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Rubble; East Duncan Pyrite

**Site type:** Occurrences

**ARDF no.:** PE087

**Latitude:** 56.6550 **Quadrangle:** PE C-4

**Longitude:** 133.0863

**Location description and accuracy:**

These occurrences are on large block of claims on the east side of Duncan Canal, east of the Castle Islands. The claim block extends for about 2 miles along the shoreline and inland for about 1.2 miles to the crest of the ridge that parallels Duncan Canal. The coordinates are on the shoreline at about the middle of the west side of the claim block along Duncan Canal. The occurrences are spread along the shoreline in section 23, T. 59 S., R. 78 E., and probably extend some distance into the sections to the northwest and southeast.

This record also includes the 'East Duncan Pyrite' occurrence listed in Still and others (2002) as a separate site. It appears similar to other occurrences described in this record and they note that it is within the claim block that defines this record. It is on a logging road just above the east shoreline of Duncan Canal opposite Big Castle Island.

**Commodities:**

**Main:** Ba, Cu, Pb, Zn

**Other:**

**Ore minerals:** Barite, chalcopyrite, galena, pyrite, pyrrhotite

**Gangue minerals:**

**Geologic description:**

After Amoco Minerals Co looked at this area and defined several geophysical and geochemical anomalies, in 1985, Atna Resources Ltd.. staked 70 claims here and termed the property the 'Rubble'. They abandoned the claims in 1988. Much of the area is covered by heavy vegetation but Still and others (2002) examined the outcrops along the shoreline for several miles and collected numerous rock and stream sediment samples.

Most of the shoreline exposures are part of the Triassic Hyd Group that is the host rock for many volcanogenic massive sulfides deposits in Duncan Canal and beyond (Karl and others, 1999). The claim block is underlain by alternating bands of Hyd Group rocks and the Permian and Mississippian Cannery Formation; the Hyd and Cannery rocks are separated by east-dipping thrust faults. The rocks along the shoreline that Still and others (2002) examined are mainly slate with interbeds of quartz-sericite schist, calcite-chlorite schist, and chert. The schist commonly contains bands and disseminations of pyrite and analyses commonly show 1 to 2 percent barite. Usually the pyrite bands are thin but locally they may be up to a foot thick and consist of to 80 percent pyrite. Samples from most of the pyrite bands are devoid of other metals in notable quantity. However, in one area marked by a conductive geophysical anomaly defined in a 1997 airborne geophysical survey (Alaska Division of Geological and Geophysical Surveys, 1997), Still and others (2002) examined the ground under the anomaly and found a 0.5-inch-thick quartz vein with sphalerite, galena, and chalcopyrite; boulders with 30-50 percent barite; and sulfide bands that include pyrrhotite in addition to pyrite. The geophysical anomaly was also marked by geochemical anomalies in copper, zinc, barium, and molybdenum (Bittenbender and others, 2001).

This record also includes the 'East Duncan Pyrite' occurrence listed by Still and others (2002). It is within the claim block that defines this site. At the occurrence, a pyrite-rich band occurs in a medium to dark gray slate. Karl and others (1999) map the rocks in this area as part of the Triassic Hyd Group. Still and others

(2002) collected three samples; the highest values in them were 9 parts per billion gold, 998 parts per million (ppm) copper, 244 ppm zinc, and all of the samples had about 0.5 percent barium.

**Alteration:**

**Age of mineralization:**
Triassic based on the age of the host rocks.

**Deposit model:**
Barite facies of a Kuroko massive-sulfide model (Cox and Singer, 1986; model 28a); alternatively a barite facies of a Sierran Kuroko model (Bliss, 1992; model 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a1

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
No workings are described but a large claim block was staked over the occurrences in 1985 and there probably was at least some ground exploration. Sampled by government geologists in the late 1990's.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Alaska Division of Geological and Geophysical Surveys and others, 1997; Karl and others, 1999; Bittenbender and others, 2001; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Nicirque

**Site type:** Prospect

**ARDF no.:** PE088

**Latitude:** 56.6470 **Quadrangle:** C-4

**Longitude:** 133.0281

**Location description and accuracy:**
The Nicirque prospect is about 2.5 miles northeast of Grief Island in Duncan Canal at an elevation of about 2,300 feet. It is about 0.4 mile north-northeast of the center of section 30, T. 60 S., R. 59 E. The location is accurate to within one-quarter mile.

**Commodities:**

**Main:** Ag, Au, Zn

**Other:**

**Ore minerals:** Pyrite

**Gangue minerals:**

**Geologic description:**
The Nicirque prospect was staked in 1993 and was active at least as recently as 1998 (Still and others, 2002). It is near the fault contact of the Permian and Mississippian Cannery Formation with volcanic and sedimentary rocks of the Triassic Hyd Group (Karl and others, 1999). A fossil find at the prospect indicates that it may be in slate of Hyd Group. The mineralization is reportedly a massive pyrite vein in a breccia zone. Still and others (2002) collected a sample across three feet of slate with pyrite bands. The sample contained 56 parts per billion gold, 2.6 parts per million (ppm) silver, and 333 ppm zinc.

**Alteration:**

**Age of mineralization:**
Possibly Triassic based on the age of the host rock.

**Deposit model:**
Pyrite bands in slate.

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

**Production Status:** None

**Site Status:** Active?

**Workings/exploration:**
There is no record of work at this prospect other than that it was first staked in 1983 and that the Bureau of Land Management examined the it and collected a sample.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Boulder Point)

**Site type:** Occurrence

**ARDF no.:** PE089

**Latitude:** 56.5813 **Quadrangle:** PE C-3

**Longitude:** 132.9778

**Location description and accuracy:**
This occurrence is at Boulder Point along Wrangell Narrows on northeastern Woewodski Island, about 0.4 mile east-southeast of the center of section 18, T. 61 S., R . 80 E. The location is accurate.

**Commodities:**

**Main:** Cu

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
The rocks in the vicinity are part of the Triassic Hyd Group that consists mainly of volcanic flows and breccias, argillite, and some limestone (Brew, 1997; Karl and others, 1999). There is no indication of mineralization here other than Still and others (2002) collected samples of iron-stained andesite along several hundred feet of shoreline that locally contains pyrrhotite and chalcopyrite along fractures. The samples contained 246 to 929 parts per million copper.

**Alteration:**
The andesite host rock is silicified.

**Age of mineralization:**
Triassic or younger based on the age of the host rock.

**Deposit model:**

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
No workings. Still and others (2002) collected samples as part of a regional mineral assessment by the Bureau of Land Management.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others (2002)

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Scott Gold

**Site type:** Prospect

**ARDF no.:** PE090

**Latitude:** 56.5748

**Quadrangle:** PE C-4

**Longitude:** 133.0039

**Location description and accuracy:**

The Scott Gold prospect is about 1.6 miles northeast of the east end of Harvey Lake and about 0.5 mile northeast of the center of section 24, T. 61 S, R. 79 E. 9. It is in a steep, heavily vegetated area along a gully at an elevation of about 580 feet. The location is accurate.

**Commodities:**

**Main:** Au, Pb, Zn

**Other:** Ba

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

At various times from the 1970's, much of central Woewodski Island has been staked by a succession of companies; these include Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Houston Oil and Minerals, Westmin Resources, and the Olympic Resources Group. During several episodes in the late 1980's and early 1990's, there was considerable soil sampling in the area including on the nearby Scott prospect (PE091) where three three holes were drilled (Still and others, 2002). The Scott Gold prospect shares a similar exploration history although only mineralized rubble is exposed along a shallow, west-trending gulch in heavy vegetation. Claims are still active on the Scott Show prospect in 2008.

The country rocks at the Scott Gold prospect are mainly semischist and phyllite, part of the Triassic Hyd Group (Karl and others, 1999, Brew, 1997). Silicified quartz-rich greenstone contain bands of disseminated pyrite, galena, and sphalerite. Samples collected by Still and others (2002) continued 834 to 1,793 parts per billion gold, 826 to 2,559 parts per million (ppm) lead, and 9,428 ppm to 2.52 percent zinc. One sample contained 13.76 percent barium.

**Alteration:**

The semischist and phyllite host rocks are notably silicified.

**Age of mineralization:**

Probably upper Triassic or younger based on the age of the host rocks and similarities to the Duncan-Zarembo belt of massive sulfide mineralization.

**Deposit model:**

Kuroko massive sulfide (Cox and Singer, 1986; model 28a).

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

28a

**Production Status:**

**Site Status:**

**Workings/exploration:**

At various times from the 1970's, much of central Woewodski Island has been staked by a succession of companies; these include Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Houston Oil and Minerals, Westmin Resources, and the Olympic Resources Group. During several episodes in the late 1980's and early 1990's, there was considerable soil sampling in the area including on the nearby Scott prospect (PE091) where three three holes were drilled (Still and others, 2002). The Scott Gold prospect shares a similar exploration history although only mineralized rubble is exposed along a shallow, west-trending gulch in heavy vegetation. Claims are still active on the Scott Show prospect in 2008. Examined and sampled by Still and others (2002) as part of a regional mineral assessment by the Bureau of Land Management.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Scott

**Site type:** Prospect

**ARDF no.:** PE091

**Latitude:** 56.5732 **Quadrangle:** PE C-4

**Longitude:** 133.0071

**Location description and accuracy:**

The Scott prospect is about 1.4 miles northeast of the east end of Harvey Lake and about 0.3 mile northeast of the center of section 24, T 61 S, R. 79 E. It is in a steep gully at an elevation of about 770 feet. The location is accurate. Figure 20 in Still and others (2002) is a detailed map of the Scott prospect.

**Commodities:**

**Main:** Ag, Au, Ba, Pb, Zn

**Other:**

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Barite

**Geologic description:**

At various times from the 1970's, much of central Woewodski Island has been staked by a succession of companies; these include Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Houston Oil and Minerals, Westmin Resources, and the Olympic Resources Group. During several of these episodes in the 1980's and early 1990's, there was soil sampling on the Scott prospect and three holes were drilled there (Still and others, 2002). It has been examined several times since and claims are still active on it in 2008. (The nearby Scott Gold prospect (PE090) shares a similar history.)

The Scott deposit can be traced for 300 feet in a series of discontinuous exposures along a steep gully. The mineralization consists of bands and lenses of barite, pyrite, and galena, 0.1 to 2.0 feet thick, that parallel the layering in the host rock. The host rocks at the prospect are semischist and phyllite that are correlative with the Triassic Hyd Group (Karl and others, 1999, Brew, 1997). Individual lenses of mineralization can be traced for to up to 30 feet. Still and others (2002) collected 22 samples that contained up to 1,122 parts per billion (ppb) gold, 47.3 parts per million (ppm) silver, 2.63 percent lead, and 40.9 percent zinc. Lower metal values persist out into the wall rock as disseminated ore minerals and a sample of quartz and greenstone float found near the sulfide lenses contained up to 8,157 ppb gold. (There is no information available on the drill holes.)

**Alteration:**

None specifically noted.

**Age of mineralization:**

Triassic or younger based on age of the host rock.

**Deposit model:**

Kuroko massive sulfide (Cox and Singer, 1986; model 28a).

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

28a

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

At various times from the 1970's, much of central Woewodski Island has been staked by a succession of companies; these include Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Houston Oil and Minerals, Westmin Resources, and the Olympic Resources Group. During several of these episodes in the 1980's and early 1990's, there was soil sampling on the Scott prospect and three holes were drilled there (Still and others, 2002). It has been examined several times since and claims are still active on it in 2008.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Hope

**Site type:** Prospect

**ARDF no.:** PE092

**Latitude:** 56.5720 **Quadrangle:** PE C-4

**Longitude:** 133.0594

**Location description and accuracy:**
This prospect is near the middle of the south side of the small lake, locally called 'Lost Lake', that is about 0.7 mile north of the west end of Harvey Lake It is in the NE1/4, section 22, T. 61 S., R. 79 E.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:**

**Gangue minerals:** Quartz

**Geologic description:**
Guided by an unpublished map dated 1933, Still and others (2002) located a 45-foot-long trench on four claims staked in the 1930's under the name 'Hope'. The trench exposes 12 feet of quartz rubble and 19 feet of a quartz vein in schist. The vein strikes N30W, and dips 45SW. A chip sample across 8.7 feet of the middle of the quartz vein averaged 4,400 parts per billion gold. Another trench is caved. The rocks in the area consist of felsic and intermediate volcanic flows and breccias, limestone, and argillite of the Hyd Group of Triassic age (Karl and others, 1999). In recent years, the prospect had often been covered by the claims of the 'Lost Show' prospect (PE029) on the north side of Lost Lake.

**Alteration:**
None noted.

**Age of mineralization:**
Triassic or younger based on the age of the host rock.

**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:** Active?

**Workings/exploration:**
Two trenches were dug on this prospect in the 1930's. One is now caved but the other was sampled by Still and others (2002).

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (adjacent to Helen S Mine)

**Site type:** Prospect

**ARDF no.:** PE093

**Latitude:** 56.5693 **Quadrangle:** PE C-4

**Longitude:** 133.0683

**Location description and accuracy:**

This deposit adjoins or overlaps the veins at the Helen S Mine (PE028). At this prospect, volcanogenic massive sulfides are exposed in several pits and occur in float for about 700 feet along a small south-flowing creek whose mouth is about 50 yards north of the mouth of the creek that drains Harvey Lake on Woewodski Island. The coordinates are at a pit with the best exposed mineralization; it is about 400 feet north of the high-tide line in southwest corner of section 22, T. 61 S., R 79 E. Figure 15 of Still and others is a detailed map of this mineralization and the Helen S Mine.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:** Ba

**Ore minerals:** Arsenopyrite, chalcopyrite, galena, pyrrhotite, sphalerite

**Gangue minerals:** Barite, quartz

**Geologic description:**

This volcanogenic massive-sulfide deposit is within the old claim of the Helen S Mine (PE028). The massive sulfides are present in several pits that may date back to the early 1900's. However, the massive sulfides were not recognized until 1980 (Berg and Grybeck,1980). Subsequently, the deposit has been examined by numerous geologists and it was examined and sampled by Still and others (2002) as part of a regional mineral assessment for the Bureau of Land Management.

The rocks in the area are mainly metamorphosed felsic and intermediate flows and breccia and argillite of the Triassic Hyd Group that have been intruded by Mesozoic hornblende gabbro exposed just a few hundred feet to the west and Cretaceous diorite a mile to the south.(Brew, 1997; Karl and others, 1999).

The best exposure of the massive sulfide mineralization is in an old pit about 400 feet north of the site of the old Helen S mill. The massive sulfides consist of crudely banded pyrite, pyrrhotite(?), arsenopyrite, sphalerite, and galena with barite in greenstone and greenschist. Similar mineralization occurs in several small pits and in float for about 400 feet north along a small creek. Still and others (2002) collected several samples in the southern pit; selected samples contained up to 113.5 parts per million (ppm) silver, up to 2.5 percent lead, and 3.0 percent zinc. Samples from the northern pits contained up to 2.13 ounces of silver per ton, 1.74 percent lead, and 8.5 percent zinc. The massive sulfide deposits do not contain detectable gold as distinct from the gold-quartz veins of the adjacent Helen S Mine. Berg and Grybeck (1980) interpreted the massive sulfides as part of the Duncan-Zarembo belt of dismembered, Upper Triassic volcanogenic massive sulfide deposits.

**Alteration:**

**Age of mineralization:**

The volcanogenic massive sulfides in the Duncan-Zarembo belt are Upper Triassic (Berg and Grybeck, 1980).

**Deposit model:**

Barite facies of a Kuroko massive-sulfide model (Cox and Singer, 1986; model 28a); or alternatively a barite facies of a Sierran Kuroko model (Bliss, 1992; model 28a1).

**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**
28a or 28a1

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**
This volcanogenic massive-sulfide deposit is within the old claim of the Helen S Mine (PE028). The massive sulfides are present in several pits that may date back to the early 1900's. However, the massive sulfides were not recognized until 1980 (Berg and Grybeck,1980). Subsequently, the deposit has been examined by numerous geologists and it was examined and sampled by Still and others (2002) as part of a regional mineral assessment for the Bureau of Land Management.

**Production notes:**

**Reserves:**
None.

**Additional comments:**
All the workings are on a patented claim.

**References:**
Wright and Wright, 1908; Buddington, 1923; Roehm, 1945 (IR 195-37); Cobb, 1972 (OF 78-870); Cobb, 1972 (MF-415); Berg and Grybeck, 1980; Grybeck, Berg, and Karl, 1984; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (on south Fork Andrew Creek)

**Site type:** Occurrences

**ARDF no.:** PE094

**Latitude:** 56.5686 **Quadrangle:** PE C-1

**Longitude:** 132.1044

**Location description and accuracy:**
These occurrences are on the South Fork of Andrew Creek at an elevation of about 1000 feet. They are about 12.6 miles east-northeast of Wrangell near the center of section 23, T. 61 S., R. 85 E.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:** Quartz

**Geologic description:**
During a reconnaissance examination of Andrew Creek, Still and others (2002) found a piece of quartz float with visible gold in the South Fork of Andrew Creek at an elevation of about 1,000 feet. They could not locate the lode source but several other samples of quartz float in the creek contained 137 to 1,992 parts per billion (ppb) gold. They also collected 21 stream-sediment sample and a panned concentrate. The stream sediment samples contained up to 493 ppb gold and the panned concentrate sample contained 1,058 ppb gold. Andrew Creek largely flows on Mesozoic and Paleozoic schist and gneiss that is intruded by Cretaceous tonalite plutons (Brew, 1997; Karl and others, 1999) . These make up the western border zone of the Coast Plutonic Complex. East of Andrew Creek the complex consists largely of Tertiary tonalite and migmatite. (Brew, 1997; Karl and others, 1999).

**Alteration:**

**Age of mineralization:**
Uncertain because the mineralization was not found in place.

**Deposit model:**
Visible gold in quartz float.

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**
Only sampling by government engineers and geologists.

**Production notes:**

**Reserves:**

**Additional comments:**

The area is now within the Stikine-LeConte Wilderness which is closed to mineral exploration and mining.

**References:**

Brew, 1997 (OF 97-156-H); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Finzens

**Site type:** Prospects

**ARDF no.:** PE095

**Latitude:** 56.5680 **Quadrangle:** PE

**Longitude:** 132.9855

**Location description and accuracy:**

Wright and Wright (1908) showed 14 prospects on the heavily vegetated northeast portion of Woewodski Island; little more has been published about them since. The prospects are scattered along a belt about two miles long that extends north-northwest from near Point Lockwood on Wrangell Narrows. The coordinates are at about the center of the belt. The location of any one of the prospects is uncertain owing to the small scale and lack of detail on Wrights' map.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**

Although much of Woewodski Island has been staked by a succession of companies since the 1980's, there appears to be little if any work concentrated on the northeast of the island along Wrangell Narrows. The only indication of mineralization at this site is on an old, small-scale map by Wright and Wright (1908); they show 14 'X' marks scattered along a belt about two miles long with the notation 'Finzen's Prospects'. Since the main commodity of interest then was gold, it is assumed that the prospect were for gold. There is no more recent information on these prospects although Still and others (2002) collected several several stream sediment samples and rock in the vicinity for geochemical analysis. None showed significant metal values. The rocks in the vicinity are part of the Triassic Hyd Group that consists mainly of volcanic flows and breccias, argillite, and some limestone (Brew, 1997; Karl and others, 1999).

**Alteration:**

**Age of mineralization:**

**Deposit model:**

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

**Production Status:** None

**Site Status:** Active?

**Workings/exploration:**

Although much of Woewodski Island has been staked by a succession of companies since the 1980's, there appears to be little if any work concentrated on the northeast of the island along Wrangell Narrows. The only indication of mineralization at this site is on an old, small-scale map by Wright and Wright (1908); they show 14 'X' marks scattered along a belt about two miles long with the notation 'Finzen's Prospects.'

Since the main commodity of interest then was gold, it is assumed that the prospect were for gold. There is no more recent information on these prospects although Still and others (2002) collected several several stream sediment samples and rock in the vicinity for geochemical analysis.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Wright and Wright, 1908; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Buddington, 1908

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (on west side of lower Duncan Canal)

**Site type:** Occurrence

**ARDF no.:** PE096

**Latitude:** 56.5650 **Quadrangle:** PE C-4

**Longitude:** 133.1014

**Location description and accuracy:**
This occurrence is in a borrow pit near sea level on the west side of Duncan Canal opposite the mouth of the creek that drains Harvey Lake on Woewodski Island. It is near the southwest corner of section 21, T. 61 S., R. 79 E. The location is accurate.

**Commodities:**

**Main:** As, Au, Cu,

**Other:**

**Ore minerals:** Chalcopyrite, pyrite

**Gangue minerals:**

**Geologic description:**
This occurrence was found during the exploration of the Duncan Canal area by Amoco Minerals Co. in the late 1970's. Still and others (2002) visited the site and collected several samples of greenstone that contained disseminated pyrite and chalcopyrite. The samples contained 15 to 821 parts per billion gold, 954 to 1,189 parts per million (ppm) copper, and 21 to 1,906 ppm arsenic. The rocks in the area are part of the Triassic Hyd Group which are known to be favorable for volcanogenic massive sulfide deposits in the Duncan Canal area (Karl and others, 1999).

**Alteration:**

**Age of mineralization:**
Triassic based on the age of the host rocks.

**Deposit model:**
Volcanogenic massive sulfide deposit?

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
First located in the late 1970's; only limited surface sampling by government and industry.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Maid of Texas

**Site type:** Prospect

**ARDF no.:** PE097

**Latitude:** 56.5648 **Quadrangle:** PE C-4

**Longitude:** 133.0289

**Location description and accuracy:**
The Maid of Texas prospect is often described with the adjacent Maid of Mexico Mine. It t is separate vein, however, and at least at some time in the past on separate claim(s). The Maid of Texas vein is parallel to the Maid of Mexico and about 200 feet to the southeast. It is about 0.4 mile south-southeast of the center of section 23, T 61 S, R. 79E. In 1996, a trail was still passable from the center of the north shore of Harvey Lake, north to the nearby Maid of Mexico Mine, but in later years it was difficult to follow in the heavy timber and vegetation. The location of the Maid of Texas is shown on Figure 17 of Still and others (2002). The location is accurate.

**Commodities:**

**Main:** Au

**Other:** Zn

**Ore minerals:** Native gold?

**Gangue minerals:** Quartz

**Geologic description:**
The Maid of Texas vein as located by Still and others (2002) is parallel to and about 200 feet southeast of the Maid of Mexico Mine. It was discovered before 1933 but there has been little work on it and no production from it. There is a small cut on the Maid of Texas vein that now can can be traced as a line of scattered quartz float that trends northeast. in gullies. Still and others (2002) collected three samples that contained up to 8 parts per billion (ppb) and 419 parts per million zinc. Two samples of iron-stained, pyrite-rich schist contained 51 and 61 ppb gold. The vein is at the contact of semischist and phyllite of the Triassic Hyd Group (Brew, 1997).

**Alteration:**
None specifically noted.

**Age of mineralization:**
Triassic or younger based on age of the host rock.

**Deposit model:**
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:** Undetermined

**Workings/exploration:**

Only a cut opened before 1933.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**

Roehm, 1945 (DGGS IR 195-37); Brew, 1997 (OF 97-156-J); Still and others, 2002.

**Primary reference:** Still and others (2002)

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (near Blind Slough)

**Site type:** Occurrence

**ARDF no.:** PE098

**Latitude:** 56.5525

**Quadrangle:** PE C-3

**Longitude:** 132.7542

**Location description and accuracy:**
This occurrence is in a borrow pit just north of the center of the head of Blind Slough at an elevation of about 120 feet. It is about 0.2 mile south of the center of section 27, T. 61 S., R. 81 E.

