



Alaska Resource Data File, Sleetmute quadrangle, Alaska

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Open-File Report 2004-1310

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

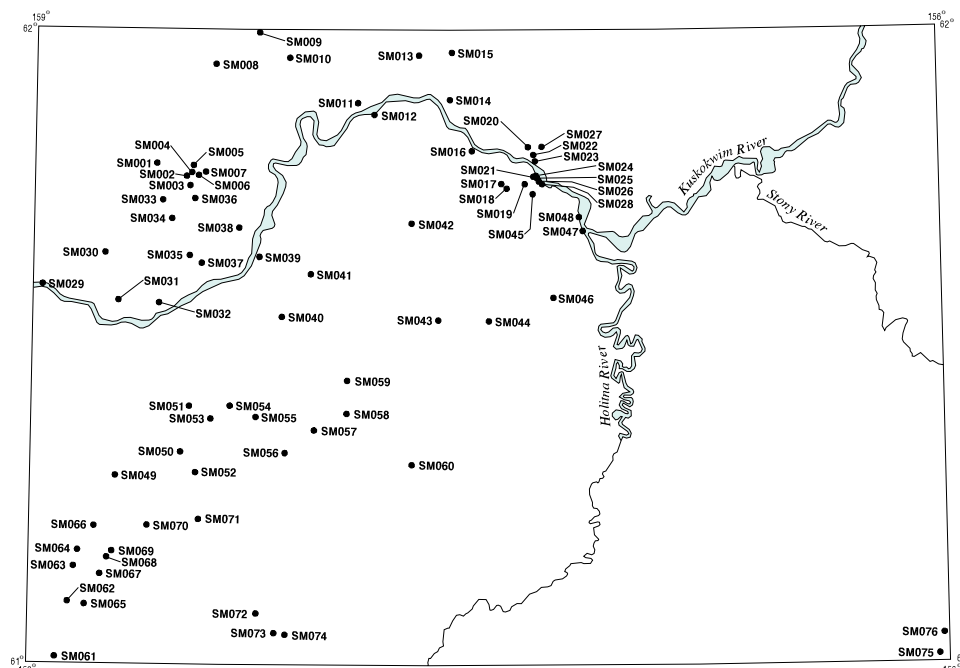
**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY**

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Sleetmute quadrangle

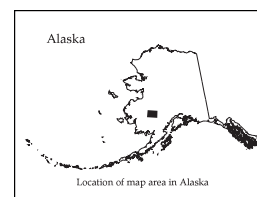
Descriptions of the mineral occurrences shown on the accompanying figure follow. See U.S. Geological Survey (1996) for a description of the information content of each field in the records. The data presented here are maintained as part of a statewide database on mines, prospects and mineral occurrences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



*Distribution of mineral occurrences in the Sleetmute
1:250,000-scale quadrangle, Alaska*

This and related reports are accessible through the USGS World Wide Web site <http://ardf.wr.usgs.gov>. Comments or information regarding corrections or missing data, or requests for digital retrievals should be directed to: Frederic Wilson, USGS, 4200 University Dr., Anchorage, AK 99508-4667, e-mail fwilson@usgs.gov, telephone (907) 786-7448. This compilation is authored by:

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OPEN-FILE REPORT 2004-1310

Site name(s): Unnamed (west of upper Getmuna Creek)**Site type:** Occurrence**ARDF no.:** SM001**Latitude:** 61.7884**Quadrangle:** SM D-7**Longitude:** 158.5958**Location description and accuracy:**

This occurrence is on a north-northeast trending ridge separating the headwaters of Getmuna Creek on the east from tributaries of the Kolmakof River on the west. It is near hill 1666, about 0.4 mile south of the center of section 30, T. 20 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ni, Zn**Other:** Bi, Co, Cr**Ore minerals:** Unspecified sulfides**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of quartz-bearing ferricrete breccia in vitreous mafic volcanic flows of the Upper Cretaceous, Horn Mountains volcanic rocks (Bundtzen and others, 1998). The mineralized zone trends north-south for a distance of about 1,100 feet. One grab sample of the ferricrete breccia contained 610 parts per million (ppm) zinc, 210 ppm nickel, 1,000 ppm chromium, 45 ppm cobalt, and 22 ppm bismuth (Bundtzen and others, 1998). The elevated zinc and bismuth values are probably hydrothermal in origin whereas the high chromium, nickel, and cobalt values probably represent background in the mafic-volcanic host rocks.

Alteration:**Age of mineralization:**

Undated; may be related to the nearby Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

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

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

22c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

Surface sampling was conducted in 1992 by the Alaska Division of Geological and Geophysical Surveys (Bundtzen and others, 1998).

Production notes:

Reserves:**Additional comments:****References:**

Cady and others, 1955; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/6/2003

Site name(s): Getmuna**Site type:** Prospect**ARDF no.:** SM002**Latitude:** 61.7687**Quadrangle:** SM D-7**Longitude:** 158.4966**Location description and accuracy:**

This prospect is on a isolated knob between two small lakes at the head of Getmuna Creek in the northern Horn Mountains. The prospect is at an elevation of about 2,400 feet near the center of the NE1/4 sec. 3, T. 19 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Au**Other:** Ag, As, Bi, Cu, Hg, Pb, Sb, Sn**Ore minerals:** Arsenopyrite, gray sulfosalts**Gangue minerals:** Quartz**Geologic description:**

The Getmuna Creek prospect consists of two 2- to 4-inches-thick auriferous, quartz-arsenopyrite-sulfosalt veins in quartz syenite of the Horn Mountains pluton. The veins strike about N20W discontinuously for 1,300 feet across the upper glaciated valley of Getmuna Creek. Rubble exposures indicate the dip is steep to vertical. Mineralized zones, where identifiable in rubble are indicated by Fe-oxide, scorodite stains, and quartz vein float. Poor exposures generally prevent an accurate estimate of the size, extent, and grade of the auriferous veins, and the available data suggests that the veins are small and of limited extent. The wall rock on either side of the veins have thin potassic alteration rims about 8 inches thick, but the host rocks otherwise are not altered. The Getmuna Creek prospect is parallel to the mineralized structure exposed at the Saddle prospect (SM003).

Two exposures of the vein were sampled. The northwest zone is on the knob at the coordinates above. The southeast zone is in rubble-crop along the eastern side of the valley near the cirque headwall and about 1,200 feet from the northwest zone. Four chip samples from the two zones contained 221 to 14,500 parts per billion (ppb) gold, 2.3 to 29.2 parts per million (ppm) silver, 56 to 219 ppm copper, 62 to 464 ppm lead, 98 to more than 2,000 ppm arsenic, 76 to more than 2,000 ppm antimony, 342 to 393 ppm chromium, 7 to 165 ppm bismuth, 10 to 41 ppm tin, and 2.7 to 11.1 ppm mercury (Bundtzen and others, 1998). This prospect, although limited in extent, contains the highest content of gold of any mineralized area in the Horn Mountains.

The Getmuna Creek prospect is in an area marked by anomalous stream sediment and panned concentrate sample sites (Gray and others, 1994; Theodorakos and others, 1992). Stream sediment samples in the area contained up to 1.7 ppm mercury, 120 ppm arsenic, and 7.0 ppm tungsten. One panned concentrate sample taken nearby contained 500 ppm gold, 20 ppm silver, and microscopically visible gold and cinnabar.

Alteration:

Weak potassium- feldspar alteration adjacent to the veins.

Age of mineralization:

Undated; may be related to the nearby Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

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

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

22c

Production Status: None

Site Status: Inactive

Workings/exploration:

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1990 (Bundtzen and others, 1998).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/7/2003

Site name(s): Saddle**Site type:** Prospect**ARDF no.:** SM003**Latitude:** 61.7538**Quadrangle:** SM D-7**Longitude:** 158.4845**Location description and accuracy:**

This prospect is in a saddle of the divide that separates the head of Whitwing Creek to the south from the head of Getmuna Creek on the north. The prospect is at an elevation of about 3,000 feet in the NW1/4 sec. 11, T. 19 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Au**Other:** As, Bi, Cd, Cu, Hg, Pb, Sb, W**Ore minerals:** Scheelite, unspecified sulfides**Gangue minerals:** Axinite, quartz, tourmaline**Geologic description:**

At the Saddle prospect, a syenite-hosted, conjugate set of veins contains axinite, quartz, tourmaline and unspecified, largely oxidized sulfides. The veins range from 1 to 6 inches thick; they dip steeply and strike N60E and N20W. The overall zone trends N20W, parallel to the faulted contact between several phases of the Horn Mountains pluton (Bundtzen and others, 1998). The veins contain 2 to 25 percent tourmaline and axinite, and 1 to 2 percent, fine grained, gray sulfides. The total width of the mineralized zone is estimated to be about 50 feet. Chip samples 3 to 5 feet wide contained up to 514 parts per billion (ppb) gold, 18,900 ppb silver, 642 parts per million (ppm) arsenic, 4.0 ppm cadmium, 48 ppm antimony, 7.0 ppm bismuth, and 14.3 ppm mercury (Bundtzen and others, 1998).

The Saddle prospect is in an area of anomalous stream sediment and panned concentrate samples (Gray and others, 1994; Theodorakos and others, 1992). Stream sediment samples contained up to 700 ppb gold, 680 ppb silver, 120 ppm copper, 370 ppm arsenic, 35 ppm antimony, and other elevated metal values. Panned concentrates contained up to 30.0 ppm gold, 15.0 ppm silver, 2,000 ppm lead, 300 ppm antimony, 1,000 ppm bismuth, and 700 ppm tungsten; several samples contained microscopically visible gold, scheelite, and barite.

Alteration:

Axinite-tourmaline-sulfide greisen.

Age of mineralization:

Undated; may be related to the nearby Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

Sn-polymetallic veins or tin veins (Cox and Singer, 1986; models 20b or 15b).

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

20b or 15b

Production Status: None

Site Status: Inactive

Workings/exploration:

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1990 (Bundtzen and others, 1998).

Production notes:

Reserves:

Additional comments:

Is also known as the 'Whitewing' prospect (Morris Hofseth, oral communication, 1990)

References:

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/7/2003

Site name(s): Unnamed (east head of Getmuna Creek)**Site type:** Occurrence**ARDF no.:** SM004**Latitude:** 61.7745**Quadrangle:** SM D-7**Longitude:** 158.4792**Location description and accuracy:**

This occurrence is located at the toe of an east-west-trending ridge east of the head of Getmuna Creek. It is at an elevation of about 2,600 feet, about 0.5 mile west of hill 3515, in the SW 1/4 sec. 35, T. 20 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Au, Zn**Other:** Ag, Cd, Sb, W**Ore minerals:** Unspecified sulfide minerals**Gangue minerals:** Axinite, quartz**Geologic description:**

This occurrence consists of axinite-quartz-sulfide veins in dacite tuff of the Horn Mountains volcanic field (Bundtzen and others, 1998). The veins are 2 to 4 inches thick, strike N25-40W, dip vertically, and can be traced along strike for about 65 feet before disappearing under talus. One grab sample of mineralization contained 54 parts per billion (ppb) gold, 1,300 ppb silver, 1,179 parts per million (ppm) zinc, 3.0 ppm cadmium, and 22 ppm antimony (Bundtzen and others, 1998).

The occurrence is in an area marked by anomalous stream sediment and panned concentrate sample sites (Gray and others, 1994; Theodorakos and others, 1992). Stream sediment samples from this area contained up to 26 ppb gold, 950 ppb silver, 290 ppm arsenic, 57 ppm antimony, 4.0 ppm mercury, 6.4 ppm bismuth, and 0.6 ppm tellurium. Panned concentrate samples contained up to 30 ppm gold, 5 ppm silver, 1,500 ppm bismuth, 500 ppm lead, 200 ppm antimony, 1,000 ppm tungsten, 1,000 ppm boron. Panned concentrates also contained up to 1.0 percent scheelite.

Alteration:

Development of axinite-quartz greisen.

Age of mineralization:

Undated; may be related to the nearby Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998)

Deposit model:

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

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

22c

Production Status: None**Site Status:** Inactive

Workings/exploration:

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1990 (Bundtzen and others, 1998).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/6/2003

Site name(s): Unnamed (northeast of head of Getmuna Creek)**Site type:** Occurrence**ARDF no.:** SM005**Latitude:** 61.7856**Quadrangle:** SM D-7**Longitude:** 158.4741**Location description and accuracy:**

This occurrence is near the top of hill 3405 in the northeast corner of the Horn Mountains. It is in the NW1/4 sec. 35, T. 20N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ce, Hg, Nb, Zn**Other:** Au, Cr, Cu**Ore minerals:** Unspecified sulfide minerals**Gangue minerals:****Geologic description:**

This occurrence consists of a strong ferricrete gossan, probably formed by the weathering of sulfides, along several high angle fault zones about 4 inches thick. The occurrence is in a dacite-andesite flow of the Horn Mountains volcanic field (Bundtzen and others, 1998). One grab sample gossan with a disseminated gray sulfide mineral contained 24 parts per billion (ppb) gold, 77 parts per million (ppm) copper, 260 ppm zinc, more than 10.00 percent iron, 310 ppm chromium, 320 ppm cerium, 48 ppm niobium, and 9.23 ppm mercury (Bundtzen and others, 1998).

Alteration:

Strong gossan development.

Age of mineralization:

Undated; may be related to the nearby Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

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

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

22c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

Surface sampling was conducted in 1990 by Ellie Harris of the Alaska Division of Geological and Geophysical Surveys (Bundtzen and others, 1998).

Production notes:

Reserves:**Additional comments:****References:**

Cady and others, 1955; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/6/2003

Site name(s): Greisen**Site type:** Prospect**ARDF no.:** SM006**Latitude:** 61.7701**Quadrangle:** SM D-7**Longitude:** 158.4566**Location description and accuracy:**

The Greisen prospect is at an elevation of 2,900 feet on the ridge north of the head of Jungjik Creek. It is in the NW 1/4 sec. 1, T. 19 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Pb, Zn**Other:** As, Cu, Hg, Sb, Sn, W**Ore minerals:** Galena, scheelite**Gangue minerals:** Axinite, tourmaline**Geologic description:**

The Greisen prospect consists of an elongate zone which contains axinite, tourmaline, and sulfides in an igneous breccia at the contact between dacite of the Horn Mountains volcanic field and the Horn Mountains pluton (Bundtzen and others, 1998). The greisen zone is about 300 feet long and about 50 feet wide; it contains about 5-8 percent axinite, 15-20 percent tourmaline, and 1-2 percent sulfides. Disseminated galena was recognized in some hand specimens. The zone strikes roughly north-south. One grab sample of sulfide-rich greisen contained 6,800 parts per billion (ppb) silver, 119 parts per million (ppm) copper, 2,302 ppm lead, 401 ppm zinc, 924 ppm arsenic, 321 ppm antimony, 32 ppm tin, and 13.43 ppm mercury (Bundtzen and others, 1998). This is the best example of a greisen deposit in the Horn Mountains.

The Greisen prospect is in an area marked by anomalous stream sediment and panned concentrate sample sites (Gray and others, 1994; Theodorakos and others, 1992). Stream sediment samples from this area contained up to 26 ppb gold, 950 ppb silver, 290 ppm arsenic, 57 ppm antimony, 4.0 ppm mercury, 6.4 ppm bismuth, and 0.6 ppm tellurium. Panned concentrate samples contain up to 30 ppm gold, 5 ppm silver, 1,500 ppm bismuth, 500 ppm lead, 200 ppm antimony, 1,000 ppm tungsten, and 1,000 ppm boron. The panned concentrates also contained up to 1.0 percent scheelite.

Alteration:

Axinite-tourmaline-sulfide greisen.

Age of mineralization:

Undated; may be related to the nearby Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

Sn-polymetallic veins and greisen (Cox and Singer, 1986; model 20b).

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

20b

Production Status: None

Site Status: Inactive

Workings/exploration:

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1990 (Bundtzen and others, 1998).