**Commodities:**

**Main:** Cu

**Other:** Pb, Zn

**Ore minerals:** Pyrrhotite

**Gangue minerals:**

**Geologic description:**
This occurrence was found by Still and others (2002) in a borrow pit beside a logging road. The occurrence consists of rubble of iron- and copper-stained hornblendite with massive pyrrhotite. A sample contained 1,007 parts per million (ppm) copper, 303 ppm lead, and 395 ppm zinc. Karl and others (1999) map the rocks around the pit as Cretaceous tonalite, granodiorite, and quartz diorite.

**Alteration:**

**Age of mineralization:**
Cretaceous or younger based on the age of the host rocks.

**Deposit model:**
Pyrrhotite in hornblendite with copper.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
Sampling in a borrow pit by government geologists.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Independence

**Site type:** Prospect

**ARDF no.:** PE099

**Latitude:** 56.5476 **Quadrangle:** C-4

**Longitude:** 133.0423

**Location description and accuracy:**
The Independence prospect consists of a shaft and 12 cuts that extend for about 1,800 feet along a quartz vein. The coordinates are at the shaft which is at an elevation of about 500 feet, about 0.3 mile north-northwest of the north end of Harrys Lake on Woewodski Island. It is about 0.5 mile north of the center of section 35, T. 61 S., R. 79 E.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:** Quartz

**Geologic description:**
The Independence prospect was found sometime before 1931 (Nelson, 1931) and by 1933 consisted of 12 cuts and a shaft 10 to 20 feet deep along a vein that extended for about 2,000 feet (Still and others, 2002). Apparently there has been no later work specifically on this prospect although much of the center of Woewodski Island has been covered by claims since the 1970's and this prospect probably still is.
The rocks in the vicinity are mainly felsic volcanic rocks of the Triassic Hyd Group (Brew, 1997, Karl and others, 1999). At the south end of the prospect, the volcanics are cut by Cretaceous hornblende diorite. The mineralization consist of a quartz vein up to 10 feet thick that strikes north and has been traced on the surface for about 2,000 feet. Still and others (2002) collected 8 samples from the pits along the vein and from the shaft dump. Six contained less than 5 parts per billion (ppb) gold, one contained 74 ppb gold, and one contained 94 ppb gold.

**Alteration:**
None specifically noted.

**Age of mineralization:**
Cretaceous or younger based on the age of the diorite host rock to the vein.

**Deposit model:**
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:** Active

**Workings/exploration:**

The Independence prospect was found sometime before 1931 (Nelson, 1931) and by 1933 consisted of 12 cuts and a shaft 10 to 20 feet deep along a vein that extended for about 2,000 feet (Still and others, 2002). Apparently there has been no later work specifically on this prospect although much of the center of Woewodski Island has been covered by claims since the 1970's and this prospect probably still is.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Nelson, 1931; Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Mad Dog 2

**Site type:** Prospect

**ARDF no.:** PE100

**Latitude:** 56.5472 **Quadrangle:** C-4

**Longitude:** 133.0254

**Location description and accuracy:**
The Mad Dog 2 prospect is about 0.9 mile south-southeast of the east end of Harvey Lake at an elevation of about 400 feet. It is near the northwest corner of section 36, T. 61 S., R. 79 E.

**Commodities:**

**Main:** Ag, Au, Cu, Zn

**Other:**

**Ore minerals:** Chalcopyrite, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**
Since the 1970's much of Woewodski Island has been covered by claims held by a succession of companies: Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Westmin Resources, and currently (2008) the Bravo Venture Group. This prospect probably was within those claims several times and it is under claim in 2008. In 1998, two holes were drilled on the Mad Dog 2 prospect by P. Beardslee (Still and others, 2002).

Most of the area is heavily vegetated. The sparse outcrop consists of metamorphosed intermediate to felsic volcanic rocks of the Triassic Hyd Formation (Brew, 1997; Karl and others, 1999). Near the 1998 drill site, Still and others (2002) located an outcrop of schist with a band of pyrite, chalcopyrite, and sphalerite 0.3 to 0.8 feet thick. Six samples contained 67 to 2,867 parts per billion gold, 2.4 to 27.1 parts per million (ppm) silver, 240 to 1,512 ppm copper, and 732 ppm to 2.9 percent zinc. The drill holes were said to miss any significant mineralization.

**Alteration:**
None specifically noted.

**Age of mineralization:**
Late Triassic based on the age of the host rock and similarities to massive sulfide deposits in the Duncan-Zarembo belt of mineralization.

**Deposit model:**
Kuroko massive sulfide (Cox and Singer, 1986; model 28a).

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

**Production Status:** None

**Site Status:** Active?

**Workings/exploration:**

Since the 1970's much of Woewodski Island has been covered by claims held by a succession of companies: Resource Associates of Alaska, Cominco Exploration, Colony Pacific, Amselco, Kennecott Exploration, Westmin Resources, and currently (2008) the Bravo Venture Group. This prospect probably was within those claims several times and it is under claim in 2008. In 1998, two holes were drilled on the Mad Dog 2 prospect by P. Beardslee (Still and others, 2002).

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (near the south end of Woewodski Island)

**Site type:** Prospect

**ARDF no.:** PE101

**Latitude:** 56.5218 **Quadrangle:** PE C-3

**Longitude:** 132.9966

**Location description and accuracy:**
This prospect covers an area of about 1,500 feet by 5,000 feet , centered about 0.6 mile north of the southern tip of Woewodski Island. The center of the area is about 0.6 mile south-southeast of the northwest corner of section 5, T. 62 S., R. 80 E.

**Commodities:**

**Main:** Au

**Other:** As

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
In the late 1990's, Olympic Resources collected hundreds of soil samples on a grid and outlined an area about 1,500 feet by 5,000 feet in size with anomalous gold values. However, when the Bureau of Land Management (Still and others, 2002) recollected some samples in the area, on analysis they could not verify the original results. The discrepancy cannot be explained. In 2000, Olympic Resources drilled 7 holes in the area; the results have not been published but were said to be 'not favorable' by Still and others (2002).
The rocks in the area are volcanics of the Triassic Hyd Group that have been intruded by a Upper Cretaceous hornblende diorite (Brew, 1997; Karl and others, 1999). While the persistent high gold values of the original soil sampling could not be confirmed by Still and others (2002), several of their soil samples contained anomalous gold and arsenic. Two samples contained 67 and 75 parts per billion (ppb) gold and 122 and 124 parts per million (ppm) arsenic. They also collected two samples of silicified greenstone with disseminated pyrite that contained 94 to 730 ppb gold and 1,374 to more than 10,000 ppm arsenic.

**Alteration:**
Volcanic rocks are silicified near one mineralized outcrop.

**Age of mineralization:**
Probably Triassic of younger based on the age of the host rocks.

**Deposit model:**

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
In the late 1990's, Olympic Resources collected hundreds of soil samples on a grid and outlined an area about 1,500 feet by 5,000 feet in size with anomalous gold values. However, Still and others (2002) could

not confirm the original assays.  In 2000, Olympic Resources drilled 7 holes in the area (Still and others, 2002).

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Brew, 1997 (OF 97-156-J); Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): AMAX Molybdenum

**Site type:** Prospect

**ARDF no.:** PE102

**Latitude:** 56.5164 **Quadrangle:** PE C-1

**Longitude:** 132.0607

**Location description and accuracy:**

The AMAX Molybdenum prospect consists of 4 deep holes drilled between 1976 and 1981 by Amax Exploration Inc. The holes extend along a line about 5,000 feet long trending about N 40 W. The location is at about the center of this line of holes, near the site of one of the holes. Still and others (2002) locate the holes precisely on their Plate 3. The center of the line of holes is at an elevation of about 3,000 feet about 1.3 miles southwest of Mount Waters and about 0.6 mile south-southwest of the center of section 6, T. 62 S., R. 85 E., in Groundhog Basin. The location is accurate.

**Commodities:**

**Main:** Mo

**Other:** W

**Ore minerals:** Molybdenite, scheelite

**Gangue minerals:** Fluorite, quartz

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin adjacent to the lines of drill holes that define this prospect, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

From 1976 to 1981, AMAX Exploration Inc. drilled four holes, 506 to 2,727 feet deep, to test the molybdenum potential of the small biotite granite exposed on the ridge northeast of the drill holes. During surface mapping in the area, AMAX collected samples that contained up to 5,000 parts per million (ppm) molybdenum in the biotite granite stock and gneiss (AMAX Exploration Inc., 1981a, 1981b). The mineralization consists of thin fractures with molybdenite in the granite and gneiss. The molybdenite is associated with quartz and fluorite in stringers and vugs, sericite-chlorite alteration, and some tungsten in the assays. The four holes that AMAX drilled were oriented to penetrate the granite at depth and three of the holes did so. Mineralization was cut in several of the holes but the best interval contained only 69 parts per million molybdenum. Still and others (2002) examined the area as part of a Bureau of Land Management mineral assessment of the area but their work was confined to a few surface samples.

**Alteration:**

The molybdenite is associated with quartz and fluorite in stringers and vugs and sericite-chlorite alteration.

**Age of mineralization:**

Associated with a 16.3 Ma granite.

**Deposit model:**
Porphyry molybdenum.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
From 1976 to 1981, AMAX Exploration Inc. drilled four holes, 506 to 2,727 feet deep, to test the molybdenum potential of the small biotite granite pluton exposed on the ridge northeast of the drill holes. They also did considerable surface mapping in the area. A few surface samples collected by Still and others (2002).

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
George and Wyckoff, 1973; AMAX Exploration Inc., 1981a; AMAX Exploration Inc., 1981b; Newberry and Brew, 1989; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Northeast Cliffs

**Site type:** Prospect

**ARDF no.:** PE103

**Latitude:** 56.5164 **Quadrangle:** PE C-1

**Longitude:** 132.0607

**Location description and accuracy:**

This prospect represents sampling by an unknown company and by Still and others (2002) on the steep north-trending cliff face east of the middle section of Groundhog Basin. The coordinates are at about the center of the work at an elevation of about 3,400 feet; it is about 0.5 mile south of the center of section 6, T. 62 S., R. 86 E. The general location is accurate but the location of the specific sampling by industry is uncertain.

**Commodities:**

**Main:** Cu, Pb, Sn, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, sphalerite

**Gangue minerals:**

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin just west of the cliff faces, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

Still and others (2002) found fixed climbing ropes at several places along about 0.5 mile on the cliff faces east of Groundhog Basin that probably represent sampling and mapping by AMAX Exploration Inc. between 1976 and 1981. Still and others (2002) collected several samples at the north and south ends of the cliffs. The rocks along the cliffs are mainly silicified gneiss and rhyolite. The mineralization consists of disseminated chalcopyrite, galena, and sphalerite (probably similar in origin to the mineralization at the Groundhog Basin prospect in the valley below (PE040)). Four samples collected by Still and others (2002) contained 112 to 980 parts per million (ppm) copper, 1,569 to 9,559 ppm zinc, and 58 to 1,941 ppm tin.

**Alteration:**

None specifically noted.

**Age of mineralization:**

16.3 Ma based on a probable genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**

Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**

Still and others (2002) found fixed climbing ropes at several places along about 0.5 mile on the cliff faces east of Groundhog Basin that probably represent sampling and mapping by AMAX Exploration Inc. between 1976 and 1981. Still and others (2002) collected several samples at the north and south ends of the cliffs.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): North Silver West

**Site type:** Prospect

**ARDF no.:** PE104

**Latitude:** 56.5150 **Quadrangle:** PE C-1

**Longitude:** 132.0484

**Location description and accuracy:**
This prospect is about 1.0 mile southwest of Mount Waters at an elevation of about 4,220 feet; it is about 0.5 north-northeast of the center of section 7, T. 62 S., R. 85 E. The location is accurate and it is Map No. 94 of Still and others (2002).

**Commodities:**

**Main:** Ag, Pb, Zn

**Other:**

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**
The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin about a mile southwest of this propect, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).
In the late 1950's, Moneta Porcupine Company staked claims in the area but subsequently dropped them. William Huff and James Fucas continued prospecting in the area and Huff discovered the North Silver West prospect in 1963. Their claims were optioned by the Bunker Hill Mining Company in 1965 and they dug several pits on the mineralization. They dropped the claims at the end of the field season and the property was optioned by a succession of companies --Humble Oil and Refining Company, El Paso Natural Gas Company and AMAX Exploration Inc.--through 1981. An adit driven early in the history of the prospect extended only a few feet into the rock. Still and others (2002) sampled the prospect during a Bureau of Land Management mineral assessment of the area.
The North Silver West prospect is associated with a fault zone up to 10 feet thick that strikes N20-40E and dips 50-89 degrees southeast . The footwall of the fault schist with 0.5-to-4-foot-thick, irregular lenses and pods of quartz with massive and disseminated pyrite, galena, and sphalerite. The fault zone, as now exposed. extends for about 185 feet. Samples collected by Still and others (2002) across 0.5 to 4.9 feet of the mineralization contained 31.3 to 79.46 parts per million (ppm) silver, 1,795 ppm to 33.47 percent lead, and from 2,734 ppm to 9.8 percent zinc.

**Alteration:**
None specifically noted.

**Age of mineralization:**
Probably related to a nearby 16.3 Ma biotite granite pluton.

**Deposit model:**
Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
In the late 1950's, Moneta Porcupine Company staked claims in the area but subsequently dropped them. William Huff and James Fucas continued prospecting in the area and Huff discovered the North Silver West prospect in 1963. Their claims were optioned by the Bunker Hill Mining Company in 1965 and they dug several pits on the mineralization. They dropped the claims at the end of the field season and the property was optioned by a succession of companies --Humble Oil and Refining Company, El Paso Natural Gas Company and AMAX Exploration Inc.--through 1981. Still and others (2002) sampled the prospect during a Bureau of Land Management mineral assessment of the area.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): North Silver Whistlepig Adit

**Site type:** Prospect

**ARDF no.:** PE105

**Latitude:** 56.5116 **Quadrangle:** PE C-1

**Longitude:** 132.0435

**Location description and accuracy:**

The North Silver Whistlepig Adit is about 1.0 mile south-southwest of Mount Waters on a steep slope at the head of a cirque. It is at an elevation of about 4,050 feet about 0.5 mile northeast of the center of section 7, T. 62 S., R. 85 E. The location is accurate and is is Map No. 95 of Still and others (2002).

**Commodities:**

**Main:** Ag, Au, Pb, Sn, Zn

**Other:**

**Ore minerals:** Galena, sphalerite

**Gangue minerals:** Fluorite, quartz

**Geologic description:**

In the late 1950's, Moneta Porcupine Company staked claims in the area but subsequently dropped them. William Huff and James Fucas continued prospecting in the area and staked several claims. Their claims were optioned by the Bunker Hill Mining Company in 1965. They dropped the claims at the end of the field season and the property was optioned by a succession of companies through 1981: Humble Oil and Refining Company, El Paso Natural Gas Company, and AMAX Exploration Inc. Sometime in the 1970's, a mine car and track were taken by helicopter to the prospect and an adit was started to intersect a silver vein. However, the adit extended only a few feet into the rock. About 20 feet of trenching was also done at that time. Still and others (2002) sampled the prospect during a Bureau of Land Management mineral assessment of the area.

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin about a mile northwest of this propect, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

The mineralization at the North Silver Whistlepig Adit prospect consists of narrow, argentiferous, galena-bearing quartz veins (Still and others, 2002). The veins are from 0.2 to 1.0 foot thick, pinch and swell, and are exposed for about 50 feet in the steep rock face above a short adit that only extends a few feet into rock and does not intersect the veins. Several samples of the vein material collected by Still and others (2002) contained from less that 5 to 4,345 parts per billion gold, 11.5 parts per million (ppm) to 517.62 ounces of silver per ton, 778 ppm to 39.75 percent lead, 377 ppm to 11.0 percent zinc, and 17 to 1,497 ppm tin. Gneiss at the adit contains small vugs of quartz and fluorite; a sample across 3.6 feet of the gneiss contained 954 ppm lead, 399 ppm zinc, and 11.9 ppm silver.

**Alteration:**

None specifically noted.

**Age of mineralization:**
Probably related to a nearby 16.3 Ma biotite granite.

**Deposit model:**
Argentiferous, galena-quartz veins.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
In the late 1950's, Moneta Porcupine Company staked claims in the area but subsequently dropped them. William Huff and James Fucas continued prospecting in the area and staked several claims. Their claims were optioned by the Bunker Hill Mining Company in 1965. They dropped the claims at the end of the field season and the property was optioned by a succession of companies through 1981: Humble Oil and Refining Company, El Paso Natural Gas Company, and AMAX Exploration Inc. In the 1970's, a mine car and track were taken by helicopter to the prospect and an adit was started to intersect a high-grade silver vein at the prospect. However, the adit extended only a few feet into the rock. About 20 feet of trenching was also done about this time. Still and others (2002) sampled the prospect during a Bureau of Land Management mineral assessment of the area.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Gault and others, 1953; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others (2002)

**Reporter(s):** D. J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): South Silver

**Site type:** Prospect

**ARDF no.:** PE106

**Latitude:** 56.5070 **Quadrangle:** PE C-1

**Longitude:** 132.0416

**Location description and accuracy:**
El Paso Natural Gas Company collected samples along a line about 1,900 feet long trending south-southwest, beginning near Peak 4326 at the head of Groundhog Basin. They then drilled a 149-foot hole about 0.1 mile southwest of Peak 4326; the coordinates for the prospect are at the drill hole. The prospect is about 0.6 mile east-southeast of the center of section 7, T. 62 S., R. 86 E. The location is accurate.

**Commodities:**

**Main:** Ag, Pb, Sn, Zn

**Other:**

**Ore minerals:** Galena, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**
The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to Tertiary or Cretaceous schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

El Paso Natural Gas Company worked in the area from 1971 to 1976 (George and Wyckoff, 1973). They collected more than 200 surface samples along a line about 1,900 feet long that extended south-southwest from Peak 4326. They also drilled a hole 149 feet deep about 0.1 mile southwest of Peak 4326. Still and others (2002) identified the mineralization as quartz veins and stringers up to 10 feet thick that follows the layering in the gneiss hostrock. Four samples contained up to 63.9 parts per million (ppm) silver, 1,417 ppm lead, and 1,089 ppm tin. In the samples El Paso Natural Gas Company collected, the 6 best surface samples contained 840 to 1,655 ppm zinc, and 320 to 2,720 ppm lead. A 32-foot intercept in the El Paso drill hole consisted of rhyolite and gneiss cut by quartz stringers with sphalerite and galena; the intercept averaged 0.7 percent zinc, 1.0 percent lead, and 0.3 ounce of silver per ton. The mineralization is almost certainly of the same origin and age as that at the nearby Groundhog Basin prospect (PE040).

**Alteration:**
None specifically noted.

**Age of mineralization:**
16.3 Ma based on a genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**
Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**

El Paso Natural Gas Company worked in the area from 1971 to 1976. They collected more than 200 surface samples along a line about 1,900 feet long that extended south-southwest from Peak 4326. They also drilled a hole 149 feet deep about 0.1 mile southwest of Peak 4326.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

George and Wyckoff, 1973; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Copper Zone

**Site type:** Prospect

**ARDF no.:** PE107

**Latitude:** 56.5052 **Quadrangle:** PE C-1

**Longitude:** 132.0504

**Location description and accuracy:**

The Copper Zone prospect is high on the cirque wall at the head of Groundhog Basin; it is at an elevation of about 3,500 feet, about 0.5 mile west-southwest of the prominent peak 4326. The prospect is about 0.3 mile south-southeast of the center of section 7, T. 62 S., R. 86 E. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Sn, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrrhotite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to Tertiary or Cretaceous schist and gneiss The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

The earliest work reported on this prospect was done by El Paso Natural Gas Company in 1972; they collected 1,044 rock samples and drilled nine holes (George and Wyckoff, 1973; Still and others, 2002) . They defined a mineralized area about 125 feet by 160 feet in size. Still and others (2002) report that the area is notable for rhyolite sills up to 60 feet thick that generally follow the layering in gneiss and schist. Disseminated chalcopyrite occurs along fractures that parallel and crosscut the foliation of the metamorphic rocks. Some lenses and bands of massive chalcopyrite and pyrrhotite up to 0.4 feet thick also occur along the fractures. Chip samples up to 0.7 feet long across the fractures contained up to 4,580 parts per billion gold, 19.65 ounces of silver per ton, 8.1 percent copper, 1.71 percent lead, 2.65 percent zinc, and 1,728 parts per million tin. Only one of the nine holes drilled by El Paso Natural Gas Company intersected mineralization; the best intercept was 70 feet that averaged 0.11 percent copper. The deposit is similar to the mineralization at the nearby Groundhog Basin prospect (PE040) and may be a continuation of it.

**Alteration:**

None noted specifically.

**Age of mineralization:**

16.3 Ma based on a probable genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**

Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**

The earliest work reported on this prospect was by El Paso Natural Gas Company in 1972; they collected 1,044 rock samples and drilled nine holes. The prospect was later sampled by Still and others (2002) as part of a BLM mineral assessment.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

George and Wyckoff, 1973; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Camp Six

**Site type:** Prospect

**ARDF no.:** PE108

**Latitude:** 56.5032 **Quadrangle:** PE C-1

**Longitude:** 132.0449

**Location description and accuracy:**

Camp Six was an exploration camp with two trailers and several smaller buildings that El Paso Natural Gas Company used in the 1970's. Still and others (2002) retained that name for the prospect. It is about 0.4 mile southwest of Peak 4362 at the head of Groundhog Basin. The prospect is about 0.6 mile southeast of the center of section 7, T. 62 S., R. 86 E. The location is accurate.

**Commodities:**

**Main:** Ag, Cu, Pb, Sn, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrrhotite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to Tertiary or Cretaceous schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin, about a mile to the northwest, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

Camp Six was an exploration camp with two trailers and several smaller buildings that El Paso Natural Gas Company used in the 1970's for their work in the area. Still and others (2002) retained that name for the prospect here where El Paso did some surface geology and sampling. As Still and others did later, El Paso identified the mineralization as narrow silicified, sheared zones along the margins of rhyolite sills and in gneiss. The zones contained pyrrhotite, chalcopyrite, galena, and sphalerite. Samples collected by Still and others contained up to 58 parts per million (ppm) silver, 1,976 ppm copper, 1,324 ppm lead, and 9.5 percent zinc. The mineralization is almost certainly of the same origin and age as the nearby Groundhog Basin prospect (PE040).

**Alteration:**

None specifically mentioned .

**Age of mineralization:**

Probably 16.3 Ma based on a genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**

Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**

Camp Six was an exploration camp with two trailers and several smaller buildings that El Paso Natural Gas Company used in the 1970's. Still and others (2002) retained that name for the prospect here. El Paso did some surface geology and sampling, as did Still and others later.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

George and Wyckoff, 1973; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Lake Cirque

**Site type:** Prospect

**ARDF no.:** PE109

**Latitude:** 56.4992 **Quadrangle:** PE B-1

**Longitude:** 132.0520

**Location description and accuracy:**

The Lake Cirque prospect consists of three areas of mineralization that crop out through patches of ice and snow along a generally north-south trend about 2,000 feet long. The coordinates are at about the center of the mineralization; it is about 0.9 mile north-northwest of Marsha Peak and about 0.4 mile north of the center of section 18, T. 62 S., R. 86 E. The location is accurate. A map of the mineralization is Plate 29 of Still and others (2002).

**Commodities:**

**Main:** Ag, Cu, Pb, Sn, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, pyrrhotite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to Tertiary or Cretaceous schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin,. about a mile to the north-northeast of this prospect, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

The mineralization at this prospect and in the surrounding area was described in detail by Gault and others (1953). The prospect area was included in various claims blocks staked in the 50's and 60's but for most of that time, the area was covered by permanent snow and ice. In 1976, Bunker Hill Mining Company was able to trace the ore beds in Groundhog Basin (PE040) into the cirque around this propect and drilled two holes in the mineralization. Still and others (2002) better defined the and sampled the mineralization in a year when much of the snow had melted off.

The mineralization at the Lake Cirque prospect is a continuation of the ore beds at the better known Groundhog Basin prospect (PE040) to the north. Still and others (2002) identified three zones of mineralization among the snow banks. The mineralization is similar in all three. It consists of layers of gneiss and/or calc-silicate gneiss that contain tabular to layered masses of chalcopyrite, galena, sphalerite, pyrite, and pyrrhotite. In the eastern zone, five samples taken in a tabular body several feet thick averaged 8.2 parts per million (ppm) silver, 752 ppm copper, 8,374 ppm lead, 5.13 percent zinc and 842 ppm tin. The west zone is about 80 feet long and 3 feet wide; samples averaged 36.9 ppm silver, 2.318 ppm copper, 9,223 ppm zinc, and 3,267 ppm tin. The mineralization at the south zone is in sheared gneiss with vuggy quartz veinlets. Samples across 9 feet of this zone's best mineralization averaged 3 ppm silver, 446 ppm copper, 1.68 percent zinc, and 567 ppm tin. Another area of mineralization originally located by Gault and others (1953) is on the south side of the cirque and consists of irregular bands and lenses of massive and disseminated pyrrhotite, galena, and sphalerite in calc-silicate gneiss and along fractures. The best sample collected in this zone by Still and others (2002) contained 130 ppm silver, 1,057 ppm copper, 1.06 percent led, 2.8

percent zinc, and 757 ppm tin.

**Alteration:**
None specifically noted.

**Age of mineralization:**
Probably 16.3 Ma based on a genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**
Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
The mineralization in this area was first described by Gault and others (1953). The prospect area was included in various claims blocks staked in the 50's and 60's, but for most of that time the area was covered by snow and ice. In 1976, Bunker Hill Mining Company was able to trace the ore beds in Groundhog Basin (PE040) in to the cirque around this propect and drilled two holes. Still and others (2002) were able to better define and sample the mineralization in a year when much of the snow had melted and the rocks were better exposed.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
George and Wyckoff, 1973; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): North Marsha Peak

**Site type:** Prospect

**ARDF no.:** PE110

**Latitude:** 56.4934 **Quadrangle:** B-1

**Longitude:** 132.0438

**Location description and accuracy:**

The North Marsha Peak prospect is about 0.5 mile north of Marsha Peak and about 0.4 mile east of the center of section 18, T. 62 S., R. 86 E. The location is accurate. A map of the prospect is Figure 30 of Still and others (2002).

**Commodities:**

**Main:** Ag, Pb, Sn, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to Tertiary or Cretaceous schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin, about 2 miles northwest of this prospect, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

The mineralization at this prospect was described by Gault and others (1953) but little was done on it by industry until the property was optioned by the Bunker Mill Mining Company in 1965. From 1968 to 1970, Humble Oil and Refining Company optioned the property and drilled two holes on it through the Nelson Glacier. El Paso Natural Gas Company optioned the property from 1971 to 1973, collected numerous surface samples, and drilled three holes on it, 116 to 230 feet long (George and Wyckoff, 1973). Still and others (2002) re-examined the property during a mineral assessment of the area by the BLM.

The mineralization here is generally similar to that in Groundhog Basin (PR040) several miles to the north and probably shares the same origin. Here the mineralization is associated with two sheared zones that parallel the foliation of the gneiss and the rhyolite sills in the gneiss; the fault zones strike north and are about 750 feet apart. As reported by Still and others (2002) the western shear zone is 4 to 12 feet thick and about 1,100 feet long. Samples averaged 1.5 ounces of silver per ton, 0.3 percent copper, 0.22 percent lead, and 0.58 percent zinc. The eastern shear zone is about 4 feet thick and can be traced for about 600 feet to where it disappears under the Nelson Glacier. Select samples of thin veinlets along the shear zone contained up to 20.7 ounces of silver per ton, 70 percent lead, and 22 percent zinc. One hole by El Paso Natural Gas Company in the western zone was probably drilled parallel to the mineralized shear zone; it averaged 1.1 percent zinc and 0.25 percent lead over its entire 116 foot length. Another drill hole in the eastern shear zone had a 13-foot interval that averaged 0.87 ounce of silver per ton, 0.08 percent copper, 0.6 percent lead, and 4.3 percent zinc.

**Alteration:**

None specifically noted.

**Age of mineralization:**
Probably 16.3 Ma based on a genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**
Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
The mineralization at this prospect was described by Gault and others (1953) but little was done on it by industry until the property was optioned by the Bunker Mill Mining Company in 1965. From 1968 to 1970, Humble Oil and Refining Company optioned the property and drilled two holes on it through the Nelson Glacier. El Paso Natural Gas Company optioned the property from 1971 to 1973, collected numerous surface samples, and drilled three holes on it, 116 to 230 feet long (George and Wyckoff, 1973). Still and others (2002) re-examined the property during a mineral assessment of the area by the BLM.

**Production notes:**

**Reserves:**
None.

**Additional comments:**
No claims were active as of 2002 according to Still and others.

**References:**
Gault and others, 1953; George and Wyckoff, 1973; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Unnamed (on Nelson Glacier)

**Site type:** Occurrences

**ARDF no.:** PE111

**Latitude:** 56.4913 **Quadrangle:** PE B-1

**Longitude:** 132.0150

**Location description and accuracy:**

These occurrences are in an area that covers most of the center and upper portions of the Nelson Glacier. Much of the glacier was covered by claims from 1964 to 1981, when there was considerable exploration to the west from Marsha Peak to Groundhog Basin. At least one occurrence is on a small nunatak on the glacier, and there is a deep hole in the upper basin of the glacier that went through 621 feet of ice before it struck rock and cut a thin intercept of mineralization (see the Geologic Description for details) This area is essentially Map no. 105 of Still and others (2002) and the coordinates are at about its center.

**Commodities:**

**Main:** Ag, Cu, Pb, Sn, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, sphalerite

**Gangue minerals:**

**Geologic description:**

From about 1964 to 1981 when there was considerable exploration across a wide swatch from from Glacier Basin to Groundhog Basin, a succession of companies considered the potential of the ground under Nelson Glacier. Much if not all of the Glacier were first staked in 1964 and first optioned to Bunker Hill Mining Company. The claims were subsequently optioned to Humble Oil and Refining Company from 1968 to 1970 and they drilled two holes through the ice in the upper part of the glacier. El Paso optioned the claims from 1971 to 1973 and AMAX Exploration Inc. optioned the claims from 1976 to 1981. Still and others (2002) did some limited sampling on or adjacent to the glacier. In 2002. there were no active claims on the glacier.

The rocks west of and under the center of the Nelson Glacier and from Glacier Basin, through Marsha Peak, and along Groundhog Basin consists mainly of Tertiary biotite and hornblende schist and gneiss with local marble interbeds, an assemblage that has been metamorphosed from Mesozoic and/or Paleozoic sedimentary and volcanic protoliths (Gault and others, 1952; George and Wyckoff, 1973; Gehrels and Berg, 1992, Brew, 1997) . The metamorphic rocks are intruded by a small 16.3 Ma stock of tin granite just north of Groundhog Basin that probably is the source of numerous rhyolite dikes and sills that cut the metamorphic rocks around Nelson Glacier as well as the source for the mineralization in the Groundhog Basin area. West of Groundhog Basin, the metamorphic rocks are intruded by several large plutons of Cretaceous tonalite, quartz diorite, and granodiorite. At the east side of the Nelson Glacier, the rocks are dominated by a thick 70-90 Ma Tertiary tonalite sill that forms the west boundary of the Coast Range igneous-metamorphic complex that extends the length of southeastern Alaska. The Tertiary metamorphic rocks and rhyolite in particular probably underlie most of the Nelson Glacier.

Many of the other prospects and occurrences along the ridges between Glacier Basin and Groundhog Basin either border Nelson Glacier or may extend beneath it ; there has been considerable speculation about mineralization under Nelson Glacier and some effort to locate it. Humble drilled two 1,700-foot, vertical holes through the ice (Humble Oil and Refining Company, 1970a and 1970b). One (H1), about 0.6 mile north-northeast of Marsha Peak, went through 491 feet of ice into gneiss but did not intersect mineralization. The other (H2) , went through 621 feet of ice into gneiss; the best intercept in it was 10 feet that averaged 0.5 ounce of silver per ton, 0.4 percent lead, and 1.7 percent zinc. El Paso National Gas (Quigley, 1973) flew an aerial magnetometer survey over the area and traced several faults zones under the glacier. Still and others (2002) found float at several areas on the glacier, most notably on a nunatak about 1.1 mile east-southeast of Marsha Peak. Samples contained up to 8.43 ounces of silver per ton, 1.5 percent copper, 8.21 percent lead, 25.95 percent zinc, and 904 parts per million tin.

**Alteration:**

**Age of mineralization:**

Probably related to a 16.9 Ma tin granite pluton near Groundhog Basin and the numerous rhyolite dikes and sills that intrude the metamorphic rocks in the area.

**Deposit model:**

Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**

From about 1964 to 1981, when there was considerable exploration across a wide swatch from from Glacier Basin to Groundhog Basin, a succession of companies considered the potential of the ground under Nelson Glacier. Much if not all of Nelson Glacier was first staked in 1964 and first optioned to Bunker Hill Mining Company. The claims were subsequently optioned to Humble Oil and Refining Company from 1968 to 1970 and they drilled two holes through the ice in the upper part of the glacier. El Paso optioned the claims from 1971 to 1973 and AMAX Exploration Inc. optioned the claims from 1976 to 1981. Still and others (2002) did some limited sampling on or adjacent to the glacier.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

**References:**

Gault and others, 1953; Humble Oil and Refining Company, 1970a; Humble Oil and Refining Company, 1970b; George and Wyckoff, 1973; Quigley, 1973; Gehrels and Berg, 1984; Brew, 1997 (OF 97-156-C); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): East Marsha Peak

**Site type:** Prospect

**ARDF no.:** PE112

**Latitude:** 56.4910 **Quadrangle:** B-1

**Longitude:** 132.0315

**Location description and accuracy:**

The East Marsha Peak prospect is about 0.5 mile northeast of Marsha Peak near the edge of the Nelson Glacier. It about 0.3 mile south of the center of section 17, T. 62 S., R. 86 E. The location is accurate. A map of the prospect is Figure 30 of Still and others (2002).

**Commodities:**

**Main:** Ag, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, galena, pyrite, pyrrhotite, sphalerite

**Gangue minerals:** Fluorite, quartz

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to Tertiary or Cretaceous schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). On the north side of Groundhog Basin, about 2 miles northwest of this prospect, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton about 1,000 by 2,0000 feet in size. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

The East Marsh Peak prospect was mapped and sampled by El Paso Natural Gas Company in the early 1970's; they dug three, 20- to 60-foot, samples on the property. Several other companies have looked at the property and Still and others (2002) mapped and sampled the prospect as part of a regional mineral assessment for the BLM.

The mineralization here is similar in origin to that at the he well known mineralization at the Groundhog Basin deposit (PE040) to the north and the numerous other base-metal prospect sin the area. The East Marsha Peak prospect is associated with a fault zone that strikes about N 25 E and crosscuts the northwest-trending layering in the gneiss and the rhyolite sills in the gneiss The shear zone is 30 to 40 feet wide and extends for about 2,000 feet. The hanging wall is highly silicified with vugs of quartz and fluorite. Sphalerite, galena, chalcopyrite, and pyrrhotite occur in masses and disseminations in brecciated gneiss along the shear zone and in gouge. The ore minerals also occur in a network of fractures that extend out into the gneiss wallrock for up to 40 feet. El Paso Natural Gas Company (George and Wyckoff, 1973) and Still and others (2002) collected numerous samples in the trenches and in surface outcrops. In one trench at an elevation of about 4,075 feet, El Paso sampled a zone up up 30 feet thick that averaged 3.19 percent zinc, 1.67 percent lead, and 1.99 ounces of silver per ton. Their trench at an elevation of about 4,100 feet exposed a zone 13 feet thick that averaged 1.45 percent zinc, 2.75 percent lead, and 1.23 ounce of silver per ton; an additional 18 feet across the mineralization averaged 1.79 percent zinc with little lead and silver. Other samples gave similar values.

**Alteration:**

Silicification along a sheared zone.

**Age of mineralization:**
Probably 16.3 Ma based on a genetic tie to a nearby, zinnwaldite 'tin' granite (Newberry and Brew, 1989).

**Deposit model:**
Banded Ag-Cu-Sn-Pb-Zn tabular replacement bodies, veins, and stringers.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
The East Marsh Peak prospect was mapped and sampled by El Paso Natural Gas Company in the early 1970's. They dug 3, 20 to 60 foot, samples on the property. Several other companies have looked at the property and Still and others (2002) mapped and sampled the prospect as part of a regional mineral assessment for the BLM.

**Production notes:**

**Reserves:**

**Additional comments:**
No claims were active as of 2002 according to Still and others.

**References:**
Gault and others, 1953; George and Wyckoff, 1973; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:**

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Unnamed (southwest of St. Johns Harbor)

**Site type:** Occurrence

**ARDF no.:** PE113

**Latitude:** 56.4240

**Quadrangle:** PE B-3

**Longitude:** 132.9841

**Location description and accuracy:**

The occurrence is in fill on Forest Service Road 52009. It is about 0.8 mile southwest of Zarembo Springs at the head of St. Johns Harbor and about 0.2 mile northeast of the center of section 7, T. 63 S., R. 80 E.

**Commodities:**

**Main:** As, Au, F

**Other:**

**Ore minerals:** Fluorite

**Gangue minerals:**

**Geologic description:**

Still and others (2002) found road fill on a logging road southwest of St. Johns Harbor that contained vuggy quartz, purple fluorite, and (unidentified) sulfides. A grab sample of the more sulfide-rich quartz and fluorite in the road fill contained 546 parts per billion gold and 826 parts per million arsenic. They could not locate the source of the fill; it may have come from a fluorite occurrence about 10 miles to the south (PE060) but they felt the source was nearby and it seems unlikely that anyone would truck fill in from the occurrence to the south when there are so many borrow pits nearby. They did not discuss the petrology of the road fill. As mapped by Karl and others (1999), the rocks in the immediate area are sedimentary and volcanic rocks of the Triassic Hyd Group . But there are large areas of Quaternary and Tertiary rhyolite just to the south and there is a borrow pit about a half mile to the west that may be in this rhyolite.

**Alteration:**

**Age of mineralization:**

Probably Tertiary based on the age of rhyolite of that age nearby.

**Deposit model:**

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**

Only sampling by government geologists.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (near Wedge Point)

**Site type:** Prospect

**ARDF no.:** PE114

**Latitude:** 56.4184 **Quadrangle:** PE B-2

**Longitude:** 132.5332

**Location description and accuracy:**
Two placer claims were staked for gold in 1974 near the mouth of the creek that drains Sunrise Lake on Woronkofski Island. The location is about 0.6 mile west-southwest of the center of section 7, T. 63 S., R. 83 E.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
Two claims were staked for placer gold in 1974 but apparently have not been active since. Still and others (2002) sampled the creek for placer gold but found none. The rocks in the area are hornfelsed graywacke of the Jurassic and Cretaceous Seymour Canal Formation (Karl and others, 1999).

**Alteration:**

**Age of mineralization:**

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

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
Two claims were staked here for placer gold in 1974 but have apparently have not been active since.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/10/2007

# Site name(s): Unnamed (northeast of Point Nesbitt)

**Site type:** Prospect

**ARDF no.:** PE115

**Latitude:** 56.2865 **Quadrangle:** PE B-3

**Longitude:** 132.8148

**Location description and accuracy:**
This site is at about the center(?) of a block of 242 claims that were first staked in 1978 and were held until 1986. The center is about 4.3 miles northeast of Point Nesbitt at the southern tip of Zarembo Island, in the SW1/4 section 29, T. 64 S., R. 81 E.

**Commodities:**

**Main:** Unknown

**Other:**

**Ore minerals:**

**Gangue minerals:**

**Geologic description:**
A block of 242 claims was staked in 1978 by NERCO Exploration Company who optioned them to Resource Associates of Alaska in 1979 and then to Houston Oil and Minerals in 1981 (Still and others, 2002). The option on the claim block was dropped by NERCO in 1986. The ZF claim block is in a large body of Tertiary or Quaternary rhyolite that makes up much of the south half of Zarembo Island (Karl and others, 1999). Still and others (2002) (briefly?) examined and sampled some of the outcrops in the claim block but did not find any mineralization nor did their only sample contain any metal values.

**Alteration:**

**Age of mineralization:**
Tertiary or Quaternary based on the age of the host rock.

**Deposit model:**

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**
Two-hundred and forty-two claims were staked in 1978 and remained active until at least 1986.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:**

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (on Shrubby Island)

**Site type:** Occurrence

**ARDF no.:** PE116

**Latitude:** 56.2385 **Quadrangle:** PE A-3

**Longitude:** 132.9860

**Location description and accuracy:**

This occurrence is in a borrow pit about 0.8 mile east-southeast of the northwest tip of Shrubby Island; the pit is shown on the 1:63,360-scale topographic map. It is in the NE1/4, section 14, T. 65 S., R. 80 E.

**Commodities:**

**Main:** Pb, Zn

**Other:** Ag, Au

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Calcite

**Geologic description:**

Still and others (2002) visited the borrow pits on Shubby Island and examined the road cuts on the logging roads of the island to try to discover the source of the strongly anomalous stream sediment samples that were reported earlier by the U.S. Geological Survey. They discovered mineralization in a borrow pit on the northwest end of the island. The mineralization consists of pods of sulfides in blocky, dark gray to white limestone of the Heceta Limestone (Karl and others, 1999). The pods are up to 2 feet long, 1 foot thick, and are mainly of fine grained pyrite with sphalerite and minor galena. The sulfides also occur in a network of thin veinlets that cut the limestone in an area about 10 feet in diameter. A 0.5-foot sample across one of the pods contained 8.1 percent zinc, and 3,646 parts per million (ppm) lead. A sample across 2.1 feet of the sulfide veinlets in the limestone contained 1.3 percent zinc and 476 ppm lead. The highest gold value in the samples Still and others (2002) collected was 19 parts per billion; the highest silver value was 2.6 ppm.

**Alteration:**

**Age of mineralization:**

Silurian or younger based on the age of the Heceta Limestone that hosts the mineralization.

**Deposit model:**

Pb-Zn sulfide pods in limestone.

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

**Production Status:** None

**Site Status:** Probably inactive

**Workings/exploration:**

Only sampling by government engineers and geologists.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D. J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): Unnamed (at head of Mosman Inlet)

**Site type:**

**ARDF no.:** PE117

**Latitude:** 56.1453 **Quadrangle:** PE A-2

**Longitude:** 132.5823

**Location description and accuracy:**
This occurrence is at the head of Mosman Inlet about 0.5 mile southeast of triangulation station 'Moss. It is near the center of section 16, T. 66 S., R. 83 E.

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:**

**Ore minerals:** Chalcopyrite, magnetite, pyrite, sphalerite

**Gangue minerals:** Calcite, garnet

**Geologic description:**
This occurrence was first reported by Pittman (1962) as a 3-feet-wide calcite vein exposed for about 10 feet on the beach and below the high-tide line. The vein has abundant garnet, chalcopyrite, pyrite, and light colored sphalerite. A sample across the vein contained 9.5 percent zinc, 0.13 percent copper, 0.41 ounce of silver per ton, and traces of gold and lead. Still and others (2002) examined the area but did not find Pittman's vein. They did find a zone of tactite with calcite, garnet, magnetite, calc-silicate minerals, and chalcopyrite. The tactite is 0.1 to 0.7 foot thick and 3 feet long in a cliff near tidewater. Samples across the tactite contained up to 1,482 parts per billion gold, 35.4 parts per million (ppm) silver, 3,635 ppm copper, and 585 ppm zinc. The area is at or near the contact of Tertiary granite with Triassic and Cretaceous greenstone and Mesozoic or Paleozoic metasedimentary and metavolcanic rocks (Karl and others, 1999).

**Alteration:**
Occurrence at least in part is a contact metamorphic assemblage with sulfides.

**Age of mineralization:**

**Deposit model:**
A calcite vein and/or tactite with silver, gold copper, and zinc minerals.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
Apparently only sampling by government engineers and geologists.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Pitman, 1962; Karl and others, 1999; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

# Site name(s): North Silver North

**Site type:** Prospect

**ARDF no.:** PE118

**Latitude:** 56.5239 **Quadrangle:** PE C-1

**Longitude:** 132.0436

**Location description and accuracy:**

The North Silver North prospect is about 0.6 mile west of Mount Waters and about 0.4 mile east of the center of section 6, T. 62 S., R. 85 E. The workings are in an area about 400 feet wide and 1,000 feet in length; the location is at about the center of the main exposures of the mineralization. The location is accurate and a map of the workings is Figure 27 of Still and others (2002).

**Commodities:**

**Main:** Ag, Pb, Zn

**Other:**

**Ore minerals:** Galena, pyrite, sphalerite

**Gangue minerals:** Quartz

**Geologic description:**

The rocks in the prospect area are part of a belt of Mesozoic or Paleozoic sedimentary and volcanic rocks that have been metamorphosed to schist and gneiss. The belt is about 1 1/2 mile wide and strikes northwest (Brew, 1997; George and Wyckoff, 1973). The metamorphic rocks are bounded on the east by a thick, regionally extensive, 60 to 70 Ma tonalite sill and on the west by a 90 Ma granodiorite pluton (Brew, 1997 Still and others, 2002). The metamorphic rocks at the prospect include several prominent thin marble layers and a quartzite layer. On the north side of Groundhog Basin about two miles to the southwest, the metamorphic rocks are intruded by a 16.3 Ma biotite 'tin' granite pluton. The granite is probably the source of the numerous rhyolite dikes and sills that extend from it and the mineralization in the area (Newberry and Brew, 1989).

In the late 1950's, Moneta Porcupine Company staked claims in the area but subsequently dropped them William Huff and James Fucas continued work in the area and Huff discovered the North Silver North prospect in 1963. Their claims were optioned by the Bunker Hill Mining Company in 1965 and they drilled 7 holes, 85 to 224 feet deep, and blasted several pits. Bunker Hill dropped the claims at the end of the field season and the property was optioned by a succession of companies --Humble Oil and Refining Company, El Paso Natural Gas Company and AMAX Exploration Inc.--through 1981. Still and others (2002) sampled the prospect during a Bureau of Land Management mineral assessment of the area.

The North Silver North prospect is associated with crosscutting, northeast trending, steeply dipping fault zones that are associated with irregular sulfide-bearing veins and lenses of quartz with sulfides. The quartz veins and lenses make up less than 10 percent of the faults (Still and others, 2002) To the east, the veins extend into limestone beds up to 30 feet thick that contain replacement deposits.