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/6/2003

Site name(s): Jungjik**Site type:** Occurrence**ARDF no.:** SM007**Latitude:** 61.7754**Quadrangle:** SM D-7**Longitude:** 158.4334**Location description and accuracy:**

The Jungjik prospect is about 0.4 mile northeast of hill 2870 on a northeast-trending, gently sloping ridge-top, in the northeast part of the Horn Mountains. The occurrence is at an elevation of about 2,700 feet in the SE1/4 sec. 36, T. 20 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Sn, Zn**Other:** Au, Hg, W**Ore minerals:** Unspecified sulfide minerals**Gangue minerals:** Axinite, quartz, tourmaline**Geologic description:**

The Jungjik prospect consists of N25W-trending, tourmaline-axinite-quartz-sulfide breccia in andesite of the Horn Mountains volcanic field. The breccia is composed of angular fragments of altered intrusive rock nested in a matrix of black tourmaline, axinite, and disseminated gray sulfides. The breccia contains up to 20 percent black tourmaline, about 4 percent purple axinite, and 1 to 2 percent sulfides; the breccia is often altered to a ferricrete box work.

This boron-enriched breccia occurs in roof pendants above granodiorite porphyry of the Horn Mountains pluton (Bundtzen and others, 1998). The breccia averages about 10 feet thick and can be traced across the top of the ridge for about 100 feet. Four grab samples taken along 60 feet of the mineralized zone contained up to 8 parts per billion (ppb) gold, 800 ppb silver, 369 parts per million (ppm) zinc, 40 ppm tin, and 2.055 ppm mercury (Bundtzen and others, 1998).

The Jungjik prospect is in an area with anomalous stream sediment and panned concentrate samples (Gray and others, 1994; Theodorakos and others, 1992). Stream sediment samples contained up to 26 ppb gold, 950 ppb silver, 290 ppm arsenic, 57 ppm antimony, 4.0 ppm mercury, 6.4 ppm bismuth, and 0.6 ppm tellurium. Pan concentrate samples contained up to 30 ppm gold, 5 ppm silver, 1,500 ppm bismuth, 500 ppm lead, 200 ppm antimony, 1,000 ppm tungsten, and 1,000 ppm boron. Pan concentrates also contained up to 1.0 percent scheelite.

Alteration:

Tourmaline-axinite (greisen).

Age of mineralization:

Undated; may be related to the nearby Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

Sn-polymetallic veins and greisen (Cox and Singer, 1986; model 20b).

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

20b

Production Status: No

Site Status: Inactive

Workings/exploration:

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1990 (Bundtzen and others, 1998).

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 3/5/2003

Site name(s): Rhyolite**Site type:** Prospect**ARDF no.:** SM008**Latitude:** 61.9452**Quadrangle:** SM D-7**Longitude:** 158.4024**Location description and accuracy:**

The Rhyolite prospect is on the south slope of Juninggulra Mountain on the divide between the Iditarod and Kuskokwim Rivers. It is marked by prospect pits and trenches over an area about a square mile in the S1/2 sec. 35; and SW1/4 sec. 36, T. 22N., R. 50 W., of the Seward Meridian. Some of the mine dumps are shown on the 1:63,360-scale USGS topographic map. The coordinates are at the center of the area. The prospect is locality 4 of Miller and others (1989). The location is accurate. (The location of this prospect in Cobb (1972, [MF 368]) is incorrect.)

Commodities:**Main:** Hg, Sb**Other:** Ag, As, Sn, Zn**Ore minerals:** Arsenopyrite, cinnabar, stibnite**Gangue minerals:** Quartz**Geologic description:**

The rocks in the vicinity of Juninggulra Mountain are mainly sandstone and shale of the Upper Cretaceous, Kuskokwim Group. The sediments are intruded by a multiphase, granite porphyry, intrusive complex at least 3.5 miles long and 1.2 mile wide (Cady and others, 1955; Bundtzen and others, 1998). Sainsbury and MacKevett (1965) also show several subordinate types of igneous rocks on Juninggulra Mountain including small diabase or lamprophyre dikes containing ubiquitous specks of pyrite, and amygdaloidal intermediate dikes. A large sill of the granite porphyry cuts these older, more mafic dikes. The Juninggulra Mountain igneous complex is along the trend of the Donlin Creek dike and sill swarm in the southwest Iditarod quadrangle ARDF ID171 to ARDF ID179 (Bundtzen, Miller, and Hawley, 2004). Gray, Gent, and others (1997) reported that sericite from vein mineralization at the Rhyolite prospect has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 70.9 Ma, or about the same age of vein mineralization radiometrically dated in the Donlin dike and sill swarm (Bundtzen and Miller, 1997; Szumigala and others, 2000).

At the Rhyolite prospect, cinnabar-stibnite mineralization is confined to steeply dipping, lenses and veins in silica-carbonate altered zones within a large granite porphyry sill (Bundtzen and others, 1998). The cinnabar occurs in three, widely-spaced locations in fractured dike rock and graywacke, and is disseminated in altered dike rocks. The cinnabar occurs as masses from 0.4 to 4 inches thick; the largest masses are at the intersections of the veins (Sainsbury and MacKevett, 1965). Most of the mineralized veinlets are associated with N50W steeply dipping faults. The primary mercury mineral is metacinnabar (Bundtzen and others, 1998). Samples assayed by the U.S. Geological Survey and the U.S. Bureau of Mines contained from less than 0.02 to 54.0 percent mercury and from less than 0.05 to 66.3 percent antimony (Maloney, 1962, 1968; Meyers, 1985). Metacinnabar, quartz, and carbonate veins sampled by Bundtzen and others (1998) also contained up to 574 parts per million (ppm) zinc, 136 ppm arsenic, 279 ppm antimony, 0.8 ppm silver, and 21 ppm tin.

Alteration:

Sericitic alteration of granite porphyry; silica carbonate alteration of mafic dikes and the largest granite porphyry sill.

Age of mineralization:

Gray and others (1997) reported that sericite from vein mineralization at the Rhyolite prospect has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 70.9 Ma.

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: None

Site Status: Inactive

Workings/exploration:

A few stringers of cinnabar were discovered by prospectors in 1953. R.F. Lyman and Joe Stuver did bulldozer trenching in 1956 and 1957 (Meyers, 1985). In 1958 and 1959, the U.S. Bureau of Mines explored the Rhyolite prospect with about 3,000 feet of trenching and sampled many exposures of mineralization (Maloney, 1962, 1968). C.L. Sainsbury geologically mapped the Rhyolite prospect by plane table in 1959 (Sainsbury and McKeveit, 1965). The prospect was restaked by Henry Waterford in 1971. In 1974, Resource Associates of Alaska, Inc. conducted surface sampling of the prospect on behalf of Calista Corporation and outlined two zones with elevated mercury values (Muntzert and others, 1975). Bundtzen and others (1998) produced a 1:63,360-scale geologic map of the Juninggulra Mountain area and sampled selected trenches at the Rhyolite prospect.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Maloney, 1962; White and Robertson, 1962; Sainsbury and MacKevett, 1965; Berg and Cobb, 1967; Maloney, 1968; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Meyer, 1985; Wells and Ghiorso, 1988; Miller and others, 1989; Bundtzen and Miller, 1997; Gray, Gent, and others, 1997; Bundtzen and others, 1998; Keith and Miller, 1997; Szumigala and others, 2000; Bundtzen, Miller, and Hawley, 2004.

Primary reference: Sainsbury and MacKevett, 1965

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Crooked Creek**Site type:** Mine**ARDF no.:** SM009**Latitude:** 61.9954**Quadrangle:** SM D-7**Longitude:** 158.2579**Location description and accuracy:**

About 0.8 miles of Crooked Creek above the mouth of Crevice Creek have been mined in the Sleetmute quadrangle. The placer extends upstream for another 6 miles into the Iditarod quadrangle. The placer in the Sleetmute quadrangle extends through the east half of section 16, T. 22 N., R. 49 W. The coordinates are the center of the placer in the Sleetmute quadrangle. The mine is locality 1 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Ag, Au**Other:** Hg**Ore minerals:** Arsenopyrite, cassiterite, cinnabar, placer gold**Gangue minerals:** Ilmenite, magnetite**Geologic description:**

The Crooked Creek placer deposit is a southern extension of the gold placer deposits in Donlin Creek in the Iditarod quadrangle (ARDF ID176; Bundtzen Miller, and Hawley, 2004). About 1 mile of the placer is in the Sleetmute quadrangle; the rest is in the Iditarod quadrangle.

The Crooked Creek placer above the mouth of Crevice Creek in the Sleetmute quadrangle consists of an ancestral alluvial terrace deposit that is a southerly extension of the 'Donlin Bench' (Cady and others, 1955). This gold-bearing bench is approximately 20 feet above the present stream level; it is up to 1 mile long and there is 10 to 100 feet of gravel over bedrock. Gold was mainly concentrated where gulches flow into Crooked Creek; thus mining was mainly in zones about 300 to 600 feet long and 300 to 450 feet wide at the mouth of Crevice Creek and just below Anaconda Creek. The principal heavy minerals recovered during placer mining are gold, cinnabar, arsenopyrite, and a trace of cassiterite. According to Bundtzen and others (1987), at least 4,200 ounces of gold and 120 ounces of silver were recovered from Crooked Creek in both the Sleetmute and Iditarod quadrangles from 1911 to 1956. However, the amount mined in the Sleetmute quadrangle alone is not known.

Alteration:

None.

Age of mineralization:

Tertiary or early Quaternary; based on similarities with other dated placers in interior Alaska (Hopkins and others, 1971; Hamilton, 1994).

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

Site Status: Inactive

Workings/exploration:

Placer deposits were discovered on Crooked Creek in 1910 and production began in 1911 (Cady and others, 1955; Cobb, 1972, [MF 368]). Exploration and development cuts were first made by horse and scraper and then by diesel-driven machinery (Maddren, 1911 and 1915; Brooks, 1912; Mertie, 1936; Cady and others, 1955).

Production notes:

Old, heavily vegetated, filled pits and bulldozer cuts that were observed in 1984 (T.K. Bundtzen, unpublished field data) indicate that the last placer mining in Crooked Creek took place many years previously. According to Bundtzen and others (1987), at least 4,200 ounces of gold and 120 ounces of silver were recovered from Crooked Creek in both the Sleetmute and Iditarod quadrangles from 1911 to 1956. However, the amount mined in the Sleetmute quadrangle alone is not known.

Reserves:

Additional comments:

References:

Maddren, 1911; Maddren, 1915; Brooks, 1912; Mertie, 1936; Cady and others, 1955; Hopkins and others, 1971; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Bundtzen and others, 1987; Miller and others, 1989; Hamilton, 1994; Bundtzen, Miller, and Hawley, 2004.

Primary reference: Miller and others, 1989

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Unnamed (head of Trapper Creek)**Site type:** Occurrence**ARDF no.:** SM010**Latitude:** 61.9557**Quadrangle:** SM D-6**Longitude:** 158.1566**Location description and accuracy:**

This occurrence is located on an east-west trending, gently undulating ridge at the head of Trapper Creek. It is at an elevation of about 1,450 feet, about 0.6 mile west of hill 1526 in the NW1/4 sec. 31, T. 22 N., R. 48 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Bi, Hg, Sb**Other:** Au, W**Ore minerals:** Pyrite, stibnite**Gangue minerals:** Quartz**Geologic description:**

This occurrence is associated with a felsic dike and sill swarm that intrudes shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; J.R. Riehle, unpublished data, 1998). The dikes and sills, most of which are sericitically altered, extends across the top of an east-west-trending ridge for at least 2 miles. The mineral occurrence is near the central portion of the dike swarm. The mineralization consists of thin quartz veinlets in an altered granite porphyry dike or sill and in altered calcareous sandstone. According to J. Riehle (oral communication, 1998), the mineralization is about 16 feet wide and the alteration zone with it can be traced along the strike of the ridge for about 100 feet. A few percent of sulfides, mainly pyrite and a few blades of stibnite, were identified in hand specimens. Six grab samples of quartz, pyrite, and sericite alteration contained 1.45 to 7.44 parts per million (ppm) mercury, up to 100 parts per billion (ppb) gold, 1,250 ppm antimony, 13.0 ppm bismuth, and 14.9 ppm tungsten. A grab sample collected about a mile west of the occurrence in the same dike and sill swarm contained 111 ppm antimony, 2.82 ppm mercury, 17 ppm bismuth, and 16 ppb gold.

Alteration:

Sericitic alteration of dikes and sediments.

Age of mineralization:

Unknown. Similar dikes in the Donlin Creek deposit (ARDF ID XXX) in the Iditarod quadrangle vary in age from 65 to 70 Ma (Bundtzen and Miller, 1997).

Deposit model:

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

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

22c

Production Status: None**Site Status:** Inactive

Workings/exploration:

The occurrence was investigated by the U.S. Geological Survey in 1998 (J. Riehle, unpublished data, 1998).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Bundtzen and Miller, 1997.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Central Creek**Site type:** Occurrence**ARDF no.:** SM011**Latitude:** 61.8849**Quadrangle:** SM D-6**Longitude:** 157.9293**Location description and accuracy:**

This placer occurrence is on Central Creek, a south-flowing tributary of the Kuskokwim River whose mouth is about 9 miles upstream from the village of Crooked Creek. About one mile of the creek was prospected; the center of this area is about 1.4 miles from the mouth of Central Creek in the NE 1/4 sec. 29, T. 21 N., R. 47 W., of the Seward Meridian. The location is accurate. The occurrence is locality 5 of Miller and others (1989).

Commodities:**Main:** Au**Other:****Ore minerals:** Placer gold**Gangue minerals:****Geologic description:**

Cady and others (1955) reported placer prospecting for gold along about for about 1.5 miles of lower Central Creek. Very little information is available for this occurrence. The rocks in the area consist of shale and sandstone of the Upper Cretaceous Kuskokwim Group (Cady and others, 1955; Miller and others, 1989).

Alteration:**Age of mineralization:**

Undated, but probably 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:**

Some prospecting prior to 1955.

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Egnaty Creek**Site type:** Prospect**ARDF no.:** SM012**Latitude:** 61.8665**Quadrangle:** SM D-5**Longitude:** 157.8742**Location description and accuracy:**

This prospect is about 0.5 kilometers upstream the mouth of an unnamed creek that is locally called Egnaty Creek; its mouth is on the the south side of the Kuskokwim River about 1.6 mile east of the mouth of Central Creek . It is at an elevation of about 300 feet near the center of section 34, T. 21 N., R. 47 W., of the Seward Meridian. The location is accurate. The prospect is locality 6 of Miller and others (1989).

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar**Gangue minerals:** Quartz**Geologic description:**

The Egnaty Creek prospect consists of fine-grained cinnabar in shear zones and fractures in sandstone and siltstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; Maloney, 1968). The rocks strike about S35W and dip 45 to 50S. The mercury is mainly disseminated; a few select samples contained about 1.0 percent mercury (Meyers, 1985). No igneous rocks were recognized at the prospect Maloney (1968) described an exploration program at the prospect; cinnabar was found in 100 of 350 auger holes drilled here. No other information is available.

Alteration:**Age of mineralization:****Deposit model:**

Silica-carbonate mercury? (Cox and Singer, 1986; model 27c).

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

27c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The Egnaty Creek prospect was staked by John Murphy and George Willis in 1966, after following up the anomalies from a panned-concentrate sample program on Egnaty Creek (Meyer, 1985). The U.S. Bureau of Mines conducted a soil-auger drill program in 1967 and found found cinnabar in 100 of 350 auger holes (Maloney, 1968). Rock samples collected by the U.S. Bureau of Mines contained up to 1.0 percent mercury (Meyers, 1985). Bulk sampling, trenching, limited diamond drilling, and additional soil sampling were also done (Miller and others, 1989).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; White and Robertson, 1962; Maloney, 1968; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Meyer, 1985; Wells and Ghiorso, 1988; Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Maloney, 1968

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Unnamed (west of George River)**Site type:** Occurrence**ARDF no.:** SM013**Latitude:** 61.9599**Quadrangle:** SM D-5**Longitude:** 157.7261**Location description and accuracy:**

This occurrence is near the top of hill 1273 about 0.8 mile west of a sharp loop in the George River and 4.6 miles north of Georgetown on the Kuskokwim River. The occurrence is in the NW1/4 sec. 33, T. 22 N., R. 46 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Hg, Sb**Other:** Ag, Au, Li**Ore minerals:****Gangue minerals:** Quartz**Geologic description:**

This occurrence is near a felsic dike that intrudes shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; M.L. Miller, unpublished field data, 1998). The occurrence consists of altered zones in the felsic dike and thin quartz veins in the adjacent sedimentary rocks. Two grab samples contained 2.1 to 49.2 parts per million (ppm) mercury, 23 parts per billion (ppb) gold, 100 ppb silver, 42 ppm antimony, and 249 ppm lithium (M.L. Miller, unpublished data, 1998).