The two most prominent veins are along the Bear and Camp faults which approach to within 80 feet of each other (Still and others, 2002). The Black Bear vein can be traced for about 1,000 feet and consists of scattered lenses of quartz with pyrite, sphalerite, and galena. The best mineralization exposed on the surface of the Black Bear vein was about 4 feet thick and a sample contained 39.1 parts per million (ppm) silver, 3.3 percent lead, and 2.39 percent zinc. A 1-foot sample collected nearby contained 92 ppm silver, 9.9 percent lead, and 4.1 percent zinc. Several drill holes on the vein cut mineralization with lesser values at depth. The Camp vein is about 0.2 to 4 feet thick and can be traced for about 350 feet. It consists of scattered quartz lenses with pyrite, sphalerite, and galena. The best mineralization exposed at the surface is about 0.4 feet thick and a sample across it contained 119.32 ppm silver. 48.61 percent lead, and 3.6 percent zinc. Two marble beds 4 to 50 feet thick can be traced for several thousand feet. Irregular bands and lenses of disseminated to massive pyrite, sphalerite, and galena are scattered along the marble for about 600 feet. The individual bands and lenses are 0.5 to 9 feet thick and extend from 3 to 100 feet. The best mineralization was a 6-foot-thick layer that contained 58 ppm silver, 5,114 ppm lead, and 12,758 ppm zinc.

**Alteration:**
None specifically noted.

**Age of mineralization:**
Probably related to a nearby 16.3 Ma biotite granite pluton.

**Deposit model:**
Scattered Ag-Pb-Zn quartz veins and lenses along fault zones and Ag-Pb-Zn replacement deposits in marble.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
In the late 1950's, Moneta Porcupine Company staked claims in the area but subsequently dropped them. William Huff and James Fucas continued work in the area and Huff discovered the North Silver North prospect in 1963. Their claims were optioned by the Bunker Hill Mining Company in 1965 and they drilled 7 holes, 85 to 224 feet deep, and blasted several pits. Bunker Hill dropped the claims at the end of the field season and the property was optioned by a succession of companies --Humble Oil and Refining Company, El Paso Natural Gas Company and AMAX Exploration Inc.--through 1981. Still and others (2002) sampled the prospect during a Bureau of Land Management mineral assessment of the area.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
George and Wyckoff, 1973; Newberry and Brew, 1989; Brew, 1997 (OF 97-156-H); Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Nelson and Tift

**Site type:** Mine

**ARDF no.:** PR005

**Latitude:** 54.8017 **Quadrangle:** PR D-6

**Longitude:** 131.9743

**Location description and accuracy:**
The Nelson and Tift Mine is on the north shore of McLean Arm, 0.8 mile west of Island Point at the entrance to the arm; it is in Sec. 33, T. 81 S., R. 90 E., of the Copper River Meridian. The location is accurate and the mine is shown by symbol on the current US Geological Survey 1:63,360-scale topographic map.

**Commodities:**

**Main:** Ag, Au, Cu, Pb

**Other:**

**Ore minerals:** Bornite, chalcopyrite, galena?, gold, magnetite, pyrite

**Gangue minerals:** Calc-silicate minerals, quartz

**Geologic description:**
The Nelson and Tift Mine was unusual in that it was found by two prospectors, mostly mined by them at low cost, and returned a profit with little legal or operational complications (Wilcox, 1937; Roehm, 1939, Roehm, 1942,; Roppel, 2005) . The deposit was found in 1935 by two fishermen, Otto Nelson and R.C. Tiff along the exposed shoreline in an area that previously had been prospected for many years. A 2,150-pound test shipment was sent to the Tacoma smelter and assayed 0.785 ounce of gold per ton. Nelson and Tift then proceeded to mine in a pit just above sea level with a small compressor and jackhammer and sent a 50-ton ore shipment to the smelter in 1936. They then leased the property to the Anaconda Copper Company who mined for a year, periodically sending out barges of sulfide rich ore that proved to be worth $50 to $770 a ton. Anaconda drilled four holes on the deposit and concluded that while rich, it was small. At the end of the year, the property reverted to Nelson and Tift who continued to mine. In 1938, they shipped 1,076 tons of ore to the smelter with a return of $34,000 in gold and silver. A small floatation mill was set up to concentrate the sulfides in the ore and a search continued into the 40's for more mineralization with no success. Nelson reported that about 1,300 tons of ore was mined and that the total return was about $111,000 in gold and silver with some copper and lead.

The rocks in the area of the Nelson and Tift mine (MacKevett, 1963, pl. 1) consist of a Cretaceous quartz diorite stock; thin roof pendants of Devonian(?) marble and calc-silicate rock; and numerous Tertiary andesite or dacite dikes that cut both the stock and the roof pendants.

The deposit (MacKevett, 1963, p. 99-100) consisted of a sulfide lens 75 feet long, 30 feet deep, and 9 feet wide, in a steeply dipping, 20- to 40-ft wide roof pendant of marble that has been intruded by quartz diorite. Near the intrusive contacts, parts of the pendant have been converted to calc-hornfels. The ore consisted largely of auriferous pyrite, accompanied by small amounts of chalcopyrite and bornite. A few pyrite-bearing quartz veins up to 6 inches thick that cut the pendant contain gold. Pyrite and a little magnetite are disseminated in parts of the marble.

**Alteration:**

**Age of mineralization:**
Probably Cretaceous or younger.

**Deposit model:**
Au skarn (Cox and Singer, 1986; model 18b).

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

**Production Status:** Yes; small

**Site Status:** Inactive

**Workings/exploration:**
The Nelson and Tift Mine was unusual in that it was found by two prospectors, mostly mined by them at low cost, and returned a profit with little legal or operational complications (Wilcox, 1937; Roehm, 1939, Roehm, 1942,; Roppel, 2005) . The deposit was found in 1935 by two fishermen, Otto Nelson and R.C. Tiff along the exposed shoreline in an area that previously had been prospected for many years. A 2,150-pound test shipment was sent to the Tacoma smelter and assayed 0.785 ounce of gold per ton. Nelson and Tift then proceeded to mine in a pit just above sea level with a small compressor and jackhammer and sent a 50-ton ore shipment to the smelter in 1936. They then leased the property to the Anaconda Copper Company who mined for a year, periodically sending out barges of sulfide rich ore that proved to be worth $50 to $770 a ton. Anaconda drilled four holes on the deposit and concluded that while rich, it was small. At the end of the year, the property reverted to Nelson and Tift who continued to mine it. In 1938, they shipped 1,076 tons of ore to the smelter with a return of $34,000 in gold and silver. A small floatation mill was set up to concentrate the sulfides in the ore and a search continued into the 40's for more mineralization with no success.

**Production notes:**
Nelson (Roehm, 1942) reported that about 1,300 tons of ore was mined and the total return was about $111,000 in gold and silver with some copper and lead.

**Reserves:**
The ore body was apparently mined out.

**Additional comments:**

**References:**
Wilcox, 1937; Roehm, 1939; Roehm, 1942; MacKevett, 1963; Cobb and Elliott, 1980; Roppel, 2005.

**Primary reference:** MacKevett, 1963

**Reporter(s):** H.C. Berg (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Wallace

**Site type:** Prospect

**ARDF no.:** RM025

**Latitude:** 61.0559

**Quadrangle:** RM A-3

**Longitude:** 159.9280

**Location description and accuracy:**

The Wallace prospect is on the crest of the ridge along the northwest side of lower California Creek near its junction with the Tuluksak River. It is at an elevation of about 1,000 feet about 0.2 mile southeast of the center of section 9, T. 11 N., R. 60 W., of the Seward Meridian. It is accurately located.

**Commodities:**

**Main:** Au

**Other:** Bi, Cu, Te, Zn

**Ore minerals:** Chalcopyrite, gold, pyrrhotite, sphalerite, tellurobismuthite, tetradymite

**Gangue minerals:** Calcite, chlorite, quartz

**Geologic description:**

In 1945, R. E. Wallace of the U.S. Geological Survey discovered free gold in quartz veins cutting a granitic dike at this site. He described the deposit in unpublished notes and memoranda and the U.S. Geological Survey announced the discovery in a press release on August 4, 1945. The steeply dipping or vertical, granitic dike is about 40 feet wide and trends N 20 E, subparallel to the ridge. Wallace traced it along strike for about 300 feet. He noted that quartz veinlets were localized in the southeastern half of the dike and that the gold occupied open spaces in the interior of the veinlets. He collected two samples. One contained 0.59 ounce of gold per ton and the other 1.3 ounces of gold per ton. The gold was associated with a slightly more abundant, soft (hardness of 2 to 3), silvery-white mineral with laminar cleavage. This mineral was tentatively identified as a telluride. Limonite and traces of sphalerite, chlorite, and amphibole were also present in the veins. The dike, which may be an apophysis of a nearby mid-Cretaceous pluton, intrudes Jurassic volcanic rocks (Box and others, 1993).

Frost (1990) described gold- and pyrite-bearing quartz veins at this site as cutting sericitized andesite and volcaniclastic hornfels. The veins are vuggy and contain euhedral quartz prisms extending into open spaces. Other gangue minerals in the iron oxide-stained veins are commonly calcite and sprays of chlorite. A sample from a quartz vein contained 4.5 parts per million (ppm) gold (Frost, 1990, sample locality 3). Bedrock in the area includes thermally metamorphosed Jurassic volcanic or volcaniclastic rocks and a small granitic stock or dike (Box and others, 1993).

Wenz (2004, 2005) reported tellurobismuthite , gold, tetradymite, and very minor amounts of chalcopyrite in quartz veins at the Wallace prospect. Alteration was not present next to the veins.

In 2005, Tonogold Resources, Inc. negotiated a mining lease agreement with Calista Corporation covering the general Nyac area. They completed detailed soil geochemical surveys in several areas including the Wallace prospect in the summer of 2005. A rock chip sample from the Wallace prospect contained 7.2 ppm gold. Strachan (2005) shows a map of soil sample sites in the general area of the Wallace prospect; several samples contained a few hundred parts per billion gold.

Tonogold (2007) drilled two holes on the Wallace prospect in the summer of 2006 and did considerable trenching Both holes cut quartz-calcite-pyrrhotite-chalcopyrite veins at depth that are unlike other mineralization in the area. The veins are in Jurassic andesitic volcanic rocks and have narrow chalcedonic envelopes surrounded by wide propylitic zones.

**Alteration:**
Chalcedonic and propylitic.

**Age of mineralization:**
Cretaceous or Tertiary. The gold-bearing quartz veins crosscut a granitic dike that may be mid-Cretaceous in age. The dike intrudes Jurassic volcanic rocks.

**Deposit model:**
Au-Bi-Te veins; pyrrhotite-chalcopyrite-pyrite veins.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
As of 2005, Tonogold Resources, Inc. has a mining lease agreement with Calista Corporation covering the general Nyac area. They completed detailed soil geochemical surveys in several areas including the Wallace prospect in the summer of 2005. Strachan (2005) shows a map of soil sample sites in the general area of the Wallace prospect; two or three samples contained a few hundred parts per billion gold. Tonogold drilled two holes on the Wallace prospect in 2006 and did considerable trenching.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Frost, 1990; Box and others, 1993; Wenz, 2004; Wenz, 2005; Strachan, 2005; Tonogold Resources, Inc., 2006.

**Primary reference:** Wenz, 2005; this record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/07

## Site name(s): Tuluksak River

**Site type:** Mine

**ARDF no.:** RM028

**Latitude:** 61.0039 **Quadrangle:** RM A-3

**Longitude:** 159.9304

**Location description and accuracy:**

The Tuluksak River has been almost continuously mined by dredge and mechanized equipment for more than 8 miles downstream from the mouth of California Creek to about a mile upstream from the mouth of Granite Creek. Somewhat arbitrarily, the coordinates for the mine are placed near the center of the mining on the river near Nyac, which was the location of the headquarters town of the New York-Alaska Company that mined the Tuluksak River for many years and remains the headquarters camp for current mining. The town is in the northwest corner of section 33, T. 11 N., R. 60 W. The mine is locality 17 of Hoare and Cobb (1972, 1977).

**Commodities:**

**Main:** Au

**Other:** Pt

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**

Gold was first discovered in the Nyac district on Bear Creek (RM032)-- a tributary of the Tuluksak River--near the mouth of Bonanza Creek in 1907 or 1908 and soon after gold was discovered on the Tuluksak River. Dredging began on the Tuluksak River in 1936 and for many years the mining in the district, which was mainly on the Tuluksak River, was carried out by the New York-Alaska Company and its successor the New York-Alaska Gold Dredging Company. The company built a company town, Nyac and an extensive physical plant and community facilities including a hydroelectric power station to power the dredges, the town, and other mining in the district. In 1965, the property was taken over by the Tuluksak Dredging Company and since 1990, the Nyac Mining Company has been actively mining in the area under an agreement with the Calista Native Corporation, which now owns most of the placer claims in the district.

Parts from a small wood-hulled dredge that had operated on Bear Creek between 1928 and 1935 were used to build a steel-hulled dredge on the Tuluksak River in 1936. In 1937, another steel-hulled dredge was built and began mining (Mining World, 1941). Dredging continued in the 1960's by the New York-Alaska Dredging Company. There has also been extensive mechanized mining using draglines, tractors, and non-floating washing plants over the years along the Tuluksak. As of 2006, the Tuluksak River is marked by dredge tailings a thousand feet or more wide that extend almost continuously from the mouth of California Creek to about five miles below Nyac. In recent years, there apparently has been little mining along the Tuluksak River itself. However in the early 1980's, Tuluksak Dredging and Northland Dredging rebuilt the steel-hulled dredge about 5 miles downstream from Nyac; they operated it for a year or more until they shut down as a result of a water-quality dispute. There apparently is no public record of it but the conventional wisdom in 2006 among those familiar with the district was that Northland Dredging had drilled out reserves that contained--still contain?-- about 37,000 ounces of gold in the vicinity of their dredge above the mouth of Granite Creek (D.J. Grybeck, conversations with miners and knowledgeable individuals during field work, 2006).

There is no public record of the production specifically from the Tuluksak River. But the district produced a minimum of 600,000 ounces of gold (Calista Corp, 2008), all from placers, and a large part of that,

perhaps more than half, came from the Tuluksak River judging on the extent of the tailings.
Joesting (1942) reported that some platinum was produced with the gold and that asbestos and graphite were dredged from bedrock. There is no evidence that a any significant amount of platinum was produced. Inquiries in 2006 about platinum ( D.J. Grybeck, conversations with local miners) at best indicated a vague knowledge that someone may have found some platinum in the gold placers but it has not been a component of placer concentrates in recent years.
Most of the rocks in the drainage basin of the Tuluksak River are hornfelsed or metamorphosed Jurassic volcanic and sedimentary rocks cut by mid-Cretaceous granitic plutons and Jurassic gabbro (Box and others, 1993; Wenz, 2005).

**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; medium

**Site Status:** Undetermined

**Workings/exploration:**
Gold was first discovered in the Nyac district on Bear Creek (RM032)-- a tributary of the Tuluksak River--near the mouth of Bonanza Creek in 1907 or 1908 and soon after gold was discovered on the Tuluksak River. Dredging began on the Tuluksak River in 1936 and for many years the mining in the district, which was mainly on the Tuluksak River, was carried out by the New York-Alaska Company and its successor the New York-Alaska Gold Dredging Company. The company built a company town, Nyac and an extensive physical plant and community facilities including a hydroelectric power station to power the dredges, the town, and other mining in the district. In 1965, the property was taken over by the Tuluksak Dredging Company and since 1990, the Nyac Mining Company has been actively mining in the area under an agreement with the Calista Native Corporation, which now owns most of the placer claims in the district.
Parts from a small wood-hulled dredge that had operated on Bear Creek between 1928 and 1935 were used to build a steel-hulled dredge on the Tuluksak River in 1936. In 1937, another steel-hulled dredge was built and began mining (Mining World, 1941). Dredging continued in the 1960's by the New York-Alaska Dredging Company. There has also been extensive mechanized mining using draglines, tractors, and non-floating washing plants over the years along the Tuluksak. As of 2006, the Tuluksak River is marked by dredge tailings a thousand feet or more wide that extend almost continuously from the mouth of California Creek to about five miles below Nyac. In recent years, there apparently has been little mining along the Tuluksak River itself. However in the early 1980's, Tuluksak Dredging and Northland Dredging rebuilt the steel-hulled dredge about 5 miles downstream from Nyac; they operated it for a year or more until they shut down as a result of a water-quality dispute.

**Production notes:**
There is no public record of the production specifically from the Tuluksak River. But the district produced a minimum of 600,000 ounces of gold (Calista Corp, 2008), all from placers, and a large part of that,
perhaps more than half, came from the Tuluksak River judging on the extent of the tailings.
Joesting (1942) reported that some platinum was produced with the gold and that asbestos and graphite were dredged from bedrock. There is no evidence that a any significant amount of platinum was produced. Inquiries in 2006 about platinum ( D.J. Grybeck, conversations with local miners) at best indicated a vague knowledge that someone may have found some platinum in the gold placers but it has not been a component of placer concentrates in recent years.

**Reserves:**

There apparently is no public record of it but the conventional wisdom in 2006 among those familiar with the district was that Northland Dredging had drilled out reserves that contained--still contain?-- about 37,000 ounces of gold in the vicinity of their dredge above the mouth of Granite Creek (D.J. Grybeck, conversations with miners and knowledgeable individuals during field work, 2006).

**Additional comments:**

**References:**

Maddren, 1915; Mining World, 1941; Joesting, 1942 (ATDM Pamph. 1); Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993; Wenz, 2005; Calista Corporation, 2008.

**Primary reference:** Hoare and Cobb, 1977

**Reporter(s):** Travis L. Hudson (Applied Geology) and Madelyn A. Millholland (Millholland & Associates); D. J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Saddle Mountain

**Site type:** Prospect

**ARDF no.:** RM030

**Latitude:** 61.0988 **Quadrangle:** RM A-3

**Longitude:** 159.7782

**Location description and accuracy:**

This prospect is at an elevation of about 2,440 feet on the crest of a ridge east of upper Bonanza Creek. It is about 0.5 mile south-southwest of hill 2765 and about 0.3 mile east-southeast of the center of sec. 29, T. 12 N., R. 59 W., of the Seward Meridian. It is locality 2 of Frost (1990); the location is accurate.

**Commodities:**

**Main:** Au

**Other:** Cu

**Ore minerals:** Chalcopyrite, gold, magnetite, pyrite

**Gangue minerals:** Calcite, chalcedony, chlorite, quartz

**Geologic description:**

Frost (1990) describes gold- and pyrite-bearing quartz veins cutting sericitized andesite and volcaniclastic hornfels at this site. The veins are vuggy and contain euhedral quartz prisms extending into open spaces. The other common gangue minerals in the iron-oxide stained veins are calcite and chlorite. A quartz vein at this prospect contained 20 parts per million (ppm) gold (Frost, 1990, sample locality 2). The rocks in the area include thermally metamorphosed Jurassic volcanic or volcaniclastic rocks near the contact with a small granitic stock (Box and others, 1993). The thermal metamorphism is caused by a large mid-Cretaceous granitic pluton exposed to the the north in the headwaters of the Tuluksak River.

Wenz (2004, 2005) describes both high and low temperature mineralization at this prospect. Quartz-chlorite-calcite veins with magnetite, chalcopyrite, and native gold are part of the higher temperature suite. Fluid inclusions in these veins have first homogenization temperatures of 282 to 557 degrees centigrade and salinities of 17 to 57 weight percent NaCl. Samples of this mineralization contain up to 10.9 ppm gold. The lower temperature mineralization includes vuggy chalcedony-bearing veins that are known to contain up to 723 parts per billion (ppb) gold, 9.88 ppm silver, and 280 ppb mercury. Sericite-altered dikes and carbonate-replaced fault breccia are also considered part of the lower temperature mineralization. Altered fault breccia contains up to 15.1 ppm gold and 1.6 ppm mercury.

In 2005, Tonogold Resources, Inc. (2006) negotiated a mining lease agreement with Calista Corporation covering the Nyac area. They completed detailed soil geochemical surveys in several areas including this prospect in the summer of 2005. Strachan (2005) shows a map of soil samples in the area of this prospect. He reported that 58 of 518 surface samples contained 0.105 to 2.86 ppm gold. Seven rock chip samples contained 0.121 to 15.1 ppm gold.

In 2006, Tonogold (2007) expanded their geochemical coverage of the area considerably, did surface mapping and sampling, and cut several trenches. Some outcrop and float samples which had visible gold contained more than 1,000 ppm gold. Wenz (2004, 2005) also maps a large area of gaudy, orange-weathering altered volcanic rocks with anomalous gold values in the flat saddle between this prospect and hill 2046 to the southeast and on the hillside between that saddle and this prospect.

**Alteration:**

Silicification, sericitization, and carbonate replacement.

**Age of mineralization:**
Wenz (2004) reports Ar-Ar ages of 113 +/- 1 Ma of intrusive rocks near this prospect.

**Deposit model:**
Au-Bi-Te veins.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
In 2005, Tonogold Resources, Inc. (2006) negotiated a mining lease agreement with Calista Corporation covering the Nyac area. They completed detailed soil geochemical surveys in several areas including this prospect in the summer of 2005. In 2006, they markedly expanded the soil survey around this propect, mapped the surface in the vicinity, and cut several trenches.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Frost, 1990; Box and others, 1993; Wenz, 2004; Wenz, 2005; Strachan, 2005; Tonogold Resources, Inc., 2006; Tonogold Resources, Inc., 2007.

**Primary reference:** Wenz, 2005; this record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/8/07

## Site name(s): Bonanza Creek

**Site type:** Mine

**ARDF no.:** RM031

**Latitude:** 61.0704 **Quadrangle:** RM A-3

**Longitude:** 159.7587

**Location description and accuracy:**
Bonanza Creek is a southeast-flowing. tributary to upper Bear Creek. The coordinates are at about the center of the tailings on lower Bonanza Creek in about the center of section 4, T. 11 N., R. 59 W., of the Seward Meridian.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
Most of the early placer mining on Bonanza Creek was near the mouth of the creek where it cuts through bench and flood-plain deposits of Bear Creek (Maddren, (1915). It is not well documented but there was some mechanized mining for about a half mile up from the mouth of the creek in the 1980's or 1990's (?) based on the presence of tailings, the abandoned heavy equipment, and a small camp in the NW1/4 of section 4 ( D.J. Grybeck, field work, 2006). There does not appear to be any significant dredging on Bonanza Creek above its mouth. In 2006, the local miners considered upper Bonanza Creek as too deep and wet to placer mine (personal communications to D.J. Grybeck, 2006).
The bedrock on Bonanza Creek includes granitic rock with malchite-bearing quartz stringers (Maddren, 1915) , but most of the bedrock in the Bonanza Creek drainage is Jurassic volcanic rocks locally intruded and thermally metamorphosed by mid-Cretaceous granitic rocks (Box and others, 1993; Wenz, 2005).

**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:**
There was at least some mining near the mouth of Bonanza Creek prior to 1915. There was also considerable mechanized mining for about a half mile above its mouth in the 1980's or 1990's (?) but apparently

there has been no significant dredging on Bonanza Creek.

**Production notes:**
Some unrecorded production into the 1990's but probably not large.

**Reserves:**

**Additional comments:**

**References:**
Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993; Wenz, 2005.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology) and Madelyn A. Millholland (Millholland & Associates); D. J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Bear Creek

**Site type:** Mine

**ARDF no.:** RM032

**Latitude:** 61.0513 **Quadrangle:** RM A-3

**Longitude:** 159.7887

**Location description and accuracy:**

Bear Creek is a large, northeast headwater tributary to the Tuluksak River. Bear Creek has been mined extensively by dredge and mechanized equipment for about 7 miles from about 2 miles above the mouth of Bonanza Creek, downstream to just below the mouth of Shamrock Creek. The coordinates are at about the midpoint of the productive part of the creek, about 0.5 mile south of the center of section 8, T. 11 N., R. 59 W. This is locality 20 of Hoare and Cobb (1972, 1977).

**Commodities:**

**Main:** Au

**Other:** Hg, Pt

**Ore minerals:** Cinnabar, gold, platinum

**Gangue minerals:**

**Geologic description:**

Gold was first discovered in the Nyac district on Bear Creek near the mouth of Bonanza Creek in 1907 or 1908 (Maddren (1915; Mining World, 1941) and gold was discovered soon after on the Tuluksak River (RM028). For many years thereafter the mining in the district, including on Bear Creek, was carried out by the New York-Alaska Company and its successor the New York Gold Dredging Company, which built a company town at Nyac on the Tuluksak River. In 1990, Nyac Mining Company began mining in the area, primarily on Spruce Creek and Bear Creek under an agreement with the Calista Native Corporation which owns most of the placer claims in the district.

A small wood-hulled dredge mined on Bear Creek from 1926 to 1936 when its parts were used to build another dredge on the Tuluksak River (Mining World, 1941). Another steel-hulled dredge operated from at least 1973(?) to 1991 on upper Bear Creek; it mined to about a mile above the mouth of Bonanza Creek where it remained in 2006 (Bundtzen and others, 1991; Tom Ratledge, personal communication, 2006). In addition to dredging there has been extensive mining using various mechanized equipment from soon after gold was discovered to as late as 2004 or 2005. In many places the workings extend for a thousand feet or more across the creek. A year or more prior to 2006, the Nyac Mining Company mined a cut with mechanized equipment about 2 miles above the mouth of Bonanza Creek; the area has now been reclaimed (D.J. Grybeck, personal observation, 2006).

There seems to be little indication of mining on Bear Creek from below the mouth of Shamrock Creek to the Tuluksak River. The reasons are unclear and several explanations are currently held among the miners in the area (D.J. Grybeck, personal conversations during field work, 2006). One is that the area was drilled and the gold values were not encouraging; another is that the ground is too deep and/or too wet to dredge.

Production figures are not available for the long history of mining on Bear Creek but the district as a whole has produced more than 600,000 ounces of gold and a significant portion of that came from Bear Creek (Calista Corporation, 2008).

Joesting (1942) reported that some platinum was produced with the gold and that asbestos and graphite were dredged from bedrock. There is little evidence that a significant amount of platinum was produced. Cinnabar is common in placer concentrates from Bear Creek (JIm Anderson, personal communication, 2006) and quartz veins with cinnabar that cut boulders can be found in the tailings along Bear Creek

(Melanie Werdon, personal communication, 2006).

Most of the rocks in the drainage basin of Bear Creek are hornfelsed or regionally metamorphosed Jurassic volcanic and sedimentary rocks cut by mid-Cretaceous granitic plutons and Jurassic gabbro (Box and others, 1993; Wenz, 2005).

**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; medium

**Site Status:** Active

**Workings/exploration:**

Gold was first discovered in the Nyac district on Bear Creek near the mouth of Bonanza Creek in 1907 or 1908 (Maddren (1915; Mining World, 1941) and gold was discovered soon after on the Tuluksak River (RM028). For many years thereafter the mining in the district, including on Bear Creek, was carried out by the New York-Alaska Company and its successor the New York Gold Dredging Company, which built a company town at Nyac on the Tuluksak River. In 1990, Nyac Mining Company began mining in the area, primarily on Spruce Creek and Bear Creek under an agreement with the Calista Native Corporation which owns most of the placer claims in the district.

A small wood-hulled dredge mined on Bear Creek from 1926 to 1936 when its parts were used to build another dredge on the Tuluksak River (Mining World, 1941). Another steel-hulled dredge operated from at least 1973(?) to 1991 on upper Bear Creek; it mined to about a mile above the mouth of Bonanza Creek where it remained in 2006 (Bundtzen and others, 1991; Tom Ratledge, personal communication, 2006). In addition to dredging there has been extensive mining using various mechanized equipment from soon after gold was discovered to as late as 2004 or 2005. In many places the workings extend for a thousand feet or more across the creek. A year or more prior to 2006, the Nyac Mining Company mined a cut with mechanized equipment about 2 miles above the mouth of Bonanza Creek; the area has now been reclaimed (D.J. Grybeck, personal observation, 2006).

There seems to be little indication of mining on Bear Creek from below the mouth of Shamrock Creek to the Tuluksak River. The reasons are unclear and several explanations are currently held among the miners in the area (D.J. Grybeck, personal conversations during field work, 2006). One is that the area was drilled and the gold values were not encouraging; another is that the ground is too deep and/or too wet to dredge.

**Production notes:**

Production figures are not available for the long history of mining on Bear Creek but the district as a whole has more than 600,000 ounces of gold; a significant portion of that came from Bear Creek (Calista, 2008).

**Reserves:**

None a matter of public record but some gold probably remains to be mined.

**Additional comments:**

**References:**

Maddren, 1915; Mining World, 1941; Joesting, 1942 (ATDM Pamph. 1); Hoare and Cobb, 1972; Hoare and Cobb, 1977; Bundtzen and others, 1991; Box and others, 1993; Wenz, 2005; Calista Corporation, 2008.

**Primary reference:** Maddren, 1915

**Reporter(s):** Travis L. Hudson (Applied Geology) and Madelyn A. Millholland (Millholland & Associates); D. J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

## Site name(s): Spruce Creek

**Site type:** Mine

**ARDF no.:** RM033

**Latitude:** 61.0671 **Quadrangle:** RM A-3

**Longitude:** 159.7804

**Location description and accuracy:**
The location of Spruce Creek is probably incorrect on the USGS 1:63,360 topographic map. It is probably the first creek southwest of Bonanza Creek (RM031); both are east-flowing tributaries of upper Bear Creek. In 2006, the local miners place Spruce Creek in sections 5 and 8, T. 11 N., R. 59 W., of the Seward Meridian (D.J. Grybeck, field work and discussions with miners in the area, 2006).

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
Early reports indicated that the lower part of Spruce Creek was placer mined where it crosses bench deposits along Bear Creek. As described by Maddren (1915), gravel deposits at the mouth of the creek are as much as 400 feet thick. Gravels along the active drainage are 20 to 30 feet thick 1,500 feet upstream of the mouth, and the headwaters of the creek cut into bedrock. Where the alluvial deposits are 20 to 30 feet thick, they consist of 2 to 4 feet of muck, 2 to 3 feet of coarse gravel with boulders as much as 1 foot in diameter, 1 to 1.5 feet of blue clay, and brown sandy and pebbly clay to bedrock. Most of the gold occurred in the blue and brown pebbly clays and on bedrock. Some of the gold was coarse and attached to quartz. Maddren (1915) thought that the gold could have been derived from the contact zone around an intrusion at the head of the creek. Bedrock in the Spruce Creek drainage includes thermally metamorphosed Jurassic volcanic rocks developed around a mid-Cretaceous granitic stock (Box and others, 1993; Wenz, 2005).

The location of the Spruce Creek that Maddren (1915) described is somewhat uncertain. The Spruce Creek labeled on the current USGS 1:63,360-scale topographic map is not in the same location as the Spruce Creek known to the miners working in the area in 2006. The Spruce Creek on the topographic map is generally parallel to and about two miles to the southwest of Bonanza Creek. The local miners consider Spruce Creek to be the creek generally parallel to and about 1 mile southwest of Bonanza Creek in sections 5 and 8.

In the late 1990's Nyac Mining Company mined extensively on the Spruce Creek about a mile southwest of Bonanza Creek and produced a minimum of 25,000 ounces of gold (Wenz, 2005). The area has now been reclaimed. It is uncertain whether the mining prior to 1915 was on the Spruce Creek as labeled on the current topographic maps or on the parallel nearby creek about a mile southwest of Bonanza Creek that was mined by Nyac Mining Company in the 1990's.

**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:**
Open-cut placer mining took place along lower Spruce Creek until about 1920. Some of this work included a 280-foot long, 15- to 20-foot wide, and 10-foot-deep trench built as a bedrock drain. In the 1990's, Nyac Mining Company mined extensively on Spruce Creek from surface cuts. (But see the location and geologic description for the uncertainty of the location of Spruce Creek.)

**Production notes:**
In the 1990's, Nyac Mining Company produced a minimum of 25,000 ounces of gold from Spruce Creek. (But see the location and geologic description for the uncertainty of the location of Spruce Creek.)

**Reserves:**

**Additional comments:**

**References:**
Maddren, 1915; Hoare and Cobb, 1972; Hoare and Cobb, 1977; Box and others, 1993; Wenz, 2005.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology) and Madelyn A. Millholland (Millholland & Associates); D. J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Pipe

**Site type:** Prospect

**ARDF no.:** RM035

**Latitude:** 61.0764 **Quadrangle:** RM A-3

**Longitude:** 159.8952

**Location description and accuracy:**
This prospect is on the east flank of the ridge on the west side of California Creek. It is about 0.4 mile northeast of the center of section 3, T. 11 N., R. 60 W. The prospect occupies most of this NE1/4 section.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
Tonogold Resources, Inc. (2006) has a mining lease agreement with Calista Corporation covering the Nyac area, which includes this prospect. They completed detailed soil geochemical surveys in several areas in 2005 and the Pipe prospect was identified by that survey (Strachan, 2005). The rocks in the area are Jurassic sedimentary rocks but a Jurassic pluton intrudes them immediately to the east (Box and others, 1993, Wenz, 2004, 2005).

**Alteration:**

**Age of mineralization:**
Probably mid-Cretaceous as at the Bonanza Ridge prospect (RM037).

**Deposit model:**
Low-sulfide Au-Bi-Te-quartz veins.

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

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**
The Pipe prospect was identified by a soil sample survey completed by Tonogold Resources, Inc. in the summer of 2005 (Strachan, 2005).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Box and others, 1993; Wenz, 2004; Wenz, 2005; Strachan, 2005; Tonogold Resources, Inc., 2006.

**Primary reference:** Strachan, 2005

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/8/07

# Site name(s): Rocky Ridge

**Site type:** Prospect

**ARDF no.:** RM036

**Latitude:** 61.0753 **Quadrangle:** RM A-3

**Longitude:** 159.8733

**Location description and accuracy:**
The Rocky Ridge prospect is on the ridge between Rocky Creek and California Creek, about 1.0 mile southwest of triangulation station Bonanza. It is about 0.2 mile north of the center of section 2, T. 11 N., R. 60 W. The location is accurate.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
The Rocky Ridge prospect is an area of anomalous soil and rock samples on the ridge between Rocky Creek and California Creek. Bedrock in the area is Jurassic sedimentary and volcanic rocks (Box and others, 1993; Wenz, 2004, 2005; Strachan, 2005). Tonogold Resources, Inc. (2006) has a mining lease agreement with Calista Corporation covering the Nyac area. They completed detailed soil geochemical surveys in several areas including this prospect in the summer of 2005. Strachan (2005) shows a map of soil sample sites in the area of this prospect; several samples contain several hundred parts per billion gold.

**Alteration:**

**Age of mineralization:**
Probably mid-Cretaceous as at the Bonanza Ridge prospect (RM037).

**Deposit model:**
Low-sulfide Au-Bi-Te-quartz veins.

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

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**
Tonogold Resources, Inc. has a mining lease agreement with Calista Corporation covering the Nyac area (http://www.tonogold.com/s/Nyac.asp; Apr. 2006). They completed detailed soil geochemical surveys in several areas including this prospect in the summer of 2005 and 2006.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Box and others, 1993; Wenz, 2004; Wenz, 2005; Strachan, 2005; Tonogold Resources, Inc., 2006.

**Primary reference:** Strachan, 2005

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/8/07

# Site name(s): Bonanza Ridge

**Site type:** Prospect

**ARDF no.:** RM037

**Latitude:** 61.0729 **Quadrangle:** RM A-3

**Longitude:** 159.8453

**Location description and accuracy:**

This prospect about a half mile east of the head of Rocky Creek in the Nyac district. It is at an elevation of about 2650 feet, about 0.3 mile southwest of triangulation station Bonanza near the center of section 1, T. 11 N., R. 60 W. The location is accurate.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Bismuthinite, chalcopyrite, gold, magnetite, molybdenite, pyrite

**Gangue minerals:** Carbonate, chlorite, quartz, sericite

**Geologic description:**

At this prospect, gold-bearing quartz veins cut granitic rocks of the Bonanza pluton (Wenz, 2004, 2005). The Bonanza pluton is a composite intrusion; it has a margin of diorite, quartz diorite, tonalite, and monzodiorite around a core of granodiorite and granite. Mafic minerals make up 10 to 25 percent of the intrusive; they include biotite, hornblende, and minor pyroxene. The more mafic parts of the pluton can have up to one percent apatite. Argon-argon radiometric ages reported by Wenz (2004. 2005) for this pluton are 109 +/- 1 Ma, 113 +/- 0.4 Ma, and 113 +/- 1 Ma.

As described by Wenz, quartz veining makes up to one to two percent of the more strongly mineralized rocks. Potassic alteration includes narrow K-feldspar-bearing selvages along barren quartz veins. Gold-bearing veins with sericite-chlorite-carbonate alteration overprint the potassic alteration. Ore minerals in the gold-bearing veins include pyrite, chalcopyrite, magnetite, bismuthinite, molybdenite, and native gold; pyrite and chalcopyrite are the most abundant. The highest gold value reported by Wenz 2004, 2005) is 20.8 parts per million (ppm). Both bismuth and tellurium correlate closely with gold. Primary fluid inclusions indicate a wide range of homogenization temperatures of from 221 to 486 degrees centigrade and the salinities vary from 21.3 to 54.7 weight percent NaCl.

Tonogold Resources, Inc. has a mining lease agreement with Calista Corporation covering the Nyac area (Tonogold Resources, Inc., 2006). They completed detailed soil geochemical surveys in several areas including this prospect in the summer of 2005. Tonogold reported that 58 of 518 surface samples contained 0.105 to 2.86 ppm gold. Seven rock chip samples contained 0.121 to 15.1 ppm gold. There is a strong correlation of bismuth and gold values in these samples. Arsenic values are low.

Tonogold (2007) drilled 4 holes at the Bonanza prospect in the summer of 2006. The drilling encountered a series of quartz-calcite-pyrite-chalcopyrite veinlets associated with an aplite dike in sericitically-altered granodiorite. The alteration increases downward in each of the holes. Numerous veinlets and mineralized fractures were cut; there were several 2-meter intercepts with up to 1.0 gram of gold per ton and the best intercept was 0.6 meter with 8.6 gram of gold per ton.

**Alteration:**

The gold-bearing quartz veins are accompanied by envelopes of sericite-chlorite-carbonate alteration. These veins and alteration overprint earlier quartz veins with some narrow K-feldspar-bearing alteration selvages.

**Age of mineralization:**
The Bonanza pluton that hosts the deposit is 109 to 113 Ma (Wenz, 2004. 2005). Wenz also reports a Ar-Ar age of 111 +/- 1 Ma for muscovite from a gold-bearing quartz vein in the Bonanza pluton.

**Deposit model:**
Low-sulfide Au-Bi-Te-quartz veins.

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

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**
Tonogold Resources, Inc. has a mining lease agreement with Calista Corporation covering the Nyac area. They completed detailed soil geochemical surveys in several areas including this prospect in the summer of 2005. Tonogold drilled 4 holes on this prospect in 2006.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
Wenz, 2004; Strachan, 2005; Wenz, 2005; Tonogold Resources, Inc., 2006; Tonogold Resources, Inc., 2007.

**Primary reference:** Wenz, 2005; this record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/07

## Site name(s): Shamrock Head

**Site type:** Prospect

**ARDF no.:** RM038

**Latitude:** 61.0650 **Quadrangle:** RM A-3

**Longitude:** 159.8508

**Location description and accuracy:**

The Shamrock Head prospect is a drill site at an elevation of about 2,240 feet on a west-trending ridge about 1.0 mile south of triangulation station Bonanza. There are several other drill sites about a half mile to the west along Rocky Creek. The geochemical anomaly that defines this prospect extends west for about 1,500 feet and east for about a mile. The prospect is about 0.5 mile north-northwest of the center of section 12, T. 11 S., R. 60 W. The location is accurate.

**Commodities:**

**Main:** As, Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**

The Shamrock Head prospect is outlined by a soil-geochemistry survey completed for Tonogold Resources, Inc. during the summer of 2005 (Strachan, 2005). Several samples contained a few hundred to several hundred parts per billion gold. The anomalous samples suggest a general east-west trend to the mineralized zone. At this prospect elevated arsenic correlates with gold in contrast to the high bismuth as at the Bonanza Ridge prospect about one mile to the north (RM037). Arsenic values in soils reach 1,390 parts per million. The rocks in the prospect area consist of Jurassic volcanic and intrusive rocks (Box and others, 1993; Wenz, 2004, 2005).

Tonogold (2007) drilled two holes at an elevation of about 2,240 feet on a west-trending ridge about 1 mile south of triangulation station Bonanza and three holes along Rocky Creek to the west.

**Alteration:**

**Age of mineralization:**

Probably mid-Cretaceous as at the Bonanza Ridge prospect (RM New A1014).

**Deposit model:**

Low-sulfide Au-Bi-Te-quartz veins.

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

**Production Status:** No

**Site Status:** Active

**Workings/exploration:**

The Shamrock Head prospect is defined by a soil geochemistry survey completed by Tonogold Resources, Inc. during the summer of 2005 (Strachan, 2005). Five holes were drilled on this prospect in 2006.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Box and others, 1993; Wenz, 2004; Wenz, 2005; Strachan, 2005; Tonogold Resources, Inc., 2006.

**Primary reference:** Strachan, 2005

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/8/07

# Site name(s): Shamrock Creek

**Site type:** Mine

**ARDF no.:** RM039

**Latitude:** 61.0364 **Quadrangle:** RM

**Longitude:** 159.8621

**Location description and accuracy:**
Shamrock Creek is a south-flowing tributary to Bear Creek in the Nyac area. The coordinates are at about the center of the area that was drilled in 2005 and 2006; the site is about 0.6 mile northeast of section 23, T. 11 N., R. 60 W. It is unclear how much of the creek will be mined but the drilling continued for about 0.8 mile above and below this point on the creek. Mining began near the upper end of the drilling in August 2006 but more drilling is likely or has already been done above the mining. The location is accurate.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
There apparently is no public record of early mining or even prospecting on Shamrock Creek although it probably was at least prospected in view of the rich placers nearby that have been known for many years (D. J. Grybeck, personal observation, 2006). Nyac Mining Company mined a cut near the mouth of Shamrock Creek a few years prior to 2006. In 2005 and 2006, they churn drilled rows of holes across the creek from near its mouth to the northeast corner of section 14, i.e., about 1.6 miles above its mouth. The drill results were encouraging and in August, 2006, they began mining with mechanized equipment about 1.6 miles above the mouth of the creek and continued churn drilling above that. The gravel is fairly thin but contains much clay and Nyac Mining Company built a new washing plant in 2006 to deal with the clay.

**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:** Yes

**Site Status:** Active

**Workings/exploration:**
There apparently is no public record of early mining or even prospecting on Shamrock Creek although it probably was at least prospected in view of the rich placers nearby that have been known for many years (D.

J. Grybeck, personal observation, 2006). Nyac Mining Company mined a cut near the mouth of Shamrock Creek a few years prior to 2006. In 2005 and 2006, they churn drilled rows of holes across the creek from near its mouth to the northeast corner of section 14, i.e., about 1.6 miles above its mouth. The drill results were encouraging and in August, 2006, they began mining with mechanized equipment about 1.6 miles above the mouth of the creek and continued churn drilling above that. The gravel is fairly thin but contains much clay and Nyac Mining Company built a new washing plant in 2006 to deal with the clay.

**Production notes:**
Mining began in August 2006.

**Reserves:**
Unknown.

**Additional comments:**

**References:**
This record.

**Primary reference:** This record

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA).

**Last report date:** March 4, 2008

# Site name(s): Unnamed (near Pinta Point)

**Site type:** Occurrence

**ARDF no.:** SD070

**Latitude:** 57.0981 **Quadrangle:** SD A-6

**Longitude:** 133.8839

**Location description and accuracy:**

This occurrence is along about 500 feet of the shoreline just east of Pinta Point on the northern tip of Kupreanof Island. It is near the northeast corner of section 24, T. 85 S., R. 72 E. The location is accurate.

**Commodities:**

**Main:** Au, Cu, Zn

**Other:**

**Ore minerals:** Chalcopyrite, pyrite, pyrrhotite, sphalerite.

**Gangue minerals:**

**Geologic description:**

This occurrence was discovered and first described by Still and others (2002) as part of a Bureau of Land Management mineral assessment. The rocks at the occurrence consist of siliceous, dark gray, well-foliated graphitic schist that is tightly folded and multiply deformed. Nearby, the unit includes limestone, chert, felsic schist, and greenstone; Brew and others (1984) mapped it as metamorphosed Stephens Passage Group of late Mesozoic age.

The schist near Pinta Point contains finely disseminated sulfides and sulfide-rich layers for about 500 feet of shoreline. The sulfides locally make up as much as 30 percent of the schist in layers up to 1 foot thick. One 15-foot-thick layer consists of about 10 percent sulfides across its entire width. The sulfides are mainly pyrite and pyrrhotite with minor sphalerite and chalcopyrite. A representative sample across 11 feet of the 15-foot-thick layer contained 43 parts per billion gold, 143 parts per million (ppm) copper, and 624 ppm zinc.

**Alteration:**

**Age of mineralization:**

Probably contemporaneous with the Upper Mesozoic host rock.

**Deposit model:**

Sulfides in layers and disseminations in schist; possibly a volcanogenic massive sulfide deposit.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**

Only sampling by government geologists who first discovered the occurrences in the late 1990's.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Brew and others, 1984; Still and others, 2002.

**Primary reference:** Still and others, 2002

**Reporter(s):** D.J. Grybeck (Port Ludlow, WA)

**Last report date:** 4/8/2007

## Site name(s): Big Hurrah

**Site type:** Mine

**ARDF no.:** SO023

**Latitude:** 64.6514 **Quadrangle:** SO C-5

**Longitude:** 164.2398

**Location description and accuracy:**

The Big Hurrah mine is located on the south side of Big Hurrah Creek (SO022) and the east side of Little Hurrah Creek at an elevation of about 275 feet. It is about 1/4 mile southeast of the confluence of Little and Big Hurrah creeks. It is locality 17 of Cobb (1972, MF 445; 1978, OF 78-181).

**Commodities:**

**Main:** Au

**Other:** Ag, Cu, W, Zn

**Ore minerals:** Arsenopyrite, chalcopyrite, electrum, gold, pyrite, scheelite, sphalerite

**Gangue minerals:** Albite, carbonate, quartz, sericite

**Geologic description:**

The Big Hurrah mine has been the most productive lode gold mine on the Seward Peninsula to date. Gold-quartz veins in slaty graphitic schist produced about 27,000 ounces of gold (Read and Meinert, 1986) primarily between 1903 and 1907, when a 20-stamp mill was in operation (Smith, 1910). The ore that was mined averaged a little less than 1 ounce of gold per ton (Cobb, 1978); six samples collected underground in 1952 from the 70 foot level contained 0.08 to 5.2 ounces of gold per ton and 0.5 to 17.2 ounces of silver per ton (Asher, 1969). The mill tailings were cyanided and there were attempts to restart underground mining in the 1950's. A fire and unstable ground prevented further underground work and all workings are now (2007) flooded. However, considerable core drilling and surface trenching has taken place in recent years, primarily in the 1980s.