Alteration:

Sericite in altered felsic dike.

Age of mineralization:**Deposit model:****Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

The occurrence was sampled by the U.S. Geological Survey in 1998.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): California Creek**Site type:** Prospect**ARDF no.:** SM014**Latitude:** 61.8900**Quadrangle:** SM D-5**Longitude:** 157.6227**Location description and accuracy:**

This placer prospect is on lower California Creek, a tributary to the Kuskokwim River about 5 miles below Red Devil. About 0.8 mile of more of the creek has been prospected. The center of this area is about 1 mile above the mouth of California Creek, in the SE 1/4 sec. 24, T. 21 N., R. 46 W., of the Seward Meridian. The prospect is locality 7 of Miller and others (1989).

Commodities:**Main:** Au**Other:****Ore minerals:** Placer gold**Gangue minerals:****Geologic description:**

Cady and others (1955) stated that placer gold had been found on California Creek probably before 1951. No other information is available.

Alteration:**Age of mineralization:**

Undated, but probably 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:**

Cady and others (1955) stated that placer gold had been found on California Creek, probably before 1951.

Production notes:**Reserves:****Additional comments:**

References:

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Harvison**Site type:** Prospect**ARDF no.:** SM015**Latitude:** 61.9644**Quadrangle:** SM D-5**Longitude:** 157.6159**Location description and accuracy:**

The Harvison prospect is on a north-trending ridge near hill 1,050, about 2.2 miles south of the mouth of the East Fork of the George River. The prospect is in the SE1/4 sec. 25, T. 22N., R. 46 W., of the Seward Meridian. The prospect is locality 3 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar**Gangue minerals:** Quartz**Geologic description:**

The Harvison prospect consists of lenses and pods of quartz and cinnabar in silicified, argillaceous sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; Jasper, 1963). The sandstone layers near the prospect are cut by a weathered dike or sill of unknown composition. The mineralized zones are 2 to 4 inches thick and are commonly associated with silicified fault breccia. No other information is available.

Alteration:

Silicification of sandstone in the area.

Age of mineralization:**Deposit model:**

Silica-carbonate mercury? (Cox and Singer, 1986; model 27c).

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

27c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

John Harvison discovered the prospect prior to 1963 by panning soils on the hill slopes nearby as well as stream gravels of nearby tributaries to the George River. By 1963, his development work consisted of a trench about 30 feet long and a 3-foot pit (Jasper, 1963).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; White and Robertson, 1962; Jasper, 1963; Berg and Cobb, 1967; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Wells and Ghiorso, 1988; Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Jasper, 1963

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Eightmile Creek**Site type:** Prospect**ARDF no.:** SM016**Latitude:** 61.8095**Quadrangle:** SM D-5**Longitude:** 157.5502**Location description and accuracy:**

According to Cady and others (1955), Eightmile Creek was prospected for placer gold for about 1.5 miles about above its mouth. The coordinates are at about the center of the area which is near the center of the west boundary of sec. 24, T. 20 N., R. 46 W., of the Seward Meridian. The prospect is locality 8 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Au**Other:****Ore minerals:** Placer gold**Gangue minerals:****Geologic description:**

According to Cady and others (1955), Eightmile Creek was prospected for placer gold for about 1.5 miles about above its mouth. No other information is available.

Alteration:**Age of mineralization:**

Unknown, but probably 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:**

Cady and others (1955) reported that placer gold was found on Eightmile Creek prior to 1951.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Meyer, 1985; Miller and others, 1989.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Cinnabar Chief**Site type:** Prospect**ARDF no.:** SM017**Latitude:** 61.7577**Quadrangle:** SM D-4**Longitude:** 157.4523**Location description and accuracy:**

The Cinnabar Chief prospect is near the head of an unnamed, east-flowing tributary to Fuller Creek, about 3.0 mile south-southwest of the mouth of Fuller Creek and 0.4 mile southeast of hill 1115. It is at an elevation of about 650 feet in the NW1/4 sec. 9, T. 19 N., R. 45 W., of the Seward Meridian. The prospect is locality 15 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar**Gangue minerals:****Geologic description:**

The rocks in the vicinity of this prospect are shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955). No more is known about the prospect than cinnabar occurs here. G.C. Bettles of the Kuskokwim Mercury Company sampled the Cinnabar Chief prospect in 1926 but he did not find economic concentrations of ore (Smith, 1929; Meyer, 1985).

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:**

G.C. Bettles of the Kuskokwim Mercury Company sampled the Cinnabar Chief prospect in 1926 but he did not find economic concentrations of ore (Smith, 1929; Meyer, 1985).

Production notes:**Reserves:****Additional comments:****References:**

Smith, 1929; Cady and others, 1955; Cobb, 1976 (OFR 76-606); Meyer, 1985; Miller and others, 1989.

Primary reference: Smith, 1929

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Fuller Creek**Site type:** Prospect**ARDF no.:** SM018**Latitude:** 61.7504**Quadrangle:** ID D-4**Longitude:** 157.4346**Location description and accuracy:**

The Fuller Creek placer prospect is located in Fuller Creek, about 3.1 mile south-southwest of the mouth of Fuller Creek and 1.2 mile southeast of hill 1115. It is at an elevation of about 400 feet in the SE1/4 sec. 9, T. 19 N., R. 45 W., of the Seward Meridian. The prospect is locality 16 of Miller and others (1989). The location is approximate.

Commodities:**Main:** Au**Other:****Ore minerals:** Gold**Gangue minerals:****Geologic description:**

According to Cady and others (1955), placer gold deposits reportedly occur for about 1.6 kilometers in Fuller Creek west of Barometer Mountain. No other size or grade information is available. The rocks in the area are shale and sandstone of the the Upper Cretaceous, Kuskokwim Group, that has been intruded by small Late Cretaceous to Early Tertiary mafic to felsic intrusions (Cady and others, 1955; Bundtzen and Miller, 1997).

Alteration:**Age of mineralization:**

Probably 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:**

Only surface prospecting was noted by Cady and others (1955).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Bundtzen and Miller, 1997.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Fairview**Site type:** Prospect**ARDF no.:** SM019**Latitude:** 61.7574**Quadrangle:** SM D-4**Longitude:** 157.3746**Location description and accuracy:**

The Fairview prospect is along the crest of a northwest-trending ridge, about 1.8 miles southwest of the mouth of McCally Creek. It is at an elevation of about 1,000 feet in the NE1/4 sec. 11, T. 19 N., R. 45 W., of the Seward Meridian. The prospect is locality 17 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Hg**Other:** Sb**Ore minerals:** Cinnabar, stibnite**Gangue minerals:** Quartz**Geologic description:**

The Fairview prospect is unusual because it is one of the few cinnabar prospects in the Kuskokwim mineral belt that is wholly in intrusive rock. The host rock is an altered, sericitized, quartz-feldspar-porphyry sill about 120 feet thick and 1,000 feet long that trends northwest, parallel to the strike of the shale and sandstone of the Upper Cretaceous, Kuskokwim Group that contains the sill (Cady and others, 1955; Sainsbury and MacKevett, 1965). The Fairview deposit has a $^{40}\text{Ar}/^{39}\text{Ar}$ isochron age of 72.6 Ma (Gray, Gent, and others, 1997); it is the only mercury deposit in the Red Devil area that has been dated.

The mineralization consists of cinnabar, stibnite, and quartz that fills several parallel fractures in the central part of the altered felsic sill. In the early 1940s, three trenches were sampled by the U.S. Bureau of Mines (Webber and others (1947). One 50-foot zone in trench 1 averaged 0.15 percent mercury ; one 5-foot zone in trench 2 averaged 0.40 percent mercury.

Alteration:

Sericitic alteration in quartz-feldspar porphyry.

Age of mineralization:

The Fairview prospect has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The property was discovered in the 1920s by tracing cinnabar-bearing float up slope from a stream below it. The Fairview prospect was staked in 1935 or 1936 (Webber and others, 1947). The U.S. Bureau of Mines trenched the property in 1943, but by 1959, the trenches were largely filled by vegetation (Sainsbury and MacKevett, 1965). Three trenches were cut normal to the felsic sill. In the early 1940s, the trenches were sampled by the U.S. Bureau of Mines (Webber and others (1947).

Production notes:**Reserves:****Additional comments:****References:**

Webber and others, 1947; Cady and others, 1955; White and Robertson, 1962; MacKevett and Berg, 1963; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Roedder, 1972; Cobb, 1976 (OFR 76-606); Wells and Ghiorso, 1988; Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Webber and others, 1947

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Willis; Willis and Fuller**Site type:** Mine**ARDF no.:** SM020**Latitude:** 61.8158**Quadrangle:** SM D-4**Longitude:** 157.3638**Location description and accuracy:**

The Willis Mine is on a knob east of the east branch of Willis Creek, about 1.4 mile northwest of the mouth of Parks Creek. It is at an elevation of about 700 feet in the NW1/4 sec. 24, T. 20 N., R. 45 W., of the Seward Meridian. The mine is locality 9 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Hg**Other:** Sb**Ore minerals:** Cinnabar, pyrite, stibiconite, stibnite**Gangue minerals:** Hematite, quartz**Geologic description:**

The Willis deposit is in sandstone, siltstone, and shale of the Upper Cretaceous, S Kuskokwim Group and in altered mafic dikes (Cady and others, 1955; Sainsbury and MacKevett, 1965). The deposit consists of quartz veins that contain cinnabar, stibnite, pyrite, hematite, and minor stibiconite. The veins are up to 50 feet long and 6 inches thick; they fill fractures in or near mafic dikes and sills that are largely altered to silica, carbonate minerals, and dickite. The veins strike N30-65W and dip steeply either NE or SW (Sainsbury and MacKevett, 1965). The cinnabar grains, which are zoned, are brilliant red or dark purple and iron-enriched (Sainsbury and MacKevett, 1965).

The ore bodies are localized near the intersections of altered gently-dipping dikes and sills with bedding plane faults that cut the Kuskokwim Group. The quartz-cinnabar-stibnite veins appear to parallel the strike of the shallow-dipping dikes and sills, a structural setting that differs somewhat from that at the Red Devil Mine (SM028). The mineralization is in a broad northwest-trending zone parallel to the axis of the Sleetmute anticline (Cady and others, 1955).

The property was first staked in 1909 by Oswald Willis and Jack Fuller, who retorted a few flasks of mercury from 1914 to 1918 (Cady and others, 1955).

Alteration:

Mafic dikes and sills are largely altered to silica, carbonate minerals, and dickite.

Age of mineralization:

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: Yes: small

Site Status: Inactive

Workings/exploration:

The property was staked by Oswald Willis and Jack Fuller; in 1943, it was conveyed to Oswald's nephew George Willis. The U.S. Bureau of Mines trenched the property in 1943 (Webber and others, 1947). Development work was limited to trenches, pits and several short adits into mineralized outcrops (Jasper, 1955, [PE 82-3]), 1961; Sainsbury and MacKevett, 1965; Miller and others, 1989). After George Willis trenched the property in 1953 and 1954, Jasper (1961) suggested that the Willis prospect could be a large, low grade, bulk-mineable mercury deposit. Alaska Mines and Minerals Inc. optioned the property in 1957.

Production notes:

Oswald Willis and Jack Fuller retorted ore and produced a few flasks of mercury from 1914 to 1918 (Cady and others, 1955).

Reserves:

Additional comments:

References:

Webber and others, 1947; Cady and others, 1955; Jasper, 1955 (PE 82-3); Jasper, 1961; White and Robertson, 1962; MacKevett and Berg, 1963; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Roedder, 1972; Cobb, 1976 (OFR 76-606); Wells and Ghiorso, 1988; Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Sainsbury and MacKevett, 1965

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Unnamed (southwest of Barometer Mountain)**Site type:** Prospect**ARDF no.:** SM021**Latitude:** 61.7691**Quadrangle:** SM D-4**Longitude:** 157.3461**Location description and accuracy:**

This prospect is about 0.3 mile southwest of the Barometer Mine (SM024). It is at an approximate elevation of 700 feet in the NE1/4 sec. 1, T. 19 N., R. 45 W., of the Seward Meridian. The occurrence is locality 18 of Miller and others (1989). The location is approximate.

Commodities:**Main:** Hg**Other:** Sb**Ore minerals:** Cinnabar, stibnite**Gangue minerals:****Geologic description:**

According to Cady and others (1955) and Sainsbury and MacKevett (1965), cinnabar and stibnite mineralization occurs in sandstone and shale of the Upper Cretaceous, Kuskokwim Group. No other information is available.

Alteration:**Age of mineralization:****Deposit model:****Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:****Production notes:****Reserves:****Additional comments:****References:**

Cady and others, 1955; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/2/2003

Site name(s): Ammiline**Site type:** Prospect**ARDF no.:** SM022**Latitude:** 61.8035**Quadrangle:** SM D-4**Longitude:** 157.3457**Location description and accuracy:**

The Ammiline prospect is on a west-facing slope of Parks Creek, about 0.6 mile north-northeast of the mouth of Parks Creek. It is at an elevation of about 430 feet in the SE1/4 sec. 24, T. 20 N., R. 45 W., of the Seward Meridian. The prospect is locality 11 of Miller and others (1989).

Commodities:**Main:** Hg**Other:** Sb**Ore minerals:** Cinnabar, stibnite**Gangue minerals:** Quartz**Geologic description:**

At the Ammiline prospect, cinnabar and minor stibnite in a gangue of fine-grained silica occurs along fractures in an albite rhyolite or granite porphyry dike that intrudes shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; Sainsbury and MacKevett, 1965). The Ammiline prospect is geologically similar to the Fairview prospect (SM019). No other information is available.

Alteration:

Albitization of the rhyolite host rock.

Age of mineralization:

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: None**Site Status:** Inactive**Workings/exploration:****Production notes:****Reserves:****Additional comments:**

References:

Cady and others, 1955; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Sainsbury and MacKevett, 1965

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Alice and Bessie; Parks**Site type:** Mine**ARDF no.:** SM023**Latitude:** 61.7934**Quadrangle:** SM D-4**Longitude:** 157.3406**Location description and accuracy:**

The Alice and Bessie or Parks Mine is on a productive group of claims near the north bank of the Kuskokwim River, about 0.4 mile east-southeast of the mouth of Parks Creek. The mine is at an elevation of about 250 feet in the SE1/4 sec. 25, T. 20 N., R. 45 W., of the Seward Meridian. The mine is locality 10 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Hg**Other:** Sb**Ore minerals:** Cinnabar, pyrite, stibnite**Gangue minerals:** Carbonate, clay, quartz**Geologic description:**

At the Alice and Bessie (Parks) Mine, sandstone and shale of the Upper Cretaceous, Kuskokwim Group are cut by mafic sills and dikes, many of which have been hydrothermally altered (Smith, 1917, 1938; Webber and others, 1947; Cady and others, 1955; Sainsbury and MacKevett, 1965; Miller and others, 1989). The alteration minerals consists mainly of a mixture of clay (dickite), quartz, carbonate, and limonite.

The mineralization, which is mainly near the altered mafic dikes, consists of cinnabar, stibnite, and pyrite in a gangue of quartz, carbonate, and brown clay. Smith (1917) believed that the pyrite was of a different age than the cinnabar and stibnite. The deposit has been mined for about 320 feet along strike. Abundant cinnabar and native mercury can be panned in Parks Creek which flows across the alteration zone exposed at the mine.

The mineralization was staked in 1906 by E.W. Parks, who from 1906 to 1923 produced about 120 flasks of mercury (Cobb, 1972; Miller and others, 1989). Additional production probably occurred in 1936 to 1937 by W.E. Dunkle but the amount is unknown (Webber and others, 1947).

Alteration:

Mafic dikes associated with the deposit have been largely altered to silica, carbonate minerals, and clay (dickite).