NovaGold Resources, Inc. (2006) acquired the Big Hurrah deposit in mid-2004. In 2004 and 2005, they drilled a total of 17,750 meters in 292 core and rotary holes. The objective was to define an open-pittable resource of 100,000 to 200,000 ounces of gold in ore that contains 5 to 7 grams of gold per ton. Production of this resource is being evaluated as part of the Rock Creek (NM207) feasibility study. In this scenario, the Big Hurrah ore would be trucked 48 miles to the proposed Rock Creek mill for processing. As of March 28, 2007, NovaGold (2007) listed a measured and indicated resource in the Big Hurrah mine as 1.8 millions tons of ore with a grade of 4.61 grams of gold per metric ton; there was an additional inferred resource of 0.6 million tons of material with a grade of 3.05 grams of gold per metric ton.

Read and Meinert (1986) describe five types of veins: 1) quartz +/- carbonate lenses, 2 to 7 centimeters thick, locally contain minor sphalerite, chlorite and arsenopyrite; 2) quartz, carbonate, pyrite, sphalerite and chalcopyrite form tabular veins 2 to 5 millimeters thick; 3) ribbon quartz veins up to 4 meters wide that average about 0.5 meters wide occupy NW-trending faults and contain more than 90 percent quartz, dolomite, albite, sericite, scheelite, arsenopyrite, pyrite and native gold; the total sulfide content is less than 2 to 3 percent and scheelite is less than 1 percent; 4) quartz-albite +/- arsenopyrite veins 5 to 25 centimeters wide contain up to 25 percent albite, up to 20 percent arsenopyrite and minor gold; thought to be syngenetic; 5) post-mineralization carbonate-quartz veinlets 2 to 3 millimeters thick that cut all other vein types. Coats (1944) estimated that the scheelite content of gold ore that remained in the bins was 0.25 percent by volume. Some veins are up to several hundred feet long; the larger veins strike northwest and dip southwest (Asher, 1969, DGGS R33). Fluid inclusion data from these veins indicate multiple generations of fluids; early veins contain $CO_2$-$CH_4$ and later veins are rich in $H_2O$-NaCl. Homogenization temperatures vary from 390 to 90 degrees C. The available data suggests that the gold-bearing fluids were produced by regional metamorphic processes. The country rock is part of a lower Paleozoic metasedimentary assemblage (Sainsbury and others, 1972; Till and others, 1986) that includes a distinctive black, very fine-grained, graphitic schist that early workers called the Hurrah Slate.

The Big Hurrah veins are probably similar in age to some other gold-quartz veins of southern Seward Peninsula. The other southern Seward Peninsula lode gold deposits formed as a result of mid-Cretaceous metamorphism (Apodoca, 1994; Ford, 1993, Ford and Snee, 1996; Goldfarb and others, 1997) that accompanied regional extension (Miller and Hudson, 1991) and crustal melting (Hudson, 1994). This higher temperature metamorphism was superimposed on high pressure/low temperature metamorphic rocks of the region.

**Alteration:**

Silicification, carbonatization, and development of quartz-carbonate stockworks.

**Age of mineralization:**

Cretaceous?

**Deposit model:**

Gold-quartz vein in metamorphic rocks; 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:** Yes; small

**Site Status:** Active

**Workings/exploration:**

A 60-degree inclined shaft extended to the 250 foot level; there are about 1,800 feet of lateral workings developed off it on the 70, 150, and 250 foot-levels. In 1954, a 105-foot-long sublevel was driven at 20 feet below the 150-East level (Asher, 1969, DGGS R33). There are also numerous surface prospecting pits and trenches on the property.

NovaGold Resources, Inc. acquired the Big Hurrah deposit in mid-2004. In 2004 and 2005, they drilled a total of 17,750 meters in 292 core and rotary holes. The objective is to define an open-pittable resource of 100,000 to 200,000 ounces of gold in ore that contains 5 to 7 grams of gold per ton. Production of this resource is being evaluated as part of the Rock Creek (NM207) feasibility study. In this scenario, the Big Hurrah ore would be trucked 48 miles to the proposed Rock Creek mill for processing.

**Production notes:**

The Big Hurrah mine is the only lode gold mine on Seward Peninsula. The gold-quartz veins in slaty graphitic schist produced about 27,000 ounces of gold (Read and Meinert, 1986), primarily between 1903 and 1907, when a 20-stamp mill was in operation (Smith, 1910).

**Reserves:**

As of March 28, 2007, NovaGold (2007) listed a measured and indicated resource in the Big Hurrah mine as 1.8 millions tons of ore with a grade of 4.61 grams of gold per metric ton; there was an additional inferred resource of 0.6 milllion tons of material with a grade of 3.05 grams of gold per metric ton.

**Additional comments:**

**References:**

Smith, 1910; Coats, 1944; Asher, 1969 (DGGS R33); Sainsbury and others, 1972 (OFR 511); Cobb, 1972 (MF 445); Cobb, 1978 (OF 78-181); Till and others, 1986; Read and Meinert, 1986; Miller and Hudson, 1991; Ford, 1993; Apodoca, 1994; Hudson, 1994; Ford and Snee, 1996; Goldfarb and others, 1997; NovaGold Resources Inc., 2006 (Rock Creek); NovaGold Resources Inc., 2007 (Reserve).

**Primary reference:** Read and Meinert, 1986

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

## Site name(s): Sun; Picnic Creek; Hot

**Site type:** Prospects

**ARDF no.:** SP039

**Latitude:** 67.0704 **Quadrangle:** SP A-5

**Longitude:** 155.0431

**Location description and accuracy:**

This site represents several prospects in an approximately 12-square-mile area northeast of Beaver Creek. The coordinates are for the center of the area in the SE1/4 of sec. 1, T. 19 N., R. 17 E., of the Kateel River Meridian. The location is accurate to within 2000 ft. The site corresponds to localities 68 and 69 of Grybeck and Nelson (1981).

**Commodities:**

**Main:** Ag, Au, Cu, Pb, Zn

**Other:**

**Ore minerals:** Arsenopyrite, bornite, chalcopyrite, enargite, galena, sphalerite

**Gangue minerals:** Actinolite, barite, cymrite, ferroan calcite, ferroan dolomite, ferrostilpnomelane, muscovite, quartz, tremolite

**Geologic description:**

The Sun deposit consists of stratiform, banded, massive to semi-massive sulfides in a series of elongate, southwest-plunging, lenticular bodies along three distinct mineral horizons. An upper horizon is silver, lead, and zinc rich, a middle horizon is copper rich, and a lower horizon is copper and zinc rich. According to Zdepski (1980), the Sun prospect is in a 5,000-foot-thick sequence of Devonian felsic to andesitic volcanic, volcaniclastic and intercalated pelitic sedimentary rocks separated into upper and lower units by calcareous metabasite beds of variable thickness. The upper unit of metarhyolite and related rocks contains all of the identified massive sulfides; the lower unit is dominantly pelitic schist and metarhyolite.

As described by Andover Ventures (2008, Sun), the Sun deposit was found in the mid-1970's by Sunshine Mining Company and has been variously studied by Anaconda Minerals, Noranda Mining, and Teck Cominco. The Sun deposit consists of 13 SUN claims and 12 HOT claims and has been extensively drilled. As of June 2007, Andover has staked 68, 160-acre claims adjacent to the Sun deposit and drilled 20 holes in 2007 (Andover Ventures, 2007, Andover-Sun; 2008, Sun). The results for 13 of the holes have been released. Some notable intercepts include: 10.94 meters of 2.34 percent copper, 0.77 percent lead, 5.98 percent zinc, 68.1 grams of silver per ton, and 0.266 gram of gram of gold per ton; 5.08 meters with 4.34 percent copper, 0.58 percent lead, 2.76 percent zinc, 99.1 grams of silver per ton, and 0.199 gram of gold per ton; 37.01 meters of 1.17 percent copper, 1.85 percent lead, 7.26 percent zinc, 44.0 grams of silver per ton and 0.179 gram of gold per ton; and 11.0 meters of 1.07 percent copper, 5.38 percent lead, 16.54 percent zinc, 88.6 grams of silver per ton, and 0.210 gram of gold per ton.

Andover Ventures (2008, Sun) cites a 1976 Anaconda report that the main Sun deposit contains 12,500,000 tons of inferred resources with a grade of 1.8 percent copper, 5.3 percent zinc, 2.6 ounces per ton of silver, and 1.8 percent lead. Andover also cites a 1977, Anaconda preliminary feasibility study that gives the 'inferred resources' amenable to open-pit mining at SUN as: 1) 2,399,000 tons with a grade of 1.93 percent copper, 4.51 percent zinc, 2.39 ounces of silver per ton, and 1.20 percent lead , and 2) 17,891,000 tons of material with a grade of 1.91 percent copper, 4.46 percent zinc, 2.37 ounces of silver per ton, and 1.18 percent lead.

**Alteration:**

**Age of mineralization:**
Devonian, based on radiometric and fossil determinations.

**Deposit model:**
Kuroko massive sulfide (Cox and Singer, 1986; model 28a).

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**
Andover Ventures (2008, Sun) cites a 1976 Anaconda report that the main Sun deposit contains 12,500,000 tons of inferred resources with a grade of 1.8 percent copper, 5.3 percent zinc, 2.6 ounces per ton of silver, and 1.8 percent lead. Andover also cites a 1977, Anaconda preliminary feasibility study that gives the 'inferred resources' amenable to open-pit mining at SUN as: 1) 2,399,000 tons with a grade of 1.93 percent copper, 4.51 percent zinc, 2.39 ounces of silver per ton, and 1.20 percent lead, and 2) 17,891,000 tons of material with a grade of 1.91 percent copper, 4.46 percent zinc, 2.37 ounces of silver per ton, and 1.18 percent lead.

**Production notes:**

**Reserves:**
Andover Ventures (2008) cites a 1976 Anaconda report that the main Sun deposit contains 12,500,000 tons of ore with a grade of 1.8 percent copper, 5.3 percent zinc, 2.6 ounces per ton of silver, and 1.8 percent lead in 'inferred resources'. Andover also cites a 1977, Anaconda preliminary feasibility study that gives the 'inferred resources' at SUN as: 1) 2,399,000 tons of material with a grade of 1.93 percent copper, 4.51 percent zinc, 2.39 ounces of silver per ton, and 1.20 percent lead that can be mined from an open pit , and 2) 17,891,000 tons of material with a grade of 1.91 percent copper, 4.46 percent zinc, 2.37 ounces of silver per ton, and 1.18 percent lead.

**Additional comments:**

**References:**
Garland and others, 1975 (ADGGS OFR 67); Sicherman, Russel, and Fikkan, 1976; Marrs, 1978; Smith and others, 1977; Smith and others, 1979; Zpedski, 1980; Grybeck and Nelson, 1981; Andover Ventures, Inc., 2007 (Andover-Sun); Andover Ventures 2008 (Sun).

**Primary reference:** Zpedski, 1980; Andover Ventures, 2008

**Reporter(s):** S.W. Nelson (Anchorage, Alaska); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): Shotgun; Mose

**Site type:** Prospect

**ARDF no.:** TA007

**Latitude:** 60.4095

**Quadrangle:** TA B-6

**Longitude:** 158.1252

**Location description and accuracy:**

The Shotgun prospect is in the southern part of the Shotgun Hills, a rugged. glaciated upland at the head of the King Salmon River. The prospect is near the center of the NW1/4 of section 27, T. 4 N., R. 51 W. of the Seward Meridian. It is on the crest and eastern slope of a northwest-trending ridge at an elevation of about 2,500 feet.

**Commodities:**

**Main:** Au

**Other:** As, Bi, Ce, Cu, T, W, Zn

**Ore minerals:** Arsenopyrite, bismuth, Bi-Te sulfides, chalcocite, chalcopyrite, copper, covellite, gold, lollingite , marcasite, pyrite, pyrrhotite, scheelite, sphalerite

**Gangue minerals:** Albite, carbonate, quartz, sericite, tourmaline

**Geologic description:**

This prospect was discovered in the 1980s during a regional exploration program by Cominco Alaska in a joint venture with ENSTAR. They named this prospect Mose and did surface mapping and sampling, and drilled six shallow diamond drill holes. In the 1990s, ENSTAR's interest was sold to NovaGold Resources Inc., the prospect was renamed Shotgun, and a renewed exploration effort took place. This exploration included extensive diamond drilling in 1998 that included 19 drill holes totaling 10,170 feet (NovaGold Resources Inc., 2000).

TNR Gold Corporation optioned Shotgun (Mose) from NovaGold Resources, Inc. in 2003. A running history of TNR Gold's work to April 2007 can be seen in several news releases and project information at their web site (TNR Gold Corp., 2007). Initial exploration under this agreement was in September 2003 and included surface geologic mapping, and an airborne magnetic survey. TNR Gold Corporation's exploration work during the summer of 2004 included surface geologic mapping, and sampling at Shotgun (Mose) and other prospects including Shot (TA031), King (TA030), and Beats Me (TA029). In the summer of 2005, the TNR Gold Corporation exploration program included drilling 6 holes to further refine and expand the resource at Shotgun (Mose) and evaluate other prospects in the area.

The Shotgun prospect is an intensely quartz-veined, felsic porphyry stock that sharply crosscuts biotite hornfels developed in mid-Cretaceous clastic sedimentary rocks of the Kuskokwim Group (Rombach, 2000). As exposed along the ridge crest and downslope to the east, the stock is an irregularly shaped composite intrusion that is about 1,000 feet long in a northwest direction and over 500 feet long in a northeast direction. The hornfels near the stock and across the ridge crest to the southwest commonly is breccia healed by a toumaline-rich matrix and locally cut by veinlets that contain arsenopyrite, pyrite, and some chalcopyrite. In the stock, some zones near the contact are extensively silicified; quartz replacement is massive and complete in these zones. Elsewhere, the stock is cut by quartz veins that in places form an intense, anastomosing stockwork. Albite-sericite-quartz +/- carbonate replacement of host intrusive rocks accompanies the quartz veining. The deposit is deeply oxidized and iron-staining is widespread. Ore minerals identified at Shotgun include arsenopyrite, primary native gold and bismuth, Bi-Te sulfides, chalcopyrite, lollingite , pyrrhotite, pyrite, scheelite, sphalerite, and supergene covellite, chalcocite, native copper, and marcasite (Rombach, 2000).

Vapor-rich and saline-rich fluid inclusions coexist in the quartz veins. In order of abundance, the vapor-rich inclusions contain water, carbon dioxide, and methane; these inclusions homogenize to vapor at about 360 degrees C. The saline-rich inclusions have salinities of 40 to greater than 60 weight percent NaCl equivalent and homogenize to liquid at 280 to more than 600 degrees C (Rombach, 2000).

Surface rock samples define a large geochemical anomaly with several areas where gold values exceed 1 part per million. Examples of drill hole intercepts include 233 feet grading 0.077 ounce of gold per ton, 399 feet grading 0.050 ounce of gold per ton, and 43 feet grading 0.155 ounce of gold per ton (NovaGold Resources Inc., 2000; all drill hole intercepts are listed online at http://www.nrigold.com/shotgun.htm; Dec 2000). Preliminary metallurgical tests indicate that gold recoveries of more than 93 percent can be achieved using conventional cyanidation. Airborne and ground magnetometer surveys have been used in conjunction with extended mapping and sampling to evaluate the potential for additional mineralization in surrounding areas. As of March 28, 2007, NovaGold Resources, Inc. (2007) reports that the Shotgun prospect has 32.8 million tonnes of resources with a grade of 0.93 gram of gold per ton.

A large granitic pluton makes up the core of the Shotgun Hills. The contact between this pluton and the hornfels that surrounds the Shotgun prospect coincides with a northwest-trending linear swale and drainage less than 0.5 mile north of the prospect. The shallow-seated intrusive environment south of this contact (extensive hornfels locally cut by fine-grained porphyry) compared to that to the north, suggests that this contact is a large fault, dropped down to the south. K/Ar and Ar/Ar dating of intrusive rocks and mineralization in the Shotgun prospect area indicate that magmatism and mineralization is latest Cretaceous in age, about 68 to 70 Ma (Rombach, 2000; Travis Hudson, unpublished data, 2000).

**Alteration:**

Silicification and albite-sericite-quartz +/- carbonate replacement of host intrusive rocks.

**Age of mineralization:**

Latest Cretaceous, 68 to 70 Ma, based on K/Ar and Ar/Ar dating of intrusive rocks and mineralization.

**Deposit model:**

Gold-bearing quartz-stockwork veining in felsic porphyry.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

This prospect was discovered in the 1980s in a regional exploration program by Cominco Alaska in joint venture with ENSTAR. They named this prospect Mose and completed surface mapping, sampling, and the drilling of six shallow diamond drill holes. In the 1990s, ENSTAR's interest was sold to NovaGold Resources Inc., the prospect was renamed Shotgun, and renewed exploration took place. This exploration included extensive new diamond drilling in 1998 that included 19 drill holes totaling 10,170 feet. Airborne and ground magnetometer surveys have been used in conjunction with extended mapping and sampling to evaluate the potential for additional deposits in surrounding areas.

TNR Gold Corporation optioned Shotgun (Mose) from NovaGold Resources, Inc. in 2003. A running history of TNR Gold's work to April 2007 can be seen in several news releases and project information at their web site (TNR Gold Corp., 2007). Initial exploration under this agreement was in September 2003 and included surface geologic mapping and an airborne magnetic survey. TNR Gold Corporation's exploration work during the summer of 2004 included surface geologic mapping and sampling at Shotgun (Mose) and other prospects including Shot (TA031), King (TA030), and Beats Me (TA029). In the summer of 2005, the TNR Gold Corporation exploration program included drilling 6 holes to further refine and expand the resource at Shotgun (Mose) and evaluate other prospects in the area.

**Production notes:**

**Reserves:**

As of March 28, 2007, NovaGold Resources, Inc. (2007) reports the that the Shotgun prospect has 32.8 million tonnes of resources with a grade of 0.93 gram of gold per ton.

**Additional comments:**

**References:**

NovaGold Resources Inc., 2000; Rombach, 2000; NovaGold Resources Inc., 2007 (Reserve); TNR Gold Corporation, 2007.

**Primary reference:** Rombach, 2000

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/10/2007

# Site name(s): Taylor Creek

**Site type:** Mine

**ARDF no.:** TA008

**Latitude:** 60.8741 **Quadrangle:** TA D-4

**Longitude:** 157.3437

**Location description and accuracy:**
Taylor Creek is the main drainage on the southeast side of the Taylor Mountains. Taylor Creek flows east and north from the highest peak (3,581 feet in elevation) for 3.8 miles Gold has been placer mined along at least the upper 3 miles of Taylor Creek, although prospects have been noted as far as 1.5 miles below the mouth of Fork Creek, a south tributary. The location is at the principal mine buildings in the NW1/4 of section 18, T. 9 N., R. 46 W., of the Seward Meridian. This is locality 11 of Cobb (1972 [MF 384]; 1976 [OF 76-606]).

**Commodities:**

**Main:** Au

**Other:** Ag, Hg, Mn, Sn

**Ore minerals:** Cassiterite, cinnabar, gold, pyrite

**Gangue minerals:**

**Geologic description:**
Placer gold mining has taken place along at least the upper 3 miles of Taylor Creek, although prospects have been noted as far as 1.5 miles below the mouth of Fork Creek, a south tributary (Cady and others, 1955, Plate 1). The alluvial gravels are about 10 feet thick, the paystreak is about 250 feet wide, and bedrock is mid-Cretaceous clastic sedimentary rocks of the Kuskokwim Group.
The heavy-mineral concentrates contain cinnabar and cassiterite; pyrite is abundant in concentrates from below the mouth of Fork Creek (Cady and others, 1955, p. 119). Cady and others (1955) reported that the Taylor Creek mine had produced a total of $90,000 worth of gold (about 2,500 ounces), mainly in 1950 and 1951. The mine has been active at different times since Cady and others' report, including small-scale mining and prospecting through the 1990s (M. Henning, personal communication, 2000). The Bureau of Land Management sampled the Taylor Creek placer deposit in 2004 (Ellefson and others, 2005). Two panned-concentrate samples contained 7.66 and 15.2 parts per million (ppm) gold, 0.25 and 0.24 ppm silver, 9.15 and 10.8 ppm mercury, 2280 and 1270 ppm manganese, 19 and 34 ppm tin, and less than 0.01 ppm tantalum.

**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:** Active

**Workings/exploration:**

Placer gold mining has taken place along at least the upper 3 miles of Taylor Creek, although prospects have been noted as far as 1.5 miles below the mouth of Fork Creek, a south tributary (Cady and others, 1955, Plate 1). An airstrip, water ditch, and mine buildings are present. Taylor Creek has been explored for a distance of about 1.5 miles downstream of the mouth of Fork Creek. The mine has been active at different times since Cady and others' report, including small-scale mining and prospecting through the 1990s (M. Henning, oral communication, 2000). Sampled by the Bureau of Land Management in 2004.

**Production notes:**

Cady and others (1955) reported that the Taylor Creek mine had produced a total of $90,000 worth of gold (about 2,500 ounces), mainly in 1950 and 1951. There has been an undocumented amount of production since 1951.

**Reserves:**

**Additional comments:**

**References:**

Cady and others, 1955; Cobb, 1972 (MF 384); Cobb, 1976 (OF 76-606); Ellefson and others, 2005.

**Primary reference:** Cady and others, 1955

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/10/2007

## Site name(s): Sleitat

**Site type:** Prospect

**ARDF no.:** TA010

**Latitude:** 60.0453 **Quadrangle:** TA A-3

**Longitude:** 157.0824

**Location description and accuracy:**

The Sleitat prospect is centered on a saddle at an elevation of 1,725 feet, between the two high peaks of Sleitat Mountain (1,979 and 1,903 feet in elevation). The prospect is near the center of section 31, T. 1 S, R. 45 W. This prospect is accurately located. It is locality 8 of Cobb (1972 [MF 384]; 1976 [OF 76-606]).

**Commodities:**

**Main:** Sn, W

**Other:** Ag, Bi, Cu, Ta, W

**Ore minerals:** Arsenopyrite, bismite, cassiterite, chalcopyrite, ferrotantalite, lollingite , pyrite, sphalerite, stannite, wolframite

**Gangue minerals:** Clay, muscovite, quartz, topaz, tourmaline, zinnwaldite

**Geologic description:**

The occurrence of granite and peripheral gold-bearing quartz gash veins was reported on Sleitat Mountain by Mertie (1938, p. 91), but subsequent exploration has shown that the principal mineral deposit is a tin-, tungsten-, and silver-bearing sheeted greisen system (Farnstrom, 1991; Burleigh, 1991; Hudson and Reed, 1997). The greisen deposit was discovered by a Cominco Alaska regional exploration program in 1983, and subsequently evaluated in the mid-1980s by detailed surface mapping, sampling, and diamond drilling (Farnstrom, 1991).

A composite granite stock that hosts most of the greisen sharply crosscuts and thermally metamorphoses mid-Cretaceous clastic sedimentary rocks of the Kuskokwim Group. The stock has a discontinuous border zone of medium-grained biotite granite and biotite-muscovite granite, and a core of fine-grained zinnwaldite granite. Felsic porphyry dikes crosscut hornfels peripheral to the stock. A K/Ar age of 56.8 +/- 2.8 Ma on muscovite from a late veinlet was reported by Burleigh (1991, p. 6). Greisen sheets trend east-west and are developed within the biotite-muscovite granite, zinnwaldite granite, and hornfels.