Age of mineralization:

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: Yes

Site Status: Inactive

Workings/exploration:

The property was staked in 1906. An adit about 200 feet long and surface trenching was done from 1906 to 1923 by E.W. Parks; the property was worked from 1936 to 1937 by W.E. Dunkle; and 1955 to 1956 by Robert Lyman and George Willis (Webber and others, 1947; Miller and others, 1989). In 1936, W.E. Dunkle extended the adit to 520 feet and found the best mineralization about 450 feet from the portal (Jasper, 1961). Work in 1942 by the U.S. Bureau of Mines (Webber and others, 1947) indicated the existence of three separate ore shoots on the property. George Willis and Robert leased the property in 1954 and eight additional claims were staked (Jasper, 1961). The U.S. Bureau of Mines again examined the mine in 1957 (Jasper, 1961). Codero Mining Company from Nevada completed an underground drill program on the property in 1957, but did not publicly release their exploration results. The workings include a 525-foot adit, 46 feet of crosscut from it, 3 vertical shafts, and 19 trenches (Miller and others, 1989).

Production notes:

The mineralization was staked in 1906 by E.W. Parks, who from 1906 to 1923 produced about 120 flasks of mercury (Cobb, 1972, [MF 368], 1976 [OFR 76-606]; Bundtzen and Conwell, 1982; Miller and others, 1989). Most of this mercury output was sold to placer gold miners in the Aniak and Iditarod mining districts (Jasper, 1961). Additional production probably occurred in 1936 to 1937 by W.E. Dunkle but there is no record of it (Webber and others, 1947).

Reserves:

Additional comments:

References:

Smith, 1917; Smith, 1938; Webber and others, 1947; Cady and others, 1955; Jasper, 1956; Jasper, 1961; Malone, 1962; White and Robertson, 1962; MacKevett and Berg, 1963; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Roedder, 1972; Cobb, 1976 (OFR 76-606); Bundtzen and Conwell, 1982; Meyer, 1985; Wells and Ghiorso, 1988; Miller and others, 1989; Belkin, 1993; Gray, Gent, and others, 1997; Bundtzen and Miller, 1997.

Primary reference: Miller and others, 1989

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Barometer**Site type:** Mine**ARDF no.:** SM024**Latitude:** 61.7706**Quadrangle:** SM D-4**Longitude:** 157.3376**Location description and accuracy:**

The Barometer Mine is in a short, unnamed, north-flowing gully that enters the flood plane of the the Kuskokwim River; it is about 0.5 mile west-northwest of the mouth of McCally Creek at an elevation of about 500 feet. The mine is labeled on the 1:63,360-scale USGS topographic map; it is in the NW1/4 sec. 6, T. 19 N., R. 45 W., of the Seward Meridian. The Barometer Mine is locality 19 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Hg, Sb**Other:** As**Ore minerals:** Cinnabar, realgar, stibnite**Gangue minerals:** Quartz**Geologic description:**

The Barometer Mine was one of the first mercury-antimony lodes that was discovered in the Kuskokwim mineral belt (Bundtzen and Miller, 1997). It has been described in detail by Webber and others (1947), Cady and others (1955), Malone (1962), and Sainsbury and MacKevett (1965).

The Barometer Mine is on the southwest limb of the northwest-trending Sleetmute anticline in a geological setting similar to that of the Red Devil Mine (SM028). The host rocks at the Barometer Mine are shale, siltstone and lithic sandstone of the Upper Cretaceous, Kuskokwim Group that have been intruded by mafic dikes and sills. The dikes and sills have been altered to a distinctive orange-weateing silica-carbonate rock (Cady and others, 1955; Sainsbury and MacKevett, 1965). The sedimentary rocks strike N45W and dip 55SW. Exposures are poor and the underground workings were caved prior to Sainsbury and McKevett's 1959 visit.

Trenching completed in 1959 by Alaska Mines and Minerals, Inc. disclosed promising cinnabar-stibnite mineralization in altered dikes cut by bedding plane faults in a structural setting similar to the Red Devil Mine (Sainsbury and MacKevett, 1960; Herreid, 1962; MacKevett and Berg, 1963). According to Cady and others (1955), cinnabar is associated with stibnite and realgar in quartz-rich gangue near the silica-carbonate rocks. Ore mined in 1940 averaged about 1.20 percent mercury (Malone (1962).

Production has been modest. About one flask was retorted in the early 1920s (Miller and others, 1989). A.C. Skidmore produced about 8 flasks of mercury in 1928 (Malone, 1962). Webber and others (1947) report that 10 flasks of mercury were produced in 1938 and 6 flasks in 1940. A total of about 25 flasks of mercury were produced from 1921 to 1940. In 1961, John Murphy and George Willis mined 50 to 75 tonnes of good surface ore, but the amount of mercury recovered is unknown (Jasper, 1961).

Alteration:

Silica-carbonate alteration of dikes and sills.

Age of mineralization:

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: Yes**Site Status:** Inactive**Workings/exploration:**

The Barometer deposit was discovered by Hans Halverson in 1921, who traced cinnabar float uphill from the base of a hill near the Kuskokwim River. In 1922, Halverson drove a 120-foot adit into the mineralized zone. In 1923, E.W. Parks purchased the claims and prospected on the surface. In 1931, Otto Rohlfphs drove a crosscut in the adit, but dropped his option in 1932. The U.S. Bureau of Mines trenched the property in 1943 (Webber and others, 1947). Regular assessment work was conducted from 1941 to the mid 1950s (Jasper, 1961). More trenches were dug by Alaska Mines and Minerals, Inc. in 1959 and 1960 (Herreid, 1962). The property was visited in 1957, 1959, and 1988 by the U.S. Geological Survey (Sainsbury and MacKevett, 1960, 1965; Miller and others (1989).

Production notes:

Production has been modest. About one flask was retorted in the early 1920s (Miller and others, 1989). A.C. Skidmore produced about 8 flasks of mercury in 1928 (Malone, 1962). Webber and others (1947) report that 10 flasks of mercury were produced in 1938 and 6 flasks in 1940. In 1961, John Murphy and George Willis mined 50 to 75 tons of good surface ore, but the amount of mercury recovered from those efforts is unknown (Jasper, 1961). A total of about 25 flasks, about 1,900 pounds, of mercury were produced from 1921 to 1940 (Malone, 1962).

Reserves:**Additional comments:****References:**

Webber and others, 1947; Cady and others, 1955; Sainsbury and MacKevett, 1960; Jasper, 1961; Herreid, 1962; Malone, 1962; White and Robertson, 1962; MacKevett and Berg, 1963; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Roedder, 1972; Cobb, 1976 (OFR 76-606); Bundtzen and Conwell, 1982; Meyer, 1985; Wells and Ghiorso, 1988; Miller and others, 1989; Belkin, 1993; Gray, Gent, and others, 1997; Bundtzen and Miller, 1997.

Primary reference: Miller and others, 1989

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Vermillion**Site type:** Prospect**ARDF no.:** SM025**Latitude:** 61.7668**Quadrangle:** SM D-4**Longitude:** 157.3335**Location description and accuracy:**

The Vermillion prospect is about 0.3 mile west of the mouth of McCally Creek at an elevation about about 450 feet. It is in the NW1/4 sec. 6, T. 19 N., R., 44 W., of the Seward Meridian. The prospect is locality 20 of Miller and others (1989). The location is accurate to within about 100 feet.

Commodities:**Main:** Hg, Sb**Other:****Ore minerals:** Cinnabar, stibnite**Gangue minerals:** Quartz**Geologic description:**

The Vermillion prospect consists of disseminated cinnabar and stibnite in thin quartz veins that intrude a shale-rich section of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; Miller and others, 1989). The dimensions and orientation of the deposit are unknown. The Kuskokwim Group strikes N60W and dips 40 SW in the area of the prospect. The Vermillion prospect is geologically and mineralogically similar to the nearby Mercury prospect (SM026). Native mercury has been panned in McCally Creek just downslope from the Vermillion prospect (Sainsbury and MacKevett, 1965).

Alteration:**Age of mineralization:**

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The prospect was systematically trenched prior to 1952 (Cady and others, 1955).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Mercury**Site type:** Prospect**ARDF no.:** SM026**Latitude:** 61.7647**Quadrangle:** SM D-4**Longitude:** 157.3242**Location description and accuracy:**

The Mercury prospect is on a northeast-trending bluff overlooking the Kuskokwim River, about 1,600 feet south of the mouth of McCally Creek. The prospect is at an elevation of about 320 feet in the SW1/4 sec. 6, T. 19 N., R. 44 W., of the Seward Meridian. The Mercury prospect is locality 21 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Hg, Sb**Other:****Ore minerals:** Cinnabar, stibnite**Gangue minerals:** Quartz**Geologic description:**

The Mercury prospect consists of disseminated cinnabar and stibnite in thin quartz veins that intrude a shale-rich section of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; Miller and others, 1989). The dimensions and orientation of the deposit are not known. The Kuskokwim Group strikes N60W and dips 40 SW in the area of the prospect. Native mercury has been panned in McCally Creek just downslope from the Mercury prospect (Sainsbury and MacKevett, 1965).

Alteration:**Age of mineralization:**

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The prospect was systematically trenched prior to 1951 (Cady and others, 1955).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Two Genevieves**Site type:** Prospect**ARDF no.:** SM027**Latitude:** 61.8162**Quadrangle:** SM D-4**Longitude:** 157.3182**Location description and accuracy:**

The Two Genevieves prospect is on an east-facing bluff overlooking Cribby Creek, about 2.5 miles north of the Kuskokwim River. The prospect is at an elevation of about 730 feet, about 0.6 mile south-southeast of the center of section 18, T. 20 N., R. 44 W., of the Seward Meridian. The location is accurate within about 0.3 mile.

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar**Gangue minerals:** Quartz**Geologic description:**

At the Two Genevieves prospect, an altered mafic sill largely composed of silica, mariposite, and carbonate minerals intrudes sandstone and shale of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955). Cinnabar and fragments of graphite occur in vugs and in a breccia zone in the upper part of the altered sill. According to Cady and others (1955), the Two Genevieves prospect is one of the few occurrences of graphite associated with cinnabar known in the Aniak district.

Alteration:

Mafic sill altered to secondary silica, mariposite, and carbonate.

Age of mineralization:**Deposit model:**

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

Only surface sampling and evaluation has taken place, mostly prior to 1952 (Cady and others, 1955; Cobb, 1976 [OFR 76-605]).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; White and Robertson, 1962; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Wells and Ghiorso, 1988; Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Red Devil Mine**Site type:** Mine**ARDF no.:** SM028**Latitude:** 61.7595**Quadrangle:** SM D-4**Longitude:** 157.3138**Location description and accuracy:**

The main shaft of the well-known Red Devil Mine is about 0.3 mile from the mouth of Red Devil Creek; the location of the mine is labeled on the 1:63,360-scale USGS topographic map. The mine is in the SE1/4 sec. 6, T. 19 N., R. 44 W., of the Seward Meridian. The Red Devil Mine is locality 22 of Miller and others (1989).

Commodities:**Main:** Hg, Sb**Other:** Au**Ore minerals:** Cinnabar, stibnite**Gangue minerals:** Carbonate, quartz, sericite**Geologic description:**

The Red Devil Mine is the largest mercury mine in Alaska and the most important lode mine in the Sleetmute quadrangle. The deposit has been described in detail by Webber and others (1947), Cady and others (1955), Herreid (1960, 1962), Malone (1962), MacKevett and Berg (1963), Sainsbury and MacKevett (1960, 1965), and Miller and others (1989). The following description summarizes those reports.

The rocks in the vicinity of the Red Devil Mine area consists of sandstone, siltstone, and shale of the Upper Cretaceous, Kuskokwim Group that have been cut by high angle, altered mafic dikes. The mineralized area is on the southern flank of the Sleetmute anticline, which strikes approximately N45W and plunges 5 to 10NW. The sedimentary rocks dip 45 to 60 degrees on either side of the anticline. Mafic dikes crosscut the sedimentary rocks at angles of 45 to 60 degrees.

Mineralization consists of cinnabar and abundant stibnite; realgar and orpiment are minor constituents. The cinnabar and stibnite form massive aggregates, encrustations, breccia fillings, and vug linings. In places both minerals are exceptionally well formed; cinnabar crystals from the Red Devil Mine have been displayed in mineralogical museums throughout the United States and Europe. Ore shoots formed at or near the intersections of altered dikes and numerous northwest trending faults that generally parallel the bedding in the Kuskokwim Group rocks (Sainsbury and MacKevett, 1960, 1965; MacKevett and Berg, 1963). Typically, the cinnabar-rich ore bodies that formed at the fault-dike intersections are pencil-shaped and plunge about 40 degrees south. The ore bodies that were mined range from 4 inches to 4 feet thick and continue along plunge for up to about 400 feet. The richest ore occurred in a zone at least 600 feet wide and 1,500 feet long.

Herreid (1960, 1962) and Malone (1962) described vertical mineral zonation in the Red Devil ore bodies. Near-surface ore bodies are generally composed of quartz and cinnabar, and the stibnite-cinnabar ratio increase with depth. On the fifth and deepest level, about 600 feet below the surface, ore shoots consist mainly of stibnite-quartz and contain only minor amounts of cinnabar (Bundtzen and Miller, 1997). Although Jasper (1961) stated that no native mercury was identified on the property up to 1960, prospectors have panned native mercury on McCally Creek west of the property. MacKevett and Berg (1963) report that clay minerals (dickite) occupy central parts of the ore-bearing veinlets but are most conspicuous in barren veinlets distant from ore bodies.

Fluid inclusion studies by Roedder (1963, 1972) and Belkin (1993) support the interpretation that ore

deposition took place at relatively shallow depths in the hydrothermal system. Homogenization temperatures of Red Devil cinnabar crystals range from 158 to 164 degrees C and quartz vein materials homogenize between 169 and 210 degrees C; salinities range from 1 to 4 percent NaCl (Belkin, 1993). Gas fluids from Red Devil are CO₂ enriched and are depleted in N₂ and CH₄; the two-phase liquid-vapor inclusions are typical of those observed in epithermal deposits (Gray, Gent, and others, 1997). Assuming densities and trapping temperatures of 160 to 200 degrees C, the deposit formed at pressures of 1,500 bars or less, probably within a hot springs plumbing system.

Mining has taken place intermittently. From 1933 to 1946, 2,972 flasks of mercury were produced from high grade, shallow ore bodies (Webber and others, 1947). An estimated 29,369 flasks were produced from 1953 to 1963 and 3,800 flasks were produced from 1969 to 1971 (Bundtzen and Conwell, 1982). A total of about 36,141 flasks of mercury were recovered from 74,000 ton of ore with an average grade of about 1.50 percent mercury. In 1970-71, stibnite was recovered using a flotation process and marketed as a sulfide concentrate.

Alteration:

The mafic dikes in the ore zones are largely converted to silica-carbonate rocks; the clay-mineral dickite is ubiquitous in the altered dikes.

Age of mineralization:

Undated; the nearby Fairview prospect (ARDF SM019) has a 40Ar/39Ar age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: Yes; medium

Site Status: Inactive

Workings/exploration:

The Red Devil deposit was discovered by an unidentified berry picker and later staked by Hans Halverson in 1933. From 1933 to 1946, activity consisted mainly of surface prospecting and selective mining from both surface and shallow underground workings. In 1952, DeCourcy Mountain Mining Company acquired a lease on the property and obtained a Defense Minerals Exploration Administration (DMEA) loan. The mine achieved its peak productivity from 1953 to 1963 when the deposit was mined from five working levels off the 'Main' and 'Dolly' shafts, which are about 1,000 feet apart.

The underground workings total about 4,000 feet and extended to a depth of about 450 feet through 1964. There are also at least 3,300 feet of trenching. Hawley and others (1969) evaluated the mine for precious metals and detected elevated gold values.

Production notes:

Mining has taken place intermittently. From 1933 to 1946, 2,972 flasks were produced from high grade shallow ore bodies (Webber and others, 1947). An estimated 29,369 flasks were produced from 1953 to 1963 and 3,800 flasks were produced from 1969 to 1971 (T.K. Bundtzen, written communication, 1988; Bundtzen and Conwell, 1982).

Mercury production started in the 1930s by processing float collected in Red Devil Creek and residually weathered material from the slopes to the side of the creek. The mercury was recovered using a Johnson McKay retort. Production was 158 flasks in 1940, 135 flasks in 1941, and 117 flasks in 1942. In late 1942, the New Idria Mining Company from California acquired the Red Devil Mine, constructed a retort and drove about 500 feet of underground workings. In 1944, 1,090 flasks were produced from 2,652 tons of ore (Jasper, 1961). In 1945, the company produced 962 flasks from 1,514 tons of ore. In 1946, R.F. Lyman leased the mine from the New Idria Mining Company and produced 500 flasks of mercury from an undis-

closed amount of ore (Jasper, 1961).

Alaska Mines and Minerals, Inc. operated the mine from 1954 to 1963, when more than 80 percent of the production took place. During 1953 to 1954, about 1,084 flasks were produced from 2,500 tons of ore. From 1955 to 1960, approximately 19,800 flasks were recovered from 47,250 tons of ore (Jasper, 1961). Production in 1961 was 4,089 flasks and production in 1962 was 3,700 flasks, but production in 1963 and 1964 combined was only about 695 flasks (Jasper, 1961; Bundtzen and Conwell, 1982).

In 1969 to 1971 Alaska Mines and Minerals Inc. produced cinnabar and stibnite concentrates for shipment to Japan from both open pit and underground workings, and retorted some mercury on the property. The mill operated for most of 1970, but the mine closed in June 1971, due to a sharp drop in the price of both mercury and antimony (Fackler, 1972). There has been no further production. Over the life of the mine, a total of 36,141 flasks of mercury has been produced from about 75,000 metric tons of ore at an average grade of about 1.5 percent mercury (Bundtzen and Conwell, 1982).

Reserves:

Unknown; abundant stibnite on the lowest (fifth) level was not mined.

Additional comments:

Cinnabar crystals from the Red Devil Mine have been displayed in mineralogical museums throughout the United States and Europe.

References:

Webber and others, 1947; Cady and others, 1955; Herreid, 1960; Sainsbury and MacKevett, 1960; Jasper, 1961; Malone, 1962; White and Robertson, 1962; Roedder, 1963; Herreid, 1962; MacKevett and Berg, 1963; Sainsbury and MacKevett, 1965; Fackler, 1972; Cobb, 1972 (MF 368); Roedder, 1972; Cobb, 1976 (OFR 76-606); Bundtzen and Conwell, 1982; Meyer, 1985; Wells and Ghiorso, 1988; Miller and others, 1989; Belkin, 1993; Gray, Gent, and others, 1997; Bundtzen and Miller, 1997.

Primary reference: MacKevett and Berg, 1963

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Kolmakof**Site type:** Mine**ARDF no.:** SM029**Latitude:** 61.5963**Quadrangle:** SM C-8**Longitude:** 158.9684**Location description and accuracy:**

The Kolmakof Mine is on a prominent terrace on the north bank of the Kuskokwim River about 3.0 mile northwest of the abandoned site of the Russian redoubt at Kolmakof and 1.5 mile west-northwest of VABM Sutter. The mine is at an elevation of about 320 feet in NE1/4 sec. 6, T. 17 N., R. 54 W., of the Seward Meridian. The mine is locality 27 of Miller and others, (1989). The location is accurate.

Commodities:**Main:** Hg**Other:** Ag, Au, Mo, Sb, Te**Ore minerals:** Arsenopyrite, cinnabar, stibnite**Gangue minerals:** Carbonate, quartz**Geologic description:**

The rocks in the vicinity of the Kolmakof mercury deposit consist of sandstone and shale of the Upper Cretaceous, Kuskokwim Group that have been intruded by complexly deformed mafic dikes, altered to a distinctive orange to tan silica-carbonate rock (Smith and Maddren, 1915; Cady and others, 1955; Jasper, 1961; Malone, 1962; Bundtzen and others, 1998). The altered dikes strike N45E and dip 40-60SE.

Mineralization consists of narrow stringers of bright red cinnabar, disseminated arsenopyrite, and minor stibnite in silica-carbonate breccias and fractures in the altered dikes. An adularia-bearing, chalcedonic alteration assemblage overprints small portions of the altered dikes in the pit that has been mined. Sulfide-bearing quartz-carbonate veins about 1 inch thick are in sandstone about 270 feet east of the main mine workings. A few samples in the cinnabar-rich zones contain up to 0.29 ounce of gold per ton and 1.31 ounces of silver per ton; however, most samples described by Bundtzen and others (1998) and Jasper (1955 [PE 82-4]) did not contain any significant gold or silver values. The quartz-carbonate veins also contain 27 to 66 parts per million (ppm) tellurium and 24 to 54 ppm molybdenum. Extensive channel sampling by Jasper (1955 [PE 82-4]) indicated grades of from 0.38 to 19.20 percent mercury over sample widths of from 22 to 50 inches. The total production of the Kolmakof Mine is about 250 flasks of mercury (about 19,000 pounds) (Bundtzen and others, 1998).

Alteration:

Mafic dikes are altered to silica-carbonate rock; adularia in mineralized zones.

Age of mineralization:

Probably Late Cretaceous (Bundtzen and Miller, 1997; Gray and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: Yes: small

Site Status: Inactive

Workings/exploration:

Most of the following summarizes Bundtzen and others (1998). According to Spurr (1900), the Kolmakof mercury deposit was discovered by Russian traders in 1838, making it one of Alaska's earliest mineral discoveries. In 1881, George King explored the deposit and sank a short shaft. In 1901, Duncan McDonnell found new high grade mercury mineralization but did not develop the deposit. In 1908, Gordon Bettles explored the Kolmakof deposit with an adit and a shaft about 80 feet deep. The U.S. Bureau of Mines trenched and sampled the Kolmakof deposit in 1944 (Webber and others, 1947); in 1958 (Maloney, 1962); and in 1970 (Merrill and Maloney, 1974). Much work took place in 1944, when 29 trenches totaling 600 feet were cut (Webber and others, 1947). In 1958, 145 chip and channel samples were cut from the trenches and assayed (Malone, 1962). Jasper (1955 [PE 82-4], 1961) sampled the property during a strip-ping program carried out in 1954 by Western Alaska Mining Company. The Rhehart-Holoday partnership explored the property from 1965-1972. Bundtzen and others (1998) provide a geologic sketch map of the property as it appeared in 1991.

Production notes:

Most of the following summarizes Bundtzen and others (1998). During the 1880s, Reinhold Searé mined and shipped several tons of high grade mercury ore to a refiner in California. In 1898 Edward Lind, a trader from Kolmakof, mined about five tonnes of ore from the Kolmakof Mine and recovered approximately 150 pounds of mercury. In 1908, Gordon Bettles mined high grade mercury ores from several underground stopes at the Kolmakof deposit and produced an unknown amount of mercury. Sometime prior to 1940, William Holoday opened up the first open cut on the deposit and built a small retort and mill. After World War II, Dean Rhehart constructed a gravity feed mill and produced 136 tonnes of ore averaging about 2.50 percent mercury, from which he recovered about 86 flasks of mercury (Morris Hofseth, oral communication, 1991). The cinnabar concentrates were shipped outside Alaska for refining. The last known production occurred during 1969-70, when the Rhehart-Holoday partnership mined and shipped cinnabar concentrates recovered in a 10-ton-per-day mill. According to Morris Hofseth (oral communication, 1991), who worked on the property from 1965 to 1970, the Kolmakof mercury mine has produced about 250 flasks of mercury (about 19,000 pounds) during its long but intermittent operation as a mine.

Reserves:

Additional comments:

References:

Spurr, 1900; Smith and Maddren, 1915; Cady and others, 1955; Jasper, 1955 (PE 82-4); Jasper, 1961; Maloney, 1962; Sainsbury and MacKevett, 1965; Berg and Cobb, 1967; Cobb, 1972 (MF 368); Merrill and Maloney, 1974; Cobb, 1976 (OFR 76-606); Brown, 1983; Meyer, 1985; Miller and others, 1989; Bundtzen and Miller, 1997; Gray, Gent, and others, 1997; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998; this record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Unnamed (near VABM Kolmakof)**Site type:** Occurrence**ARDF no.:** SM030**Latitude:** 61.6473**Quadrangle:** SM C-8**Longitude:** 158.7631**Location description and accuracy:**

This occurrence covers about 12 square miles; it is centered near VABM Kolmakof, east of the Kolmakof River. The center is at an elevation of about 800 feet in the SE1/4 sec. 18, T. 18 N., R. 52 W., of the Seward Meridian.

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar**Gangue minerals:****Geologic description:**

This occurrence covers about 12 square miles and is defined by strong anomalies in stream sediment and panned concentrate samples (Gray and others, 1994; Theodorakos and others, 1992). The rocks in the area consists of shale and sandstone of the Upper Cretaceous, Kuskokwim Group; a roof pendant of altered mafic volcanic rocks that crops out high on a ridge near VABM Kolmakof; and several circular areas of hornfels, each about 0.4 square miles in size. The hornfels probably overlies a pluton (Bundtzen and others, 1998). Stream sediments samples collected in the area contain 5.6 and 0.75 ppm mercury; the panned concentrates from the same sites contain as much as 50.0 percent cinnabar (Gray and others, 1994).

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:**

Stream sediment and panned concentrates were sampled by government geochemists.

Production notes:**Reserves:****Additional comments:**

References:

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Gray and others, 1994

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (north of the Kuskokwim River)**Site type:** Occurrence**ARDF no.:** SM031**Latitude:** 61.5728**Quadrangle:** SM C-8**Longitude:** 158.7175**Location description and accuracy:**

This occurrence is near the top of hill 951, about 2.6 miles northwest of the village of Napaimiut on the north bank of the Kuskokwim River. The occurrence is in the SW1/4 sec. 9, T. 17 N., R. 52 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Au**Other:** Zr**Ore minerals:****Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of north-northeast striking quartz-gossan veins that occur in an altered olivine basalt dike and in a shear zone that cuts shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Bundtzen and others, 1998). Cady and others (1955) show a lode gold occurrence on the edge of the flood plain of the Kuskokwim River, about 1.0 mile to the south which may be along the same structural trend. Samples from this occurrence contained 9 parts per billion (ppb) gold, 900 ppb silver, and 700 parts per million (ppm) zirconium (Bundtzen and others, 1998). There is no known source for the zirconium.

Alteration:

Oxidation to a gossan.

Age of mineralization:**Deposit model:****Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

Cady and others (1955) show a lode gold occurrence on the edge of the flood plain of the Kuskokwim River, about 1.0 mile to the south. The occurrence was sampled by Bundtzen and others (1998).

Production notes:**Reserves:****Additional comments:**

References:

Cady and others, 1955; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Murray Gulch; New York Creek**Site type:** Mine**ARDF no.:** SM032**Latitude:** 61.5690**Quadrangle:** SM C-7**Longitude:** 158.5835**Location description and accuracy:**

The placers on Murray Gulch and New York Creek are about 1.6 mile northwest of the abandoned village of Little Mountain Village on the Kuskokwim River. The site is a placer about 0.6 mile long that extends along lower Murray Gulch and into New York Creek; most of the placer is in the NE1/4 sec. 18, T. 17., N., R. 18 W., of the Seward Meridian. The center of the placer is near the junction of the two creeks. The mine is locality 29 and 30 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Au**Other:** Ag, As, Hg**Ore minerals:** Arsenopyrite, cinnabar, monazite, placer gold, placer silver**Gangue minerals:** Garnet, magnetite**Geologic description:**

Murray Gulch is a tributary of New York Creek and placer mining has taken placer for about 0.3 mile above and below their junction. The placer is in gravel 3 to 10 feet thick. Mining on Murray Gulch is largely confined to an open cut about 1,600 feet long and 800 feet wide. An alluvial terrace on the north side of New York Creek downstream from the mouth of Murray Gulch has been mined by underground drifting. Maddren (1915) reported that fluvial gravels on New York Creek were being prospected in two levels: 1) a lower terrace level 15 feet above the active flood plain; and 2) a higher terrace level about 70 feet above the active flood plain. The principle heavy minerals identified in the placer include gold, cinnabar, monazite, and arsenopyrite (Bundtzen and others, 1998). The placer in Murray Gulch may be a residual placer and not an alluvial placer (T.K. Bundtzen, unpublished field data, 1998). Smith (1941) reported that gold fineness from New York Creek drainage varies from 825 to 840 and averages about 830.

Bundtzen and others (1998) reported that mining took place in 1914 and 1915, from 1917 to 1922, and during 1937. A total of 1,542 ounces of gold and 230 ounces of silver were recovered. According to Miller and others (1989), Murray Gulch and New York Creek were mined from 1979 to 1981. Mining also took place in 1983 (Meyers, 1985) and also during 1998 (T.K. Bundtzen, unpublished field observation, 1998).

A diffuse felsic dike swarm mapped in upper Murray Gulch and along roads to the mine is a plausible lode source for the placer deposits at Murray Gulch and in New York Creek (Bundtzen and others, 1998).

Alteration:

None.

Age of mineralization:

Undated, possibly both Tertiary (New York Creek) and Quaternary (Murray Gulch), based on similarities with dated deposits in Interior Alaska (Hamilton, 1994; Hopkins, 1971).

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:**

According to Berry (1973) and Brown (1983), placer gold may have been found on New York Creek by Russian explorers in 1844, several years before Peter Doroshin found placer gold on the Kenai Peninsula. In 1910, Nick Miljevic, A. Perledo, and J. Bittewith discovered coarse placer gold on New York Creek about 6 kilometers above its mouth. Maddren (1915) reported that the gravels contained \$0.75 per square foot in gold (at \$20.67 per ounce). Plans then were to dig a 4,000 foot long ditch to bring in water for a hydraulic operation. Hydraulic mining began in 1915, and during the 1920s and 1930s several small tributaries, mainly Murray Gulch and Mary Creek were being mined on a small scale. In 1938, claims were staked by Rudolph Dobnik and Alta Jacoby. Claims were again staked by Adolph Dobnik in 1971. In 1990, Bundtzen and others (1998) observed evidence of both churn drilling and drift mining on the north side of New York Creek. In 1990, several mine buildings, mining equipment, a bulldozer, and sluice box remained at the mine.

Production notes:

Bundtzen and others (1998) reported that mining took place in 1914 and 1915, from 1917 to 1922, and during 1937. A total of 1,542 ounces of gold and 230 ounces of silver were recovered to 1937. According to Miller and others (1989), Murray Gulch and New York Creek were mined from 1979 to 1981. Mining also took place in 1983 (Meyers, 1985) and also during 1998 (T.K. Bundtzen, unpublished field observation, 1998).

Reserves:**Additional comments:****References:**

Maddren, 1915; Smith, 1941; Cady and others, 1955; Hopkins and others, 1971; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Berry, 1973; Brown, 1983; Meyer, 1985; Miller and others, 1989; Hamilton, 1994; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998; this record**Reporter(s):** T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)**Last report date:** 5/3/2003

Site name(s): Unnamed (east tributary of Kolmakof River)**Site type:** Occurrence**ARDF no.:** SM033**Latitude:** 61.7309**Quadrangle:** SM C-7**Longitude:** 158.5746**Location description and accuracy:**

This placer occurrence is at the head of an unnamed, east tributary of the Kolmakof River that drains the western slopes of the Horn Mountains. The location of the occurrence provided by Cady and others (1955) is vague. Gray and others (1994) describe a heavy mineral placer occurrence at an elevation of about 1,600 feet in the SW 1/4 sec. 17, T. 19 N., R. 51 W of the Seward Meridian that may coincide with this occurrence. The location is approximate.

Commodities:**Main:** Ag, Au**Other:** As, W**Ore minerals:** Placer gold, scheelite**Gangue minerals:** Ilmenite**Geologic description:**

Abundant scheelite (CaWO₃) and gold were found in Quaternary gravel on the western side of the Horn Mountains at some unknown location prior to 1951 and probably prior to WWI (M. Hofseth, oral communication, 1990; Cady and others (1955). Theodorakos and others (1992), and Gray and others (1994) reported values of up to 500 parts per million (ppm) gold, 20 ppm silver, and 120 ppm arsenic in panned concentrates and stream sediment samples along this creek, but no anomalous tungsten. The rocks in the vicinity consist of the Upper Cretaceous Horn Mountains pluton, the slightly older Horn Mountains volcanic rocks, and contact metamorphic rocks at the contact of the pluton and the volcanics (Bundtzen and others, 1998).

Alteration:**Age of mineralization:**

Late Pleistocene-Holocene, based on dated glacial chronology established in Horn Mountains by Bundtzen and others (1998).

Deposit model:

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

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

39a

Production Status: No**Site Status:** Inactive**Workings/exploration:**

There was surface sampling by prospectors before 1951 (Cady and others, 1955). The U.S. Geological

Survey resampled the area in 1988, 1989, and 1990 (Theodorakos and others, 1992; Gray and others, 1994). Bundtzen and others (1998) mapped, sampled, and described the Quaternary deposits in the area.