The east-west trending cassiterite-bearing greisen zones are nearly vertical quartz-topaz-tourmaline +/- white mica veins and tabular bodies that vary from inches to 20 feet in thickness and coalesce to greater thicknesses in places. They are concentrated in the north half of the stock and in a second zone along the south border that includes some greisen sheets in peripheral hornfels. The individual greisen sheets are granular, massive, separated by less-altered granite, have disseminated clay-lined voids, and have cores that locally contain a few inches of coarse quartz veins carrying high concentrations (50 to 60 percent) of cassiterite (Burleigh, 1991, p. 14). Cassiterite is disseminated in the greisen, concentrated in cores of greisen veins, and in quartz-topaz veins that fill fractures in hornfels. Cassiterite-bearing veins in hornfels are up to 1.5 feet wide and a few hundred feet long. Small amounts of wolframite are disseminated in the greisen but it also occurs with arsenopyrite in quartz veins, especially in hornfels peripheral to greisen zones. Arsenopyrite is common in the greisen and veins. Up to 5 percent lollingite with inclusions of bismite has been identified as disseminations in biotite-muscovite granite (Burleigh, 1991, p. 16). Sphalerite is a minor but common constituent of the greisen and some stannite and chalcopyrite are associated with the sphalerite. One small grain of ferrotantalite was identified during SEM analysis of the greisen (Burleigh, 1991, p. 16). Individual greisen zones locally have high tin grades. For example, one 47.7-foot (true) drill intercept averaged 1.56 percent tin, and included a 5-foot-thick section grading 12.6 percent tin and 5.7 ounces of silver per ton (Farnstrom, 1991; Burleigh, 1991, p. 18).

The Sleitat prospect is a deeply eroded tin-bearing system. The sheeted greisens, particularly those on the north side of the stock, are expected to diminish in size and in intensity of cassiterite mineralization at depth. However, mineralization in the relatively wide hornfels zone on the south side of the stock may indicate that the upper contact of the granite body is not steeply dipping there, or that a mineralizing zinnwaldite granite cupola could be present at depth (Hudson and Reed, 1997, p. 461). Burleigh (1991) showed that much of the eroded tin-bearing material had migrated downslope and along the small streams that head against the lode deposit.

Solomon Resources Ltd. staked 3,520 acres on the Sleitat prospect in the summer of 2005 (Brett Resources Inc., 2006). They subsequently worked out a joint venture agreement with Brett Resources, Inc., and geologic and geochemical field work began in Sept. 2005. In 2005, Brett commissioned a extensive report on the deposit by William T. Ellis (2006) who analyzed and compiled the previous data on the deposit and did some limited verification sampling.

Burleigh (1991) estimated that the Sleitat deposit contained a total of 28.6 million tons of ore with an average grade of 0.37 percent tin, 0.04 percent tungsten and 17 ppm silver. However, Ellis (2006) cautioned that these figures while not necessarily wrong do not meet current industry standards for determining mineral resources.

**Alteration:**

Greisenization, late clay development, oxidation including iron- and scorodite-staining.

**Age of mineralization:**

Early Tertiary. A composite granite stock that hosts most of the greisen sharply crosscuts and thermally metamorphoses mid-Cretaceous clastic sedimentary rocks of the Kuskokwim Group. A K/Ar age of 56.8 +/- 2.8 Ma on muscovite from a late veinlet was reported by Burleigh (1991, p. 6).

**Deposit model:**

Sn greisen deposits (Cox and Singer, 1986; model 15c)

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

15c

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The Sleitat prospect was discovered and explored by Cominco Alaska in the 1980s. This work included detailed surface mapping, sampling, and some diamond drilling (Farnstrom, 1991). In 1989, the U. S. Bureau of Mines conducted additional surface examinations, geochemical sampling, surface magnetometer and radiometric surveys, and a pan concentrate survey in nearby drainages (Burleigh, 1991). Solomon Resources Ltd. staked 3,520 acres on the Sleitat prospect in the summer of 2005. They subsequently worked out a joint venture agreement with Brett Resources, Inc., and geologic and geochemical field work began in Sept. 2005. In 2005, Brett commissioned a extensive report on the deposit by William T. Ellis who analyzed and compiled the previous data on the deposit and did some limited verification sampling.

**Production notes:**

**Reserves:**

Burleigh (1991) estimated that the Sleitat deposit contained a total of 28.6 million tons of ore with an average grade of 0.37 percent tin, 0.04 percent tungsten, and 17 ppm silver. However, Ellis (2006) cautioned that these figures, while not necessarily wrong, do not meet current industry standards for determining mineral resources.

**Additional comments:**

**References:**
Mertie, 1938; Cobb, 1972 (MF 384); Cobb, 1976 (OF 76-606); Menzie and Reed, 1986; Burleigh, 1991; Farnstrom, 1991; Hudson and Reed, 1997; Brett Resources, Inc., 2006; Ellis, 2006.

**Primary reference:** Burleigh, 1991

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/10/2007

# Site name(s): Unnamed (near peaks of Little Taylor Mountains)

**Site type:** Occurrence

**ARDF no.:** TA020

**Latitude:** 60.8494 **Quadrangle:** TA B-6

**Longitude:** 157.1924

**Location description and accuracy:**
This occurrence is on the crest of the Little Taylor Mountains, 3.1 miles southeast of the junction of Fork and Taylor creeks. The occurrence is near peak 2,100 at an elevation of about 2,100 feet, in the SW1/4 of section 24, T. 9 N., R. 45 W., of the Seward Meridian. This occurrence was included under the name 'Little Taylor Mts.' by Cobb (1976 [OF 76-606]).

**Commodities:**

**Main:** Au (?)

**Other:** As, Cu

**Ore minerals:** Arsenopyrite, gold, pyrite

**Gangue minerals:** Quartz, sericite

**Geologic description:**
Several Cretaceous or Tertiary felsic dikes or sills cut mid-Cretaceous clastic sedimentary rocks of the Kuskokwim Group in the higher parts of the Little Taylor Mountains (Cady and others, 1955, p. 71, plates 1 and 6). At a locality a little northwest of the summit of the Little Taylor Mountains, the felsic dikes or sills trend northwest, and dip southwest, parallel to the bedding of the enclosing sedimentary rocks. The felsic intrusions and the enclosing sedimentary rocks are strongly silicified and pyritized. 'Traces of copper' were also noted by Cady and others (1955, p. 122) in the Little Taylor Mountains. In 2005, T. K. Bundtzen (oral communication, 2005) found thin, arsenopyrite-bearing quartz veins in or near felsic intrusives on the southwest flank of the mountains at an elevation of about 1850 in SW1/4 sec 24, T9N, R45W of the Seward Meridian. Gold is not specifically noted but possibly is present, probably in the quartz veins.

**Alteration:**
Silicification, pyritization, and sericitization.

**Age of mineralization:**
Late Cretaceous or early Tertiary, the age of the felsic plutons in southwest Alaska that intrude the mid-Cretaceous clastic sedimentary rocks of the Kuskokwim Group.

**Deposit model:**
Gold(?)-bearing altered felsic intrusive rocks.

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

**Production Status:** None

**Site Status:** Undetermined

**Workings/exploration:**
Only some surface examination and sampling.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Cady and others, 1955; Cobb, 1976 (OF 76-606).

**Primary reference:** Cady and others, 1955

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/10/2007

## Site name(s):  Shot

**Site type:** Prospect

**ARDF no.:** TA021

**Latitude:** 60.3694 **Quadrangle:** TA B-6

**Longitude:** 158.1524

**Location description and accuracy:**

This prospect is in the southern Shotgun Hills near the top of a upland west of the headwaters of an unnamed north tributary to the King Salmon River. It is in the NW1/4, section 9, T. 3 N., R. 51 W. The location is accurate.

**Commodities:**

**Main:** Ag, Au, Sn

**Other:** As, B, Bi, Cu, Hg, Pb, Sb

**Ore minerals:** Arsenopyrite, gold, malachite

**Gangue minerals:** Quartz, tourmaline

**Geologic description:**

Clark and others (1970 [OF 438]) collected rock samples for about 5,000 feet along the crest of this upland. Several of these samples have weakly to strongly anomalous concentrations of silver (to 7 parts per million (ppm)), arsenic, boron, bismuth, copper, lead, antimony, tin, gold (to 0.1 ppm), and mercury. Bedrock is mostly hornfels in mid-Cretaceous clastic sedimentary rocks of the Kuskokwim Group. Clark and others (1970 [OF 438]) describe this hornfels as strongly limonite stained and cut by numerous small quartz veins rarely exceeding 1/8 inch in width. Some of the quartz veins carry minor amounts of arsenopyrite and arsenopyrite is also locally disseminated in the hornfels. Some scorodite and malachite are locally present.

Cominco examined the prospect during a reconnaissance exploration program in the early 1980s (Travis Hudson, personal knowledge, 2005). Felsic intrusives cut hornfels and intense tourmaline alteration is locally developed. Shot was originally considered a tin-silver prospect and stream sediments, panned concentrates, and rock samples do contain anomalous tin values. Rock samples collected during initial exploration contained up to 510 ppb gold. TNR Gold Corporation (2005) was exploring this prospect in 2005 as part of their district exploration program centered on the Shotgun prospect (TA007).

**Alteration:**

Silicification and tourmalinization.

**Age of mineralization:**

Probably Latest Cretaceous, the age of intrusive rocks and mineralization in the similar Shotgun (TA007) prospect nearby.

**Deposit model:**

Quartz veins in hornfels and felsic intrusive rocks; possibly 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:** Active?

**Workings/exploration:**

Originally found during regional mapping by the U.S. Geological Survey in the late 1960's  Examined by Cominco Exploration in 1981 during an initial reconnaissance of the area. TNR Gold Corporation was exploring this prospect in 2005 as part of their district exploration program centered on the Shotgun prospect (TA007).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Clark and others, 1970 (OF 438); TNR Gold Corporation, 2005.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

# Site name(s): Unnamed (in Taylor Mountains)

**Site type:** Occurrence

**ARDF no.:** TA023

**Latitude:** 60.9235 **Quadrangle:** TA D-4

**Longitude:** 157.4491

**Location description and accuracy:**
This occurrence is high in the Taylor Mountains about 1.2 miles west of peak 3581 (the highest peak in the Taylor Mountains) and about 0.1 mile north of elevation 3007. It is about 0.3 mile south of the center of section 28, T. 10 N., R,. 46 W. The location is accurate.

**Commodities:**

**Main:** B

**Other:** As, Cu, U

**Ore minerals:** Tourmaline

**Gangue minerals:** Quartz

**Geologic description:**
Black tourmaline and quartz-tourmaline rock partly to completely replace porphyritic biotite granite of the Cretaceous Taylor Mountains pluton (Travis Hudson, unpublished field data, 2005) Coarse euhedral tourmaline aggregates are well developed along a northwest-trending vertical fracture or fault in the granite. The tourmaline-rich zone is at least several feet wide; float blocks of tourmaline and quartz-tourmaline rock are up to 4 or 5 feet thick. These blocks are scattered on the surface in a line for about one to two hundred feet. The host granite has large euhedral K-feldspar phenocrysts up to 8 to 10 centimeters long in a fine- to medium-grained equigranular groundmass. The Bureau of Land Management sampled this occurrence in 2004 (Ellefson and others, 2005). Two rock samples contained 100 and 300 parts per million (ppm) arsenic, 107 and 106 ppm copper, less than 5 and 15 ppm tin, less than 0.01 tantalum, and 2.96 and 15.3 ppm uranium. These samples contained only 10 and 70 ppm boron and are therefore not representative of the tourmaline-rich rocks at this locality. T. K. Bundtzen (personal communication, 2005 ) also sampled these tourmaline-rich rocks in 2005.

**Alteration:**
Tourmaline and quartz replacement of porphyritic biotite granite.

**Age of mineralization:**
Late Cretaceous, the age of the Taylor Mountains granite pluton.

**Deposit model:**
Tourmaline and quartz-tourmaline replacement in granite.

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**

Only limited surface sampling.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Ellefson and others, 2005.

**Primary reference:** Ellefson and others, 2005

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

# Site name(s): Unnamed (west of upper Taylor Creek)

**Site type:** Mine

**ARDF no.:** TA024

**Latitude:** 60.8720 **Quadrangle:** TA D-4

**Longitude:** 157.4382

**Location description and accuracy:**

This mine is in the headwaters of an unnamed north tributary to Kiknik Creek. A small saddle separates the mine from the headwaters of upper Taylor Creek (TA008) to the east. The mine, which was active as of August 2005, is in the NW1/4, section 16, T. 9 N., R. 46 W. of the Seward Meridian.

**Commodities:**

**Main:** Au

**Other:** Ag, Sn, W

**Ore minerals:** Gold, magnetite, scheelite, wolframite

**Gangue minerals:**

**Geologic description:**

Like Taylor Creek (TA008) to the east, this placer is in a drainage that marks the approximate boundary between hornfels associated with the Taylor Mountain pluton and non-metamorphosed clastic sedimentary rocks of the Kuskokwim Group. Bedrock in the mine area is non-metamorphosed Kuskokwim Group sedimentary rocks. In some recent years to at least 2005, open cut mining has taken place on this creek early in the summer when water is available.

The BLM sampled this deposit in 2004 (Ellefson and others, 2005). Their 2-pan, concentrate sample contained 40 to 60 very fine to fine gold colors. After removal of visible gold, this sample contained 305 parts per million (ppm) gold, 60.1 ppm silver, 267 ppm mercury, 1,660 ppm manganese, 2,350 ppm tin, less than 0.01 ppm tantalum, and 820 ppm tungsten. Two samples of sluice concentrate contained 556 and greater than 1,500 ppm silver, 37.1 and 171 ppm mercury, 5,130 and greater than 10,000 ppm manganese, 1,400 and 2,330 ppm tin, 0.6 ppm tantalum, and 15.7 and 36 percent tungsten. Abundant wolframite with minor magnetite and scheelite were identified in the concentrate samples.

**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:** Active

**Workings/exploration:**

In some recent years to at least 2005, open cut mining has taken place on this creek early in the summer when water is available. The BLM sampled this placer in 2004.

**Production notes:**

In recent years and through 2005, this mine produced a small amount of gold each year. The concentrates also contain some tin and tungsten but neither commodity is recovered or marketed.

**Reserves:**

Unknown but probably some (in 2005).

**Additional comments:**

**References:**

Ellefson and others, 2005.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 4/10/2007

## Site name(s): Unnamed (on Whitewater Creek)

**Site type:** Occurrence

**ARDF no.:** TA025

**Latitude:** 60.8707 **Quadrangle:** TA D-4

**Longitude:** 157.5539

**Location description and accuracy:**
This occurrence is at an elevation of about 500 feet on Whitewater Creek on the south flank of the Taylor Mountains. It is in section 14, T. 9 N., R. 47 W. The location is accurate.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
Whitewater Creek heads in the south contact zone of the Taylor Mountain granite pluton. The bedrock in the area is mostly hornfels developed from graywacke and shale of the Cretaceous Kuskokwim Group (Travis Hudson, unpublished field data, 2005). The Bureau of Land Management sampled the alluvial sediments at this location in the summer of 2004 (Ellefson and others, 2005). A stream-sediment sample contained 1,395 parts per billion gold A two-pan, panned-concentrate sample contained 6 very fine colors of gold. After removing the visible gold, this sample contained 2.25 parts per million (ppm) gold; tin and tantalum were below the detection limits of 5 ppm and 0.01 ppm respectively.

**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:** None

**Site Status:** Inactive

**Workings/exploration:**
The only documented work in this area is reconnaissance sampling by the Bureau of Land Management in the summer of 2004.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Ellefson and others, 2005.

**Primary reference:** Ellefson and others, 2005

**Reporter(s):** Travis Hudson (Applied Geology, Inc.)

**Last report date:** 4/10/2007

# Site name(s): Unnamed (on Kiknik Creek)

**Site type:** Occurrence

**ARDF no.:** TA026

**Latitude:** 60.8549 **Quadrangle:** TA D-5

**Longitude:** 157.5504

**Location description and accuracy:**
Kiknik Creek is the major drainage southwest of the Taylor Mountains. This placer occurrence is on Kiknik Creek at an elevation of about 440 feet. It is about 1.3 miles upstream from the mouth of Whitewater Creek and about 0.5 mile west of the center of section 24, T. 9 N., R. 47 W. The location is accurate.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Gold

**Gangue minerals:**

**Geologic description:**
This placer gold occurrence is in alluvial sediments mostly derived from clastic sedimentary rocks of the Kuskokwim Group in the headwaters of Kiknik Creek. This occurrence is about 1.5 miles downstream of the confluence of Kiknik Creek and an unnamed north tributary with a rich headwater placer (TA024). The Bureau of Land Management collected a stream- sediment sample that contained 0.192 part per million (ppm) gold and a panned-concentrate contained 5.55 ppm gold (Ellefson and others, 2005).

**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:** None

**Site Status:** Inactive

**Workings/exploration:**
The only documented work in this area is reconnaissance sampling by the Bureau of Land Management in the summer of 2004.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

Ellefson and others, 2005.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

# Site name(s): Unnamed (headwaters of the Nushagak River)

**Site type:** Prospect

**ARDF no.:** TA027

**Latitude:** 60.6733 **Quadrangle:** TA C-1

**Longitude:** 156.1333

**Location description and accuracy:**
This prospect is on a ridge north of the head of the Nushagak River. It is at an elevation of about 1,675 feet about 0.4 miles north of the center of section 28, T. 7 N., R. 39 W.

**Commodities:**

**Main:** Au (?)

**Other:**

**Ore minerals:** Gold (?)

**Gangue minerals:** Quartz

**Geologic description:**
Sparse quartz veins up to a few centimeters wide cut graywacke and shale of the Cretaceous Kuskokwim Group at their contact with a granitic intrusion (Travis Hudson, unpublished field data, 2005). A small prospect pit has been dug but it does not expose outcrop. A composite, quartz vein sample was collected in 2005 by the U.S. Geological Survey.

**Alteration:**

**Age of mineralization:**
Late Cretaceous or Early Tertiary; probably related to the adjacent felsic intrusion which cuts the Cretaceous Kuskokwim Group.

**Deposit model:**
Quartz veins in sedimentary rocks at contact with granitic intrusion.

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**
A small prospect pit has been dug on the contact of Kuskokwim Group and granitic rocks at this occurrence; outcrop is not exposed.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**
This record.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

## Site name(s): King

**Site type:** Prospect

**ARDF no.:** TA028

**Latitude:** 60.3319 **Quadrangle:** TA B-6

**Longitude:** 158.1362

**Location description and accuracy:**

The King prospect is in the isolated upland north of the upper King Salmon River, the highest point of which is marked by VABM King. The exact location of the prospect on the upland is unknown and is somewhat arbitrarily plotted at VABM King in the SE1/4, section 21, T. 3 N., R. 51 W. The prospect is probably within a mile of VABM King.

**Commodities:**

**Main:** Au

**Other:** Ag, Sn

**Ore minerals:**

**Gangue minerals:** Quartz, tourmaline

**Geologic description:**

Cominco discovered and explored this prospect during a reconnaissance exploration program in the early 1980s (Travis Hudson, personal knowledge, 2005). The prospect is in an area of hornfels developed from the sedimentary rocks of the Cretaceous Kuskokwim Group. Felsic intrusions cut the hornfels and intense tourmaline alteration is locally developed. The prospect was originally considered to be a silver prospect. However, stream sediments and rock samples contain anomalous tin values and some contain anomalous gold values. TNR Gold Corporation (2005) was exploring this prospect in 2005 as part of their district exploration program centered on the Shotgun prospect (TA007).

**Alteration:**

Silicification and tourmalinization.

**Age of mineralization:**

Probably Latest Cretaceous, the age of intrusive rocks and mineralization in the nearby Shotgun (TA007) prospect area.

**Deposit model:**

Quartz veins in hornfels and felsic intrusive rocks.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

Joe Piekenbrock discovered this prospect in 1981 during an initial reconnaissance of the area for Cominco Exploration. Cominco mapped and sampled the prospect in the early 1980s. TNR Gold Corporation was exploring this prospect in 2005 as part of their district exploration program centered on the Shotgun prospect (TA007).

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

TNR Gold Corporation, 2005.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

# Site name(s): Beats Me; Winchester

**Site type:** Prospect

**ARDF no.:** TA029

**Latitude:** 60.2825 **Quadrangle:** TA B-6

**Longitude:** 158.1023

**Location description and accuracy:**

This prospect is on an upland south of the upper King Salmon River, possibly in section 10 and/or 11, T. 2 N., R. 51 W. The site of this prospect is arbitrarily chosen to be the summit of this upland at elevation 1606; it is probably within a mile of the true location of this prospect.

**Commodities:**

**Main:** Au

**Other:**

**Ore minerals:** Arsenopyrite , gold

**Gangue minerals:** Quartz

**Geologic description:**

Cominco Exploration discovered this prospect in the early 1980s (Travis Hudson, personal knowledge, 2005). It is in an upland area of hornfels developed from sedimentary rocks of the Cretaceous Kuskokwim Group that are cut by felsic dikes. Quartz stockwork veining and arsenopyrite mineralization are locally well-developed. Stream sediments in the area have anomalous gold values and several rock samples contain over 1 part per million gold. TNR Gold Corporation (2005) continued exploration of this prospect and core drilled in the summer of 2005. TNR announced the results of their 2005 drilling in October 2005. The 6 holes totaled 1754.3 feet and most went through medium-grained felsic intrusive rock into sedimentary rocks of the Cretaceous Kuskokwim Group. The felsic intrusive rocks were commonly anomalous in gold associated with arsenic, bismuth, copper, and tungsten. The highest grade interval in the holes was 1.60 grams of gold per ton over 14.3 meters; this included a 2.13 meter interval with 2.93 grams of gold per ton. The holes were drilled on a geochemical anomaly 500 by 1200 in area along the ridge. There is little outcrop in the area. TNR Gold Corporation (2007) drilled 11 more holes in 2006 with emphasis on the Winchester zone where they now have 7 holes along a cross section through the zone and a clearer understanding of the geology of the deposit. The mineralization continues to be associated with light-gray felsic intrusive sills and is not restricted to brecciated zones or veins.

**Alteration:**

Silicification.

**Age of mineralization:**

Probably Latest Cretaceous, the age of intrusive rocks and mineralization in the nearby Shotgun (TA007) prospect.

**Deposit model:**

Arsenopyrite-bearing quartz veins in hornfels and felsic intrusive rocks.

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

The Winchester prospect was mapped and sampled by TNR Gold Corporation in 2005 and 6 holes were drilled that totaled 1754.3 feet. TNR drilled 11 more holes in 2006 with emphasis on the Winchester zone where they now have 7 holes along a cross section through the zone and a clearer understanding of the geology of the deposit.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

TNR Gold Corporation, 2005; TNR Gold Corporation, 2007 (projects).

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

# Site name(s): Kusk; Forlorn Hills

**Site type:** Prospect

**ARDF no.:** TA030

**Latitude:** 60.2695 **Quadrangle:** TA B-5

**Longitude:** 157.7671

**Location description and accuracy:**
This prospect is on an isolated upland south of the middle section of the Salmon River. It is near elevation 2280, about 0.4 mile north of the center of section 15, T. 2 N., R. 49 W.