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Theodorakos and others, 1992

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Sue Creek**Site type:** Prospect**ARDF no.:** SM034**Latitude:** 61.7017**Quadrangle:** SM C-7**Longitude:** 158.5438**Location description and accuracy:**

The Sue Creek prospect at an elevation of about 2,800 feet on the ridge between the Whitewing Valley and the headwaters of the eastern tributary of Sue Creek. The prospect is about 1.2 mile south-southwest of peak 3461 and about 0.6 mile southwest of the center of sec. 28, T. 19 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** As, Sb, W, Zn**Other:** Au, Mo, Sn**Ore minerals:** Goethite**Gangue minerals:** Axinite, quartz, tourmaline**Geologic description:**

The Sue Creek prospect is a large area of hydrothermal alteration and mineralization in the contact zone between border phases of the Cretaceous Horn Mountains pluton and hornfels (Bundtzen and others, 1998). The border phase of the pluton is composed of altered, porphyritic, potassium-feldspar-rich diorite, granite and quartz monzonite. The hornfels is a dark gray to bleached metasiltstone and recrystallized metasandstone. Late aphanitic, felsic dikes cut both the pluton and the hornfels. A northwest-trending high-angle fault crosses the mineralized area and forms part of the southern boundary of the Horn Mountains.

The mineralized area, which covers an area at least 200 feet by 200 feet in size, consists of tourmaline, axinite, quartz, and goethite flooding mainly in hornfels, although some of the goethite flooding occurs in porphyritic granite. The sulfides have been completely altered to a dark brown network of sooty goethite veins, which locally comprise up to 40 percent of the hornfels. Immediately adjacent to the intrusion, a quartz-axinite ferricrete zone about 65 feet thick contains nearly 50 percent brown axinite. The mineralized veins and Fe-boxwork are covered by vegetation to the east and west of the prospect area. Sixteen chip samples taken along about 130 feet of mineralization contained up to 570 parts per million (ppm) zinc, 140 parts per billion (ppb) gold, 788 ppm arsenic, 337 ppm antimony, 102 ppm tungsten, and 33 ppm tin (Bundtzen and others, 1998). Although all samples contained sub-economic amounts of metals, the large extent of the mineralized zone may indicate a larger zone at depth. An unnamed occurrence 400 meters further to the southeast described in Bundtzen and others (1998) may be an extension of the Sue Creek prospect.

The occurrence is in an area of where anomalous stream sediment and panned concentrate samples were collected (Gray and others, 1994; Theodorakos and others, 1992). The stream sediment samples contained up to 700 ppb gold, 680 ppb silver, 120 ppm copper, 370 ppm arsenic, 35 ppm antimony, and other elevated metal values. Panned concentrates contained up to 30.0 ppm gold, 15.0 ppm silver, 2,000 ppm lead, 300 ppm antimony, 1,000 ppm bismuth, and 700 ppm tungsten; several samples contained microscopically visible gold, scheelite, and barite.

Alteration:

Axinite-tourmaline-sulfide greisen.

Age of mineralization:

In the contact-metamorphic zone of the Horn Mountain intrusive which was been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

Silver-polymetallic veins or tin veins (Cox and Singer, 1986; models 20b or 15b).

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

20b or 15b

Production Status: None

Site Status: Inactive

Workings/exploration:

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1991 and 1992. A geologic prospect sketch produced during that investigation is provided in Bundtzen and others (1998).

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and Miller, 1997; Bundtzen and others, 1998; Bundtzen, Miller, and Hawley, 2004.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (east of upper Bear Creek)**Site type:** Occurrence**ARDF no.:** SM035**Latitude:** 61.6437**Quadrangle:** SM C-7**Longitude:** 158.4839**Location description and accuracy:**

This occurrence is on a west-facing slope about 0.5 mile west of hill 1379. It is at an elevation of about 750 feet in the SW1/4 sec. 14, T. 18 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Au**Other:** Cr**Ore minerals:** Unspecified sulfide mineral**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of a chalcedony-cemented breccia in a flow of fine-grained, dark gray basalt or basaltic andesite (Bundtzen and others, 1998). The breccia contains 1-2 percent, finely disseminated sulfides in both quartz veinlets and in mafic volcanic rock. One grab sample contained 880 parts per billion gold and 200 parts per million chromium (Bundtzen and others, 1998). The elevated chromium probably represent the background of the host rocks.

Alteration:

Chalcedony.

Age of mineralization:**Deposit model:****Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1992 (Bundtzen and others, 1998).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (east head of Whitewing Valley)**Site type:** Occurrence**ARDF no.:** SM036**Latitude:** 61.7337**Quadrangle:** SM C-7**Longitude:** 158.4681**Location description and accuracy:**

This occurrence is at an elevation of about 2,100 feet on a steep, southwest-facing knob east of junction of the two headwater tributaries in the cirque at the head of the Whitewing Valley. The occurrence is about 0.3 mile southeast of the center of section 14, T. 19 N., R. 51 W., of the Seward Meridian and 0.8 mile south-east of peak 3310. The location is accurate.

Commodities:**Main:** Ag, Au**Other:** As, Bi, Cu, Sb, W**Ore minerals:** Goethite after sulfide, scheelite**Gangue minerals:** Barite, quartz, tourmaline**Geologic description:**

This occurrence consists of a sulfide-bearing quartz greisen in and adjacent to a felsic dike that intrudes syenite of the Cretaceous Horn Mountains pluton. Fine-grained disseminated sulfides occur both in the dike and in a quartz greisen breccia zone in the syenite; the greisen also contains barite and tourmaline. The sulfides are oxidized to goethite. One grab sample taken from the mineralized zone contained 113 parts per billion (ppb) gold, 1,400 ppb silver, 171 parts per million (ppm) copper, 171 ppm arsenic, 82 ppm antimony, 2,300 ppm barium, and 2.0 ppm bismuth (Bundtzen and others, 1998).

The occurrence is in an area of anomalous stream sediment and panned concentrate samples (Gray and others, 1994; Theodorakos and others, 1992). The stream sediment samples contained up to 700 ppb gold, 680 ppb silver, 120 ppm copper, 370 ppm arsenic, 35 ppm antimony, and other elevated metal values. Panned concentrates contained up to 30.0 ppm gold, 15.0 ppm silver, 2,000 ppm lead, 300 ppm antimony, 1,000 ppm bismuth, and 700 ppm tungsten; several samples contained microscopically visible gold, scheelite, and barite.

Alteration:

Development of quartz-tourmaline greisen; oxidation of sulfides.

Age of mineralization:

May be related to the Horn Mountain pluton which has been dated at 68-69 Ma (Bundtzen and others, 1998).

Deposit model:

Silver-polymetallic veins or tin veins (Cox and Singer, 1986; models 20b or 15b).

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

20b or 15b

Production Status: None

Site Status: Inactive

Workings/exploration:

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1990 (Bundtzen and others, 1998).

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (northeast of lower Sue Creek)**Site type:** Occurrence**ARDF no.:** SM037**Latitude:** 61.6319**Quadrangle:** SM C-7**Longitude:** 158.4442**Location description and accuracy:**

This occurrence is on a broad, north-south trending ridge about 1.6 mile north-northwest of VABM Sue. The occurrence is at an elevation of 800 feet, about 0.2 mile south of the center of sec. 24, T. 18 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ce, La, Sm, Th, U, W, Zr**Other:** Au, Cu, Hg, Pb**Ore minerals:****Gangue minerals:** Quartz**Geologic description:**

This occurrence is a zone of quartz veining at the contact between granite porphyry and diorite (Bundtzen and others, 1998). The details of the intrusive contact is unclear and the mineralization is poorly understood. One grab sample of the quartz vein contained 9 parts per billion (ppb) gold, 72 parts per million (ppm) copper, 94 ppm lead, 86 ppm tungsten, 167 ppm lanthanum, 28.3 ppm samarium, 800 ppm cerium, 2,200 ppm zirconium, 8.5 ppm uranium, 51.0 ppm thorium, and 8.4 ppm mercury (Bundtzen and others, 1998).

Alteration:**Age of mineralization:****Deposit model:**

Thorium-rare earth deposit? (Bliss, 1992; model 11d).

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

11d?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1991 (Bundtzen and others, 1998).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (near VABM Shale)**Site type:** Occurrence**ARDF no.:** SM038**Latitude:** 61.6878**Quadrangle:** SM C-7**Longitude:** 158.3210**Location description and accuracy:**

This occurrence is an area of about 12 square miles southeast of the Horn Mountains, centered on VABM Shale. The coordinates are at the center of the area which is at an elevation of about 1,400 feet in the in the SE1/4 sec. 34, T. 19 N., R. 50 W., of the Seward Meridian.

Commodities:**Main:** Au, Sn, W**Other:** Ba, Pb**Ore minerals:** Gold, scheelite**Gangue minerals:** Barite**Geologic description:**

This occurrence is an area of about 12 square miles defined by geochemical anomalies in stream sediment and panned concentrate samples (Gray and others, 1994; Theodorakos and others, 1992). The rocks in the area consist mainly of sandstone, siltstone, and shale of the Upper Cretaceous, Kuskokwim Group (Bundtzen and others, 1998). Gray and others (1994) report that two stream sediment samples contained 18 and 12 parts per billion (ppb) gold; heavy mineral concentrates contained up to 1,000 parts per million (ppm) tin, 10,000 ppm barium, 200 ppm lead, and microscopically visible gold, scheelite, and barite. The elevated metal contents may indicate a buried mineralized intrusion or placer deposits in glaciofluvial sediments originating in the the Horn Mountains (Gray and others, 1994; Bundtzen and others, 1998).

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:**

Geochemical sampling.

Production notes:**Reserves:****Additional comments:**

References:

Theodorakos and others, 1992; Gray and others, 1994; Bundtzen and others, 1998.

Primary reference: Gray and others, 1994

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (east valley wall of Kuskokwim River)**Site type:** Occurrence**ARDF no.:** SM039**Latitude:** 61.6421**Quadrangle:** SM C-7**Longitude:** 158.2533**Location description and accuracy:**

This occurrence is at the summit of a prominent northeast-trending ridge east of the Kuskokwim River near the eastern boundary of the Sleetmute C-7 quadrangle. The occurrence is at an elevation of about 800 feet and about 0.6 mile north-northeast of the center of sec. 24, T. 18 N., R. 50 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** As, Mo, Pb**Other:** Hg, W**Ore minerals:** Arsenopyrite, unspecified sulfides**Gangue minerals:** Quartz**Geologic description:**

This unnamed occurrence consists of thin, conjugate quartz -sulfide veins in a granite porphyry sill. This intrusion has a 40K/40Ar biotite age of 71.2 Ma (Bundtzen and others, 1998). The conjugate veins, which strike N75E and N55W and dip steeply to vertically, are 0.4 to 1.1 inches thick. The veins consist of quartz with selvages of mica, 0.5 to 1.0 percent arsenopyrite, and other unidentified sulfides. The mineralized area totals about 550 square feet in size and within that area there is an average of about 1 vein per foot. Several grab samples contained up to 148 parts per million (ppm) lead, 52 ppm molybdenum, 2.0 ppm tungsten, and 1.4 ppm mercury (Bundtzen and others, 1998).

Alteration:

White mica (potassic).

Age of mineralization:

Undated; may be genetically related to the granite-porphyry host rock which has been dated at 71.2 Ma (Bundtzen and others, 1998).

Deposit model:

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

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

22c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

Surface sampling was conducted by the Alaska Division of Geological and Geophysical Surveys in 1987 and 1991 (Bundtzen and others, 1998). During the 1990s, Placer Dome Exploration sampled this occur-

rence but the results of their study is unknown. The area has been trenched but the trenches were overgrown with vegetation in 1991.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Bundtzen and others, 1998.

Primary reference: Bundtzen and others, 1998

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (near hill 2370 northeast of Aghaluk Mountain)**Site type:** Occurrence**ARDF no.:** SM040**Latitude:** 61.5478**Quadrangle:** SM C-6**Longitude:** 158.1778**Location description and accuracy:**

This occurrence is in a saddle about 0.3 mile northeast of hill 2370, about 2.9 miles east-northeast of Aghaluk Mountain. It is at an elevation of about 2,000 feet, about 0.3 mile west-southwest of the center of section 21, T. 17 N., R. 50 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Cu**Other:** Mo, Pb, Sb, Zn**Ore minerals:** Pyrite**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of pyrite-bearing hornfels, quartz veins in hornfels, and disseminated pyrite in a felsic intrusion. The felsic dike intrudes sandstone and shale of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; M. L. Miller, unpublished field data, 1999). The rocks strikes N44E and dips 50SE. One grab sample of the pyrite-bearing hornfels contained 800 parts per billion (ppb) silver, 4.07 parts per million (ppm) cadmium, 246 ppm copper, 128 ppm lead, 13.1 ppm molybdenum, and 214 ppm zinc (M.L. Miller, unpublished analytical data, 1999).

Alteration:

Sericitic alteration in felsic dike.

Age of mineralization:

Unknown. The nearby Aghaluk Mountain granite porphyry intrusion and dike swarm has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 71.2 Ma (Bundtzen and others, 1998).

Deposit model:

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

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

22c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey investigated the site in 1999.

Production notes:

Reserves:**Additional comments:****References:**

Cady and others, 1955; Bundtzen and others, 1998.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/10/2003

Site name(s): Unnamed (on hill 1,220)**Site type:** Occurrence**ARDF no.:** SM041**Latitude:** 61.6153**Quadrangle:** SM C-6**Longitude:** 158.0830**Location description and accuracy:**

This occurrence is on hill 1220, about 6 miles south of the Oskawalik River in an area of subdued topography. The occurrence is about 0.4 mile south-southwest of the center of section 25, T. 18 N., R. 49 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Au**Other:** As, Cd, Co, Cr, Ni, Sb**Ore minerals:** Pyrite**Gangue minerals:** Quartz**Geologic description:**

This rocks at this occurrence consist of an east-west-trending, altered mafic dike that cuts hornfels of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; M.L. Miller, unpublished field data, 1999). Quartz veins radiate away from the dike into the hornfels. The hornfels contains thin seams of fine-grained pyrite. The occurrence is on the southwest edge of a large, prominent, but poorly understood circular feature that extends over the north-central Sleetmute C-6 quadrangle south of the Oskawalik River (T.K. Bundtzen, unpublished field data, 1999). Isolated bodies of intrusive rocks and hornfels occur in the circular feature. The layered rocks appear to dip outward around this circular feature. One grab sample of quartz vein and hornfels contained 298 parts per billion (ppb) gold, 3,800 ppb silver, 230 parts per million (ppm) arsenic, 76 ppm antimony, 4.0 ppm cadmium, 39 ppm cobalt, 166 ppm chromium, and 211 ppm nickel. The elevated cobalt, chromium, and nickel values probably reflect background values in a nearby altered, mafic dike.

Alteration:

Silicification of hornfels.

Age of mineralization:**Deposit model:**

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

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

22c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey sampled the site in 1999.

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/10/2003

Site name(s): Unnamed (north of Oskawalik River)**Site type:** Occurrence**ARDF no.:** SM042**Latitude:** 61.6954**Quadrangle:** SM C-5**Longitude:** 157.7501**Location description and accuracy:**

This occurrence extends for about 0.6 mile along a northeast-trending ridge, north of the headwaters of the Oskawalik River. The coordinates are at about the center of the area which is at an elevation of about 1,500 feet in the NW1/4 sec. 35, T. 19 N., R. 47 W., of the Seward Meridian.

Commodities:**Main:** As, Au**Other:** Ag, Hg**Ore minerals:** Pyrite**Gangue minerals:** Quartz**Geologic description:**

This occurrence consist of an elongate, northeast-trending area of about 0.8 square mile. The rocks in the vicinity are altered and hornfelsed sandstone and shale of the Upper Cretaceous, Kuskokwim Group. The sedimentary rocks have been intruded by felsic dikes of at least two compositions. One is tan-colored, biotite granite porphyry; the other is bleached alaskite. Both strike N60E and average about 13 feet thick; they extend along strike for about 1,600 feet. The sedimentary rocks contains quartz, ferricrete, and sulfide-bearing breccia. In the southern part of the mineralized area, a conspicuous quartz vein about 10 feet thick and 320 feet long strikes N45E, nearly parallel to the felsic dikes. The mineralization occurs as goethite-rich quartz breccias in hornfels; pyrite-bearing, quartz veins; and quartz-carbonate stockworks near the dikes. Most of the mineralization is exposed only as rubble crop and float. Twelve grab samples of quartz veins and goethite-rich quartz breccia contained up to 83 parts per billion (ppb) gold, 470 parts per million (ppm) arsenic, 390 ppb mercury, and 300 ppb silver (T.K. Bundtzen, unpublished analytical data, 1998 and 1999).

Alteration:

Sericitic alteration in intrusive rocks; oxidation of breccia; hornfelsing of shale and sandstone.

Age of mineralization:**Deposit model:**

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

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

22c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The prospect was discovered and sampled in 1998 by government geologists.

Production notes:**Reserves:**

None.

Additional comments:**References:**

Cady and others, 1955.

Primary reference: This record**Reporter(s):** T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)**Last report date:** 5/8/2003

Site name(s): Oskawalik River**Site type:** Occurrence**ARDF no.:** SM043**Latitude:** 61.5431**Quadrangle:** SM C-5**Longitude:** 157.6614**Location description and accuracy:**

The Oskawalik River placer occurrence extends for about 1 mile east-northeast of Henderson Mountain. The coordinates are for the midpoint of the occurrence; it is at an elevation of about 500 feet in the SW1/4 sec. 20, T. 17 N., R. 47 W., of the Seward Meridian. The location is approximate. The occurrence is locality 31 of Miller and others (1989).

Commodities:**Main:** Au**Other:****Ore minerals:** Placer gold**Gangue minerals:****Geologic description:**

Cady and others (1955) were told of placer gold in the Oskawalik River, east-northeast of Henderson Mountain. No other information is available.

Alteration:**Age of mineralization:**

Unknown, but probably 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:**

There was prospected in the area prior to 1951 (Cady and others, 1955). In 1982, the Oskawalik River near Henderson Mountain was staked for placer gold by the Kuskokwim Mining Company. These claims are no longer active.

Production notes:**Reserves:****Additional comments:**

References:

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Meyer, 1985; Miller and others, 1989.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/5/2003

Site name(s): Roger's Knob**Site type:** Prospect**ARDF no.:** SM044**Latitude:** 61.5417**Quadrangle:** SM C-4**Longitude:** 157.4943**Location description and accuracy:**

This prospect is on a knob that is informally called Rogers Knob; it is about 0.5 mile south of hill 1083, just west of upper Vreeland Creek. The prospect is at an elevation of about 850 feet, about 0.2 mile west of the southeast corner of section 19, T. 17 N., R. 46 W., of the Seward Meridian. This hill is approximately 200 feet wide, 400 feet wide, and 50 feet high. The location is accurate.

Commodities:**Main:** Hg**Other:** As, Au, Sb, W**Ore minerals:** Cinnabar**Gangue minerals:** Quartz**Geologic description:**

The rocks at this prospect are poorly known because of poor exposure. The prospect consists of weak, quartz-cinnabar mineralization that cuts sandstone of the Upper Cretaceous, Kuskokwim Group near a small altered mafic dike (Cady and others, 1955; Muntzert and others, 1975; M.L. Miller and T.K. Bundtzen, unpublished field data, 1997 and 1998). Only rubble crop and talus is exposed at the site. The quartz veins are up to 10 centimeters wide and are associated with silicification of the host rocks. The vein density is difficult to determine due to poor exposure, but there appears to be a vein every foot or two, about two veins per meter. The rocks are intensely fractured. This fracture system might be related to a northeast-striking fault that follows nearby Vreeland Creek (Cady and others, 1955). A northwest fracture set intersects this northeast striking fault at Rogers Knob, and the structural intersection could have played a role in localizing the mercury mineralization (Muntzert and others, 1975).

Cinnabar occurs in quartz veins and finely disseminated in the host rocks, sandstone of the Kuskokwim Group. The maximum amount of cinnabar observed in quartz veins was about 3 percent (Muntzert and others, 1975). Pyrite was also observed in some veins as well as an unidentified, secondary brown mineral. The Rogers Knob prospect does not appear to be similar to the other mercury deposits in the Kuskokwim mercury province (Sainsbury and MacKevett, 1965). The mineralization at the Rogers Knob deposit is more disseminated and there is a notable lack of a concentration of cinnabar.

Thirty channel samples cut by Resource Associates of Alaska, Inc. over about 650 of strike length averaged 400 parts per million (ppm) mercury. Two selected high grade samples contained 1.50 percent and 0.75 percent mercury (Muntzert and others, 1975). Four grab samples of disseminated cinnabar mineralization collected by Calista Corporation and the U.S. Geological Survey contained up to 2,940 ppm mercury, 100 parts per billion (ppb) gold, 27.0 ppm antimony, 158 ppm arsenic, and 30 ppm tungsten (M.L. Miller and J.Y. Foley, unpublished analytical data, 1997).

Alteration:

Silica-carbonate alteration of mafic dikes.

Age of mineralization:

Deposit model:

Silica-carbonate mercury? (Cox and Singer, 1986; model 27c).

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

27c?

Production Status: None

Site Status: Inactive

Workings/exploration:

Rogers Knob was investigated by Resource Associates of Alaska, Inc. in 1974. The U.S. Geological Survey and Calista Corporation sampled the site in 1997.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; White and Robertson, 1962; Muntzert and others, 1975; Wells and Ghiorso, 1988; Gray, Gent, and others, 1997.

Primary reference: Muntzert and others, 1975; this record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): McCally Creek**Site type:** Prospect**ARDF no.:** SM045**Latitude:** 61.7416**Quadrangle:** SM C-4**Longitude:** 157.3481**Location description and accuracy:**

This prospect is on McCally Creek, about 1.6 miles north-northeast of VABM 2484 on Barometer Mountain. The prospect is at an elevation of about 500 feet in the NE1/4 sec. 13, T. 19 N., R. 45 W., of the Seward Meridian. The prospect is locality 23 of Miller and others (1989). The location is approximate.

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar**Gangue minerals:****Geologic description:**

The McCally Creek prospect consists of disseminated cinnabar in sandstone and shale of the Upper Cretaceous, Kuskokwim Group, near the contact with the granite porphyry intrusive complex that makes up most of Barometer Mountain (Cady and others, 1955; Miller and others, 1989). No size, orientation, or assay information is available. The mineralization at the McCally Creek prospect is probably similar to mineralization at the Fairview prospect (SM019).

Alteration:**Age of mineralization:**

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury (Cox and Singer, 1986; model 27c).

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

27c

Production Status: No**Site Status:** Inactive**Workings/exploration:**

Only surface exploration has taken place on the property (Cady and others, 1955).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Sainsbury and MacKevett, 1965; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Miller and others, 1989

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Red Mountain**Site type:** Prospect**ARDF no.:** SM046**Latitude:** 61.5784**Quadrangle:** SM C-4**Longitude:** 157.2812**Location description and accuracy:**

The Red Mountain prospect is along the southwest flank of Red Mountain, an isolated summit on the eastern edge of the Kuskokwim Mountains. The prospect is just southwest of VABM 1461 which is about 0.5 mile east of the center of section 8, T. 18 N., R. 44 W., of the Seward Meridian.

Commodities:**Main:** Ag, As**Other:** As, Au, Bi, Cd, Cu, Hg, Mo, Pb, Sb, Sn, Zn**Ore minerals:** Arsenopyrite, goethite (after sulfides)**Gangue minerals:** Axinite, quartz, tourmaline**Geologic description:**

The Red Mountain prospect consists of quartz-tourmaline veins, axinite-tourmaline breccias, and oxidized shear zones, associated with a hypabyssal, porphyritic to aphanitic pluton that intrudes shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; M.L. Miller, J.Y. Foley, and T.K. Bundtzen, unpublished field data, 1997). The mineralization covers about half of a square mile. Goethite dominates in the veins and breccias but relict arsenopyrite grains are locally preserved. Rubble-crop indicates that the veins and vein-breccias strike northeast.

In 1975, Resource Associates of Alaska, Inc. collected surface samples and reported up to 3,500 parts per billion (ppb) ppb gold and 24 parts per million (ppm) silver from samples collected on Red Mountain (Jennings, 1975). Twenty seven grab and chip samples collected in 1997 by the U.S. Geological Survey and Calista Corporation contained up to 1,140 ppb gold (3 samples contained more than 1,000 ppb gold), 18.0 ppm silver, 5,330 ppm arsenic, 134 ppm antimony, 10.8 ppm mercury, 450 ppm lead, 53 ppm tungsten, 645 ppm zinc, 167.0 ppm bismuth, 14.0 ppm cadmium, 116 ppm tin, 396 ppm copper, and 8.4 ppm molybdenum (M.L. Miller, J.Y. Foley, and T.K. Bundtzen, unpublished analytical data, 1997).

Alteration:

Axinite-tourmaline-quartz greisen.

Age of mineralization:**Deposit model:**

Silver-polymetallic veins (Cox and Singer, 1986; model 20b).

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

20b

Production Status: None**Site Status:** Inactive

Workings/exploration:

In 1975, Resource Associates of Alaska, Inc. (RAA) sampled the Red Mountain prospect on behalf of Calista Corporation. The prospect was examined by the U.S. Geological Survey, the Alaska Division of Geological Survey, and Calista Corporation in 1997.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Jennings, 1975.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Mellick's**Site type:** Prospect**ARDF no.:** SM047**Latitude:** 61.6834**Quadrangle:** SM C-4**Longitude:** 157.1831**Location description and accuracy:**

The Mellick prospect is on the southwest bank on the Kuskokwim River behind Mellick's trading post. The prospect is located in the NW1/4 sec. 1, T. 19 N., R. 44 W., of the Seward Meridian, at an elevation of about 200 feet. The location is accurate. The Mellick prospect is locality 25 of Meyer (1985); and locality 26 of Miller and others (1989).

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar**Gangue minerals:****Geologic description:**

Disseminated cinnabar occurs along northwest-trending, high-angle faults in sandstone of the Upper Cretaceous, Kuskokwim Group, immediately behind Mellick's Trading Post (Miller and others, 1989). There is no information on the length, size, or assay results from this prospect. Biotite-bearing basaltic dikes were mapped by Cady and others (1955) about 0.6 mile south of the prospect.

Alteration:**Age of mineralization:****Deposit model:**

Disseminated cinnabar along fault.

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):**Production Status:** None**Site Status:** Inactive**Workings/exploration:**

Nick Mellick Sr. and George Willis staked the prospect in 1952; the claim was inactive in 1983 (Meyer, 1985).

Production notes:**Reserves:**

None.

Additional comments:

References:

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Meyer, 1985; Miller and others, 1989.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 4/30/2003

Site name(s): Landru**Site type:** Occurrence**ARDF no.:** SM048**Latitude:** 61.7066**Quadrangle:** SM C-4**Longitude:** 157.1823**Location description and accuracy:**

The Landru occurrence is on the west bank of the Kuskokwim River about 0.5 mile northwest of the center of the village of Sleetmute. The occurrence is in the NW1/4 sec. 25, T. 19 N., R. 44 W., of the Seward Meridian. The occurrence is locality 24 of Miller and others (1989). The location is vague.

Commodities:**Main:** Hg**Other:****Ore minerals:** Cinnabar, metacinnabar**Gangue minerals:****Geologic description:**

Joesting (1942) reported considerable float rich in cinnabar and metacinnabar along the banks and lower slopes adjacent to the Kuskokwim River in this vicinity but the lode source was never precisely determined (Cobb, 1972, MF 368; Cobb, 1976, OFR 76-606; Miller and others, 1989). The rocks in the area are shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955).

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:**

Joesting (1941) reported that Herschell and Hortense Landru owned a mercury prospect in this area in 1941.

Production notes:**Reserves:****Additional comments:****References:**

Joesting, 1942; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989.

Primary reference: Joesting, 1941

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Kay Creek**Site type:** Occurrence**ARDF no.:** SM049**Latitude:** 61.2968**Quadrangle:** SM B-8**Longitude:** 158.7199**Location description and accuracy:**

The Kay Creek occurrence is on Kay Creek, a tributary of the Buckstock River. The coordinates are at an elevation of about 700 feet in the NE1/4 sec. 23, T. 14 N., R. 53 W., of the Seward Meridian. The location is approximate.

Commodities:**Main:** Sb**Other:** Au**Ore minerals:** Placer gold, stibnite**Gangue minerals:****Geologic description:**

According to Cady and others (1955), 'natives report antimony occurrences on Kay Creek, a tributary of the Buckstock River'. In 1992, T.K. Bundtzen, unpublished field notes, 1992) found one piece of stibnite-quartz float along a steep, bedrock canyon on the north side of Kay Creek. The stibnite-quartz float was semi-rounded and may have been transported by fluvial or colluvial processes; the lode source was not found. The coordinates are for the location of stibnite-quartz float. Morris Hofseth (oral communication, 1990) reported that he found placer gold in Kay Creek canyon a few miles above the mouth. The rocks in the area consist of shale and sandstone of the Upper Cretaceous, Kuskokwim Group that has been intruded by a swarm of felsic to mafic dikes.

Alteration:**Age of mineralization:**

The reported placer deposit is Quaternary.

Deposit model:

Stibnite-quartz vein(?) and 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:**

Apparently only prospecting and reconnaissance work by a government geologist and a private individual.

Production notes:

Reserves:**Additional comments:****References:**

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (Upper Kogoyuk Creek)**Site type:** Occurrence**ARDF no.:** SM050**Latitude:** 61.3346**Quadrangle:** SM B-7**Longitude:** 158.5076**Location description and accuracy:**

This occurrence is on a steep northwest-facing knob overlooking upper Kogoyuk Creek in the northeast Buckstock Mountains. The occurrence is on hill 2147 in the NE1/4 sec. 1, T. 14 N., R. 52 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Au, Bi, Te**Other:** Ag, As**Ore minerals:** Unspecified sulfides**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of quartz-sulfide veins in a sericitized porphyry dike or sill that is part of the Cretaceous Buckstock Mountains plutonic complex. The Buckstock Mountains pluton has a U-Pb age of 59.2 Ma (Miller and others, 2002). The dike or sill is one of many near the occurrence that cut hornfels of the Upper Cretaceous Kuskokwim Group (Cady and others, 1955). No other information is available. One grab sample of the quartz-sulfide mineralization contained 150 parts per billion (ppb) gold, 400 parts per million (ppm) bismuth, 1,000 ppb silver, 190 ppm arsenic, and 8.8 ppm tellurium (M.L. Miller, unpub. assay data, 1993).

The occurrence is in the northeast corner of area of anomalous stream-sediment and panned-concentrate samples (Gray, Motooka, and Theodorako, 1997). Stream sediments contained up to 1.3 parts per million (ppm) gold, 150 ppm arsenic, 14 ppm bismuth, and elevated antimony and tungsten. Panned concentrates contained up to 200 ppm gold, 100 ppm silver, 500 ppm antimony, 3,000 ppm tungsten, and more than 2,000 ppm bismuth.

Alteration:

Strong sericite alteration of dike or sill.

Age of mineralization:

Unknown. Miller and others (2002) report a U-Pb age of 59.2 Ma for the Buckstock pluton that makes up much of the area.

Deposit model:

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

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

22c?

Production Status: None**Site Status:** Inactive

Workings/exploration:

This occurrence was found in 1993 during a cooperative study by the Alaska Division of Geological and Geophysical Surveys and the U.S. Geological Survey in the Buckstock Mountains.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Gray, Motooka, and Theodorakos, 1997; Miller and others, 2002.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Gold Run**Site type:** Prospect**ARDF no.:** SM051**Latitude:** 61.4067**Quadrangle:** SM B-7**Longitude:** 158.4803**Location description and accuracy:**

About 1 mile of Gold Run, a tributary of the Holokuk River, has been prospected for gold. The coordinates are at about the midpoint of this work. The prospect is at an elevation of about 450 feet in the SW1/4, sec. 8, T. 15 N., R. 51 W., of the Seward Meridian. The occurrence is locality 33 of Miller and others (1989).