**Commodities:**

**Main:** Sn

**Other:**

**Ore minerals:** Cassiterite

**Gangue minerals:** Quartz

**Geologic description:**
A zone of surface rubble about 50 feet long and 10 to 15 feet wide is marked by pieces of quartz-veined stockworks and breccia (Travis Hudson, unpublished field data, 2005). The upland in the area consists of hornfels developed in clastic sedimentary rocks of the Cretaceous Kuskokwim Group; porphyroblastic hornfels with cordierite and/or andalusite porphyroblasts is common. Sparse quartz and quartz-tourmaline veining is locally developed. Intrusive rocks are not exposed on hills 2280, 1866, and 1610. Float from a few-centimeter-thick felsic dike was found at an elevation of about 500 feet on the southwest flank of hill 1750. Cominco Exploration identified cassiterite and high-grade tin values in the quartz breccia.

**Alteration:**
Silicification of hornfels.

**Age of mineralization:**
Probably Early Tertiary, the age of the tin mineralization at the nearby Sleitat Mountain prospect (TA010).

**Deposit model:**
Quartz vein breccia in hornfels.

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

**Production Status:** None

**Site Status:** Inactive

**Workings/exploration:**
Surface examination and rock sampling. This prospect was originally discovered by and staked during a reconnaissance exploration program by Cominco Exploration in the early 1980s.

**Production notes:**

**Reserves:**

**Additional comments:**

**References:**

This record.

**Primary reference:** This record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

# Site name(s): Kougarok

**Site type:** Prospect

**ARDF no.:** TE072

**Latitude:** 65.7103 **Quadrangle:** TE C-1

**Longitude:** 165.2289

**Location description and accuracy:**

The Kougarok prospect is a 1.5 square mile area centered 2 miles north of the summit of Kougarok Mountain (2,870 feet elevation), the highest area in the Teller quadrangle outside the York Mountains. The prospect area is on the west flank of the north-south trending ridge crest from near the Kougarok Mountain summit downslope to elevations of about 1,000 feet in the southeast headwaters of Star Creek. Star Creek is a north-flowing headwater tributary to the south fork of the Serpentine River.

**Commodities:**

**Main:** Nb, Sn, Ta

**Other:**

**Ore minerals:** Arsenopyrite, cassiterite, columbite-tantalite, pyrrhotite

**Gangue minerals:** Fluorite, quartz, topaz, tourmaline, white mica

**Geologic description:**

A Late Cretaceous composite granite complex intrudes metapelitic schist in the Kougarok prospect area. The metapelitic schist is a highly deformed mica-quartz schist characterized by isoclinally folded quartz boudins and segregations that may be Precambrian in age (Gardner and Hudson, 1984). It is thermally metamorphosed to biotite-bearing hornfels within several hundred feet of the granite contact. Boron-rich metasomatism has altered metapelitic schist and hornfels to tourmaline-axinite-sulfide rocks throughout the main prospect area.

Most of the granite complex is only present in the subsurface but a few granite dikes and a highly altered plug are exposed at the surface. Diamond drilling shows the subsurface granite to have porphyritic and equigranular phases (Puchner, 1986) . Equigranular leucocratic phases were intruded later than the porphyritic phases and are associated with extensive alteration of the country rocks, exogreisen development in peripheral dikes and plug, and roof greisen development in the subsurface pluton. Local and regional gravity surveys (Puchner, 1986; Barnes and Hudson, 1977) show that the Kougarok granites are part of a much larger batholithic complex at depth. Puchner (1986) reports Rb/Sr and K/Ar data that indicate that the granite and associated mineralized rocks are Late Cretaceous in age (72 +/- 2 and 70.2 +/- 2.2 Ma respectively). These ages are consistent with that of other tin granite complexes on the western Seward Peninsula (Hudson and Arth, 1983).

A greisen-altered granite dike, Chuck's dike, and the Main plug are the principal exogreisen deposits (Puchner, 1984; Apel, 1984). The equigranular zinnwaldite granite dike is offset locally by normal faults and is almost 3,000 feet long in the prospect area (Puchner, 1986, figure 3). This dike dips steeply east, and varies in thickness from one to 15 feet although it commonly is 6 to 8 feet thick. It is variably altered over most of its length but complete greisenization is present at five places at the surface (Puchner, 1986, p. 1787). The longest exposed greisen segment is 500 feet in strike length and greisen development in it continues down dip in the subsurface about 500 feet where it merges with a roof greisen in the subsurface pluton (Puchner, 1986, p. 1786). Tin grades in the Chuck's dike greisen are commonly 1 percent. Two surface trenches and 9 diamond drill holes in this part of the dike indicate a resource of 240,000 tons of 1.3 percent tin ( with a 0.1 percent tin cutoff grade (Puchner, 1984). This resource includes a higher grade portion of 110,000 tons averaging 2.3 percent tin. The Main plug area that is exposed up slope to the east of Chuck's dike at an elevation of about 2,100 feet is a nearly vertical composite intrusive center that is extensively altered and contains two greisen pipes. These pipes, each about 100 feet across at the surface, appear to merge at depth and extend to deep levels in the intrusive center (Puchner, 1986, p. 1786). The Main plug is a complex body but surface trenches and diamond drilling suggest a combined resource of 1.4 million tons averaging 0.45 percent (no cutoff); tantalum and niobium are each present in the 0.1 to 0.03 percent range (Puchner, 1984). A high grade resource within this plug (0.5 percent tin cutoff) is estimated to contain 100,000 tons averaging 2.1 percent tin.

The zinnwaldite granite that forms Chuck's dike at the surface becomes a subhorizontal granite intrusion at depth whose irregular upper part is a greisen (Puchner, 1986, p. 1786). Alteration throughout this intrusion increases upward to quartz-tourmaline-topaz greisen in which tin grades can exceed 1 percent. Limited diamond drilling suggests a resource of 1.3 million tons or more averaging 0.36 percent tin (0.1 percent cutoff) including a portion where 140,000 tons averages 1.0 percent tin (0.5 percent cutoff) (Puchner, 1984). One of the diamond drill intercepts in the roof greisen was 53 feet of 0.23 percent tin (0.1 percent cutoff) including 13 feet of 0.93 percent tin (0.5 percent cutoff). In general, tin grade increases to as much as 3.4 percent upwards through the altered zinnwaldite intrusion to the roof greisen. Upward from the base to the roof greisen, silver increases to 17 parts per million (ppm) and lead to 1,340 ppm; tantalum increases from 20 ppm to as high as 845 ppm from the base to the roof greisen. The zinnwaldite granite contains 1 to 2 percent fluorite and arsenic may be as high as 1,000 ppm locally in the upper part of the intrusion (Puchner, 1986, p. 1791).

Kougarok is a boron-rich tin system characterized by abundant tourmaline and axinite replacement in the host schist and by tourmaline disseminations in altered granite. Its elevated tantalum and niobium, present in discrete tantalite/columbite grains, is also notable.

Anaconda's 1980s exploration showed that parts of the roof greisen and main plug zones contained elevated tantalum contents in the few to several hundred ppm range. (The following information has not previously been made public; it comes from the personal involvement in the work by the compiler, Travis Hudson.) Navigator Exploration Corp. and Chapleau Resources, Ltd. optioned this prospect from Greatland Exploration Ltd. in 2001 and 2002 to evaluate its tantalum potential. This exploration included surface prospecting and sampling, examination and sampling of core from Anaconda's 1980s drilling, analysis of gravity and magnetic data, and drilling of 7 vertical diamond drill holes totaling 2,438.2 m (8,000 feet). Their descriptions follow:

1) Drill hole 2002-1 was located near the summit of Kougarok Mountain (489457 mE, 7284312 mN). This 237.6 m (813 foot) hole encountered a few felsic dikes intruding Kougarok Schist. The highest tantalum value was 32 ppm and the highest tin value was 310 ppm; 2) Drill hole 2002-2 was located near the north end of Chuck's dike and about 650 meters northwest of the main plug (489222 mE, 7287955 mN). This 237.6 meter (780 feet) hole encountered 70.8 meters (232 feet) of zinnwaldite granite with tantalum values to 87 ppm and tin values to 337 ppm; 3) Drill hole 2002-3 was located between 2002-2 and the main plug (489494 mE, 7287718 mN). Its total length was 368.4 meters (1,209 feet) and it encountered 114.4 meters (375 feet) of zinnwaldite granite and related intrusive breccias. The highest tantalum value was 57 ppm and the highest tin value was 408 ppm; 4) Drill hole 2002-4 was located about 40 meters east of the main plug (489683 mE, 7287497 mN). This 328.6 meter (1,078 feet) hole encountered 198 meters (649 feet) of variously altered zinnwaldite granite and related intrusive breccias. Tantalum values reached 353 ppm; one 31.5 meter (103 feet) interval averaged 233 ppm Ta. Tin values reached 3.6 percent.; 5) Drill hole 2002-5 was located about 250 meters east of 2002-4 (389916 mE, 7287460 mN). This 408.6 meter (1,340 foot) hole encountered 172 meters (564 feet) of Kougarok Schist above 237 meters (778 feet) of Paleozoic quartzite and marble. No samples were submitted for assay from this hole.; 6) Drill hole 2002-6 was located on Tourmaline Ridge about 1,200 meters southwest of the main plug and near the south end of Chuck's dike (489453 mE, 7826435 mN). This 473.1 meter (1,552 foot) hole encountered a zone of zinnwaldite granite intrusives between 393 and 470 meters (1,289 and 1,542 feet). The hole bottomed in porphyritic biotite granite. The highest Ta value in the hole was 13 ppm and the highest Sn value was 59 ppm; 7) Drill hole 2002-7 was located about 900 meters (2,950 feet) north of the main plug (489700 mE, 7288447 mN) This 264.6 meter (868 foot) hole encountered several felsic dikes and brecciated intrusives in Kougarok Schist. One dike contained 119 ppm tantalum.

**Alteration:**

Hydrothermal alteration is extensive in the Kougarok prospect area. The country rock metapelitic schist and hornfels is extensively veined and replaced by tourmaline, axinite, and sulfide minerals (dominantly pyrrhotite but including arsenopyrite and chalcopyrite) over a roughly circular area with a diameter of 3,700 feet at the surface and to a depth of almost 800 feet in the area above the zinnwaldite granite and between Chuck's dike and the Main plug (Puchner, 1986). Tin is commonly anomalous in these rocks and in places exceeds 0.1%. Sericite and tourmaline development is ubiquitous in granite intrusions of the prospect area. Puchner (1986) recognizes increasing degrees of alteration from weak sericite-tourmaline replacement to assemblages with increasing zinnwaldite contents to quartz-tourmaline-topaz greisen. Zinnwaldite-rich alteration zones peripheral to roof greisen are common.

**Age of mineralization:**

Late Cretaceous; the radiometric ages referenced by Puchner (1986) include an Rb/Sr age of 72 +/- 2 Ma for porphyritic biotite granite and a K/Ar age of 70.2 +/- 2.6 Ma for zinnwaldite granite from the Main plug.

**Deposit model:**

Tin greisen including exogreisen and endogreisen (roof) deposits (Cox and Singer, 1986, model 15c)

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

15c

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

Surface dozer trenching has been completed on a part of Chuck's dike and in the Main plug area. Twenty nine larger diameter diamond drill holes and 32 smaller diamond drill (Winkie) holes were done in the early 1980's (Puchner, 1984). Most of these have been in the north Chuck's dike and Main plug area.

Anaconda's 1980s exploration showed that parts of the roof greisen and main plug zones contained elevated tantalum contents in the few to several hundred ppm range. Navigator Exploration Corp. and Chapleau Resources, Ltd. optioned this prospect from Greatland Exploration Ltd. in 2001 and 2002 to evaluate its tantalum potential. This exploration included surface prospecting and sampling, examination and sampling of core from Anaconda's 1980s drilling, analysis of gravity and magnetic data, and drilling of 7 vertical diamond drill holes totaling 2,438.2 meters (8,000 feet).

**Production notes:**

**Reserves:**

Preliminary resource estimates have been made for a part of the exogreisen deposit in Chuck's dike, the exogreisen deposit in the Main plug, and the roof greisen in buried zinnwaldite granite (Puchner, 1984). The resource estimate for exogreisen in Chuck's dike is 240,000 tons averaging 1.3 percent tin (including a part that is 110,00 tons averaging 2.3 percent tin). The Main plug exogreisen resource estimate is 1.4 million tons averaging 0.45 percent tin and 0.1 to 0.3 percent of both tantalum and niobium; this includes a part that has 100,000 tons of 2.1 percent tin. The roof greisen estimate is 1.3 million tons of 0.36 percent tin including a part that is 140,000 tons of 1.0 percent tin. Puchner (1984) emphasized that these estimates are preliminary and that more exploration is needed to constrain them. (No reserves have been published from the drilling in 2001 and 2002).

**Additional comments:**

**References:**

Cobb and Sainsbury, 1972; Cobb, 1975 (OF 75-857); Marsh and others, 1972; Barnes and Hudson, 1977; Hudson and Arth, 1983; Apel, 1984; Gardner and Hudson, 1984; Puchner, 1984; Puchner, 1986.

**Primary reference:** Puchner,1984; Puchner, 1986; this record

**Reporter(s):** Travis L. Hudson (Applied Geology, Inc.)

**Last report date:** 10/10/05

## Site name(s): King and Queen; Golddigger

**Site type:** Prospect

**ARDF no.:** TK088

**Latitude:** 62.4851 **Quadrangle:** TK B-4

**Longitude:** 148.7927

**Location description and accuracy:**

The King and Queen prospect is at an elevation of about 3,400 feet on northwest end of a ridge; it is about 2 miles south of the Talkeetna River in the SW1/4 sec. 30, T. 28 N., R. 4 E., Seward Meridian. The location is accurate to within 1/4 mile.

**Commodities:**

**Main:** Ag, Au

**Other:** Hg

**Ore minerals:** Gold, iron oxides, pyrite, silver tellurides(?)

**Gangue minerals:** Calcite, chalcedony, clay

**Geologic description:**

The rocks in the vicinity of this prospect are interbedded felsic and mafic volcanic rocks (Ben Porterfield, written commun., 2001). In part, the felsic rocks form a dome that consists of flow-banded rhyodacite, volcanic breccia, and possibly hot-springs sinter. Hydrobreccia occurs in float. Argillic alteration is dominant, with some propylitic alteration and silicification. Minor fine-grained pyrite and silver tellurides(?) occur in the matrix of the volcanic breccia, which weathers to conspicuous iron oxides. Based on air photos, the dome appears to be 2,000 feet long by 1,600 feet wide.

The following data are provided by Ben Porterfield (written commun., 2001), who owned the property in 2002. The prospect was discovered in 1918 by Sinclair and Foster. An old shaft is on top of the volcanic dome. The prospect was explored by Kennecott in 1919, when L.W. Storm reported that gold could be panned from almost any material selected at random. Trench samples contained 0.24 ounce of gold per ton from 'seams'; a 25-foot channel sample had 0.08 ounce of gold per ton and 1.76 ounces of silver per ton. A 6-inch-wide seam in an outcrop of felsic rock assayed 6.8 ounces of gold per ton and 15.9 ounces of silver per ton. Samples across 58 feet of trench averaged 1.82 parts per million gold. Grab samples every three feet along 190 feet of an old dump averaged 490 parts per billion gold. A grab sample of typical volcanic breccia from the shaft dump contained 1 part per million gold. Samples from the margins of the dome contained 12 parts per million mercury. Seven samples collected from a 38-foot-long northern trench contained 1 to 5.7 parts per million gold, and averaged 2.2 parts per million gold. Stream-sediment samples contained up to 870 parts per billion gold, 1.4 parts per million silver, and 5 parts per million mercury.

In 2006, Full Metal Minerals acquired the King and Queen prospect under an agreement with Ben Porterfield (Full Metal, 2007, Gold Digger). They reported that in recent years samples over a felsic dome contained 1.8 grams of gold per ton across 17.7 meters and samples from a trench vary from 0.7 to 5.7 grams of gold per ton. Full Metals also staked several other prospects nearby(?), the Toklat and Talkeetna prospects. (One or both of these may be among the unnamed prospects that have been listed in ARDF as TK049 to TK058, TK089 to TK092, and TK125). The Toklat prospect was explored by Anaconda Exploration in the 1980's and consists of silicified material with visible cinnabar in altered volcanic rocks and limestone. Samples contained 0.3 to 2.2 grams of gold per ton, 10 to 30 grams of silver per ton and 0.5 percent mercury. The Talkeetna prospect is associated with a shear zone and a 2.3-meter-long chip sample averaged 2.5 percent copper and 5.4 grams of silver per ton.

**Alteration:**
Float samples on the rhyodacite dome show strong argillic alteration, mainly illite and smectite. Local propylitic alteration, with calcite veining and opaline silica is associated with mafic agglomerate north of the dome (Ben Porterfield, written commun., 2001). Conspicuous iron staining.

**Age of mineralization:**
A preliminary whole-rock age date on the basalt is 453 Ma (P. Oswald, oral commun., 2002).

**Deposit model:**
Hot spring Au-Ag (Cox and Singer, 1986; model 25a).

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

**Production Status:** None

**Site Status:** Active?

**Workings/exploration:**
An old shaft is on top of the dome. The prospect was explored by Kennecott in 1919, when L.W. Storm reported that gold could be panned from almost any material selected at random. As of January 1, 2000, a block of 4 prospecting sites covered this prospect (Northern Associates Inc., written commun., 2001). In 2006, Full Metal Minerals acquired the property and did some surface sampling and mapping.

**Production notes:**

**Reserves:**
None.

**Additional comments:**

**References:**
Csejtey and others, 1978; Full Metal Minerals, 2007 (Gold Digger).

**Primary reference:** This record.

**Reporter(s):** R.K. Rogers (USGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

# Site name(s): West Tanana; Ring Hill-Monday Creek

**Site type:** Prospect

**ARDF no.:** TN018

**Latitude:** 65.2474 **Quadrangle:** TN B-6

**Longitude:** 152.8676

**Location description and accuracy:**

The West Tanana prospect covers much of the western half of section 23, the northeast one-quarter of section 22, and the SE1/4 of section 15, T. 5 N., R. 26 W., of the Fairbanks Meridian. The coordinates are at about the center of this prospect which is about 1 mile north-northwest of the junction of Monday and Grant Creek.

**Commodities:**

**Main:** Ag, Au, Bi, Te

**Other:** As, Ba, Cu, Mo, Pb, Pd, Pt, Sb, Zn

**Ore minerals:** Gold, pyrite

**Gangue minerals:** Quartz

**Geologic description:**

The West Tanana prospect is on the southwest flank of Grant Dome in a broad divide that separates Monday and Lynx creeks. The bedrock in the area is black graphitic schist, quartz-muscovite schist, chert, and quartzite (WGM, Inc., 1998). The closest intrusive rock known in the area is the Cretaceous Melozitna pluton, which crops out about 8 miles northwest of the prospect (Chapman and others, 1982). Boulders of a diorite dike are in gravel at the American Creek placer mine, about 2 miles to the northwest (TN015) (WGM, Inc., 1998).

Although placer gold was mined in the early 1900's from nearby Grant Creek (TN071), more recent work has focused on exploring the area for lode deposits. DiMarchi (1991) postulated that concentric rings identified in air photos of Lynx Dome may represent a granitic cupola associated with mineralization. Anomalous values of 1-3 parts per million (ppm) molybdenum in geochemical samples support this possibility. Concentric circular features and intersecting lineaments at Ring Hill also suggest a buried pluton there.

During the 1990 season, 121 soil, 12 rock, and 5 stream-sediment samples were collected by Central Alaska Gold Company (DiMarchi, 1991). The sampling program delineated an area up to 5,000 feet wide of anomalous gold and arsenic values, including 15 samples with gold values between 30 and 910 parts per billion (ppb) and arsenic as high as 1,510 ppm.

Trenches dug by Central Alaska Gold Company in 1991 intersected several gold-bearing shear zones that trend N10E and dip 20W. Samples show high arsenic, barium, iron, strontium and phosphorus values. Platinum and palladium values are also elevated, but silver and base metal values are low.

Ventures Resource Corporation (1997) reported that west of Monday Creek there is a broad area of gold geochemical anomalies, quartz veins, and altered zones of silification, iron oxide and clay. Of 64 samples, 16 contained gold ranging from 50 to 580 ppb. These samples average twice background levels of arsenic and contain weakly anomalous phosphorous.

WGM, Inc., explored the Ring Hill-Monday Creek area in 1997. Their work confirmed that several large, northeast-trending, as well as smaller, northwest-trending, faults cut the prospect area (WGM, Inc., 1998). These faults may be conjugate sets associated with the east-west trending, right-lateral Kaltag fault. The northeasterly structures are traceable for up to 12 miles, and cut across Lynx Creek and Grant Creek. Silicification appears to have occurred along all of the faults; silicified country rocks up to 1,000 feet from the faults contain up to 5 percent sulfides, mostly pyrite.

In 2006, International Tower Hill Mines, Ltd. (2007, Drilling; 2008, West Tanana) began geochemical soil surveys and mapping in this area under a exploration agreement with Doyon, Ltd. They defined a geochemical anomaly in gold, bismuth, and tellurium, about 1 kilometer in diameter. Samples from old trenches and outcrops contained 5.7 to 17.6 ppm gold, up to 11.8 ppm silver, less than 5 ppm to 1 percent arsenic, less than 2 to 96 ppm bismuth, less than 0.05 to 3.95 ppm tellurium, and minor copper, lead, zinc, and antimony. Drilling in 2007 defined a shallow, east-dipping zone of gold mineralization about 30 meters wide. Notable intercepts include 0.3 meters with 15.6 grams of gold per ton and a 4.3 meter breccia zone with 2.5 grams of gold per ton. The mineralization seems to be associated with a series of north-northeast-trending structures. The prospect is considered to be a stacked Pogo-type vein system.

**Alteration:**

Silicification and pyritization; iron oxide and clay.

**Age of mineralization:**

Mineralization may be Cretaceous based on the age of the nearby Melozitna Pluton.

**Deposit model:**

Pogo-type Au-Bi-Te-quartz veins?

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

**Production Status:** None

**Site Status:** Active

**Workings/exploration:**

Although placer gold was first mined in the early 1900's from nearby Grant Creek (TN071), more recent work has focused on exploring the area for lode deposits and trenches were dug by Central Alaska Gold Co. in 1991 (DiMarchi, 1991) that intersected several gold-bearing shear zones. In 1996 Dighem Surveys of Toronto Canada flew magnetic and electromagnetic surveys, and Ventures Resource Corporation worked in the area. WGM, Inc. worked in on the prospect in 1997 and carried out a soil geochemical survey over an area of about 2 square miles (WGM, Inc., 1998). In 2006, International Tower Hill Mines, Ltd. (2007, Drilling; 2008, West Tanana) began soil geochemical surveys and surface mapping under a exploration agreement with Doyon, Ltd. Drilling in 2007 defined a shallow, east-dipping zone of gold mineralization about 30 metes wide.

**Production notes:**

**Reserves:**

None.

**Additional comments:**

The prospect lies on land leased or owned by Doyon, Ltd.

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Chapman and others, 1982; DiMarchi, 1991; Ventures Resource Corporation, 1997; McCoy and others, 1997; WGM Inc., 1998 (DLR 98-28); International Tower Hill Mines Ltd., 2007 (Drilling); International Tower Hill Mines Ltd., 2008 (West Tanana).

**Primary reference:** WGM, Inc., 1998; this record

**Reporter(s):** G.E. Graham (ADGGS); D.J. Grybeck (Port Ludlow, WA)

**Last report date:** March 4, 2008

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