Commodities:**Main:** Au**Other:****Ore minerals:** Placer gold**Gangue minerals:** Quartz**Geologic description:**

Cady and others (1955) cite reports of placer gold prospects on Gold Run Creek. Morris Hofseth (oral communication, 1991) found a 5 ounce gold-quartz nugget while prospecting Gold Run in 1954. T.K. Bundtzen and M.L. Miller (unpublished data, 1999) have mapped an extensive felsic dike and sill swarm that cuts the Upper Cretaceous, Kuskokwim Group in the basin of Gold Run. Miller and others (2002) report that the nearby Buckstock pluton has a U-Pb age of 59.5 Ma. Similar igneous rocks are the sources of placer gold elsewhere in the Kuskokwim mineral belt (Bundtzen and Miller, 1997). Gray, Motooka, and Theodorakos (1997) reported that panned concentrate samples from Gold Run contained visible grains of gold and stibnite, and up to 20 percent scheelite.

Alteration:**Age of mineralization:**

Unknown, but probably 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: No**Site Status:** Inactive**Workings/exploration:**

There was surface sampling and prospecting here before 1951, during 1954, and from 1992 to 1994 (Miller and others, 2002). Gray, Motooka, and Theodorakos (1997) reported that panned-concentrate samples from Gold Run contained visible grains of gold and stibnite and up to 20 percent scheelite.

Production notes:

Morris Hofseth (oral communication, 1991) found a 5 ounce gold-quartz nugget on Gold Run in 1954.

Reserves:**Additional comments:****References:**

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Gray, Motooka, and Theodorakos, 1997; Bundtzen and Miller, 1997; Miller and others, 2002.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/6/2003

Site name(s): Unnamed (summit 3162)**Site type:** Occurrence**ARDF no.:** SM052**Latitude:** 61.3023**Quadrangle:** SM B-7**Longitude:** 158.4578**Location description and accuracy:**

This occurrence is near the top of peak 3162 near the center of the Buckstock Mountains. The occurrence is about 0.2 mile east-southeast of the center of section 17, T. 14 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Zn**Other:** Au, Cd, Mo**Ore minerals:** Iron oxide, pyrite**Gangue minerals:****Geologic description:**

This occurrence consists of pyrite-rich hornfels derived from the Upper Cretaceous, Kuskokwim Group or Mesozoic Gemuk Group (Cady and others, 1955; M.L. Miller, unpublished field data, 1999). The protolith of the fractured hornfels is a medium grained sandstone. The rocks strike N45E and dip 42SE. One grab sample contained up to 21 parts per billion (ppb) gold, 1,750 parts per million (ppm) zinc, 24 ppm molybdenum, and 4.87 ppm cadmium (M.L. Miller, unpublished analytical data, 1999).

Alteration:

Sulfides have altered to iron oxides.

Age of mineralization:

Unknown. Miller and others (2002) report a U-Pb age of 59.2 Ma from the nearby Buckstock pluton.

Deposit model:

Polymetallic replacement deposit? (Cox and Singer, 1986; model 19a).

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

19a?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey investigated the site in 1999.

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Miller and others, 2002.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/10/2003

Site name(s): Unnamed (north end of Buckstock Mountains)**Site type:** Prospect**ARDF no.:** SM053**Latitude:** 61.3868**Quadrangle:** SM B-7**Longitude:** 158.4095**Location description and accuracy:**

This prospect is on hill 2008 at the head of the northern tributary to Gold Run in the northern Buckstock Mountains. The occurrence is near the center of the SW1/4 sec. 5, T. 15 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Au, Cu**Other:** As, Bi, Cd, Pb, W, Zn**Ore minerals:** Arsenopyrite, bornite, chalcopyrite, scheelite, sphalerite**Gangue minerals:** Quartz**Geologic description:**

This prospect consists of two quartz-sulfide veins that strike N75-80W across a knob of hornfels of the Upper Cretaceous Kuskokwim Group; the hornfels is cut by N70E-striking felsic dikes of the Cretaceous Buckstock Mountains intrusive complex (Cady and others, 1955). A younger dike that strikes north-south also cuts hornfels on the ridge. The Buckstock Mountains pluton has a U-Pb age of 59.2 Ma (Miller and others, 2002).

The mineralized quartz veins cut both the hornfels and the dikes. The dikes are argillized and the hornfels near the dikes are intensely altered to tourmaline, quartz, and ferricrete. The two mineralized quartz veins each average about 12 to 20 inches thick and can be traced for about 280 feet before disappearing into talus on both sides of the knob. Sulfides, which make up 1 to 2 percent of the quartz veins, include arsenopyrite, bornite, chalcopyrite, and traces of sphalerite. Yellow scheelite grains were identified in hand specimens. The sulfides are usually associated with quartz that forms coxcomb textures. Six grab samples of the quartz-sulfide veins contained 187 parts per billion (ppb) gold, 72.7 parts per million (ppm) silver, 1,410 ppm copper, 149 ppm bismuth, 1,060 ppm lead, 419 ppm zinc, 495 ppm arsenic, 6.0 ppm cadmium, and 419 ppm tungsten (M.L. Miller and T.K. Bundtzen, unpublished analytical data, 1992, 1999).

Alteration:

Strong argillic alteration in dikes; tourmaline impregnations in hornfels.

Age of mineralization:

Unknown. Miller and others (2002) report a U-Pb age of 59.2 Ma for the Buckstock pluton that is present here as felsic dikes.

Deposit model:

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

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

22c

Production Status: None

Site Status: Inactive

Workings/exploration:

This prospect was sampled during a joint Alaska Division of Geological and Geophysical Surveys and U.S. Geological Survey investigation in 1992.

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Miller and others, 2002.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Unnamed (on northeast bank of Holokuk River)**Site type:** Occurrence**ARDF no.:** SM054**Latitude:** 61.4074**Quadrangle:** SM B-7**Longitude:** 158.3466**Location description and accuracy:**

This occurrence is on the northeast bank of the Holokuk River about 1.0 mile northwest of the mouth of Beemguiga Creek. The occurrence is at an elevation of about 380 feet, about 0.3 mile northwest of the center of section 12, T. 15 N., R. 51 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Au**Other:** Ag, As, Cu, Sb**Ore minerals:** Pyrite**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of a zone of quartz stringers adjacent to a swarm of granite-porphyry dikes that intrudes sandstone and shale of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; T.K. Bundtzen, unpublished field data, 1999). The largest dike strikes N45E and is about 30 feet wide. One grab sample of a quartz stringer contained 141 parts per billion (ppb) gold, 138 parts per million (ppm) arsenic, 200 ppb silver, 21 ppm antimony, and 118 ppm copper (T.K. Bundtzen, unpublished analytical data, 1999).

Alteration:

Sericite alteration in dikes.

Age of mineralization:**Deposit model:**

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

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

22c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey sampled the site in 1999.

Production notes:**Reserves:****Additional comments:**

References:

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/10/2003

Site name(s): Holokuk Mountain**Site type:** Prospect**ARDF no.:** SM055**Latitude:** 61.3901**Quadrangle:** SM B-7**Longitude:** 158.2615**Location description and accuracy:**

The Holokuk Mountain prospect is at an elevation of about 2,350 feet about 0.4 mile northwest of peak 3229 at the southwest end of Holokuk Mountain. The prospect is about 0.3 mile west of the center of sec. 16, T. 15 N., R. 50 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Au, Sb**Other:** As, Bi, Cd, Cu, W**Ore minerals:** Arsenopyrite, boulangerite?, kermesite, stibnite**Gangue minerals:** Quartz**Geologic description:**

The Holokuk Mountain prospect consists of auriferous, sulfide-sulfosalt-bearing quartz veins in an altered porphyritic felsic intrusion with pyrite and sericite. The intrusion is associated with dark gray hornfels derived from the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955). Quartz float is abundant in the area and is spread along the hill slope for about 250 feet in elevation. The prospect consists of quartz stockwork veins in an area of rubble-crop area at least 100 feet by 480 feet in size. A breccia zone in the hornfels which strikes N70W, has quartz-sulfide veins up to 4 inches thick. A north-south trending, barren mafic dike cuts both the porphyritic felsic intrusive and the hornfels with the quartz-sulfide veins. The quartz veins contain disseminations and masses of 1 to 5 percent stibnite, arsenopyrite, boulangerite?, pyrite, and kermesite. The quartz-sulfide veins comprise about 2 to 5 percent of the host rock. About 50 percent of the mineralization is in rubble-crop and talus. The mineralized zone is open-ended to the east. Twelve samples contain up to 2,700 parts per billion (ppb) gold, 35.4 parts per million (ppm) silver, 4,130 ppm arsenic, 1.06 ppm mercury, 3.0 ppm cadmium, 105 ppm bismuth, 307 ppm lead, more than 6,000 ppm antimony, 204 ppm copper, 13 ppm tin, and 12.0 ppm tungsten (T.K. Bundtzen and M.L. Miller, unpublished analytical data, 1998).

Alteration:

Pervasive sericite (phyllic) alteration adjacent to veins and in intrusive host rocks.

Age of mineralization:

Unknown. Plutonic rocks on the east end of Holokuk Mountain have a 40K/40Ar age of 68.0 Ma (Decker and others, 1995).

Deposit model:

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

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

22c

Production Status: None

Site Status: Inactive

Workings/exploration:

The prospect was discovered during surface sampling and mapping investigations carried out by the U.S. Geological Survey, in 1998 (T.K. Bundtzen and M.L. Miller, unpublished field data, 1998).

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Decker and others, 1995.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (on lower Kiokluk Creek)**Site type:** Occurrence**ARDF no.:** SM056**Latitude:** 61.3335**Quadrangle:** SM B-6**Longitude:** 158.1648**Location description and accuracy:**

This occurrence is along the eastern edge of a steep-walled canyon along lower Kiokluk Creek. The occurrence is at an elevation of about 650 feet about 3.7 miles southwest of the summit of Chuneekluk Mountain, in the NW1/4 sec. 1, T. 14 N., R. 50 W., of the Seward Meridian.

Commodities:**Main:** Hg**Other:****Ore minerals:****Gangue minerals:****Geologic description:**

This occurrence is in an altered rhyolite dike that intrudes sandstone and shale of the Upper Cretaceous, Kuskokwim group (Cady and others, 1955; Decker and others, 1995; Miller and others, 1989). One grab sample contained 1.9 parts per million mercury (Robinson, 1984 [RI 84-11]).

Alteration:**Age of mineralization:****Deposit model:****Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

The Alaska Division of Geological and Geophysical Surveys investigated this occurrence in the 1980s (Robinson, 1984 [RI 84-11]; Decker and others, 1995).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Robinson, 1984 (RI 84-11); Miller and others, 1989; Decker and others, 1995.

Primary reference: Robinson, 1984 (RI 84-11)

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Chineekluk Mountain**Site type:** Prospect**ARDF no.:** SM057**Latitude:** 61.3696**Quadrangle:** SM B-6**Longitude:** 158.0696**Location description and accuracy:**

This prospect is on the northeastern shoulder of Chineekluk Mountain, about 0.3 mile northeast of the summit. The prospect is at an elevation of about 1,500 feet in the SE1/4 sec. 21, T. 15 N., R. 49 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Hg**Other:** Ag, Au, Bi, Cd, Pb, Sr, W, Zn**Ore minerals:** Cinnabar, pyrite**Gangue minerals:** Quartz**Geologic description:**

The Chineekluk Mountain cinnabar prospect is in an N65E-trending swarm of altered, mafic dikes that cut hornfels of the Upper Cretaceous Kuskokwim Group on the northeast flank of Chineekluk Mountain (Cady and others, 1955; Decker and others, 1995; M.L. Miller and T.K. Bundtzen, unpublished field data, 1998, 1999). The cinnabar occurs as: 1) isolated grains up to 5 mm in size and as ellipsoidal lenses in altered dikes; 2) in ferricrete breccia zones in hornfels; and 3) in quartz veinlets that intrude both hornfels and the altered mafic dikes. Euhedral, bright-red cinnabar grains are up to 1 cm in diameter. Three cinnabar-bearing zones occur over a distance of about 300 feet on the shoulder of Chineekluk Mountain. Each mineralized zone ranges from 50 to 100 feet long and from 15 to 45 feet thick. The cinnabar-bearing quartz veins are locally controlled by small, northwest-trending, high angle fractures that are oblique to the general northeast trend of the altered mafic dikes. Chip and grab samples of cinnabar mineralization of all three types described were collected (M.L. Miller and T.K. Bundtzen, unpublished analytical data, 1998 and 1999). They contain up to 1.63 percent mercury, 12 parts per billion (ppb) gold, 14.3 parts per million (ppm) silver, 109 ppm antimony, 1,120 ppm lead, 2,310 ppm zinc, 5.5 ppm cadmium, 57.4 ppm tungsten, and 601 ppm strontium. The Chineekluk Mountain mercury deposit may contain specimen quality crystal-line cinnabar.

Alteration:

Silica-carbonate alteration of mafic dikes.

Age of mineralization:

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury? (Cox and Singer, 1986; model 27c).

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

27c?

Production Status: None

Site Status: Inactive

Workings/exploration:

M.L. Miller found the Chineekluk prospect during geologic mapping by the U.S. Geological Survey in 1998. The prospect was sketched and sampled the following year (T.K. Bundtzen, unpublished field data, 1999).

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; White and Robertson, 1962; Wells and Ghiorso, 1988; Decker and others, 1995; Gray, Gent, and others, 1997.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Mountain Top**Site type:** Mine**ARDF no.:** SM058**Latitude:** 61.3957**Quadrangle:** SM B-6**Longitude:** 157.9629**Location description and accuracy:**

The Mountain Top Mine is on a small plateau about 4.2 mile east-northeast of Chineekluk Mountain. It is at an elevation of about 1400 feet, about 0.6 mile northwest of the center of sec. 18, T. 15 N., R. 48 W., of the Seward Meridian. The location is accurate. The mine is locality 34 of Miller and others (1989).

Commodities:**Main:** Hg**Other:** Ag, As, Au, Co, Cr, Sb**Ore minerals:** Cinnabar, pyrite, stibnite**Gangue minerals:** Carbonate, quartz**Geologic description:**

The rocks in the vicinity of the Mountain Top Mine consists of thermally altered, olivine basalt that overlies(?) sandstone and siltstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; Sorg and Estlund, 1972). The basalt is interpreted to be a large dike by Sorg and Estlund (1972); a flow by Reifenhuth and others (1984) and by the reporters of this record (T.K. Bundtzen and M.L. Miller, unpublished field data, 1988).

A series of four, en echelon, high-angle faults cut the olivine basalt; the faults strike about N50W, and dip about 80NE (T.K. Bundtzen and M.L. Miller, unpublished prospect map, 1988). The faults are filled with cinnabar, pyrite, and minor stibnite, in a gangue that consists of carbonate minerals and euhedral crystals of quartz. The individual ore zones range from 120 to 190 feet long and 4 to 18 inches thick.

Sorg and Estlund (1972) reported that small amounts of liquid hydrocarbon accompany the cinnabar; they also identified dickite and buddingtonite in the mineralized zones. Their mineralized grab samples contained up to 2.00 percent mercury, 1,500 parts per million (ppm) chromium, 100 ppm cobalt, 1,500 ppm arsenic, and 1.5 ppm silver. The high chromium and cobalt probably reflect high background values in the mafic host rocks. Up to 300 parts per billion gold were identified in cinnabar-rich zones (Robinson, 1984 [RI 84-11]). From 1982-1986, about 165 flasks (about 12,540 pounds) of mercury were produced from the Mountain Top Mine (Bundtzen and others, 1987; Miller and others, 1989).

Alteration:

Mafic dikes are altered to dickite and buddingtonite.

Age of mineralization:

Undated; the nearby Fairview prospect (ARDF SM019) has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 72.6 Ma (Gray, Gent, and others, 1997).

Deposit model:

Silica-carbonate mercury? (Cox and Singer, 1986; model 27c).

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

27c?

Production Status: Yes; small

Site Status: Probably inactive

Workings/exploration:

James R. Wylie discovered the Mountain Top deposit in 1968 after panning cinnabar to its hardrock source. J. R. Wylie subsequently explored the deposit with an auger drill and a bulldozer. In 1970, the U.S. Bureau of Mines drilled seven core holes on the property, the deepest of which was 50 feet. Sorg and Estlund (1972) published a detailed geologic map of the property in 1971. The reporters of this record made a geologic sketch of the property in 1988 (T.K. Bundtzen and M.L. Miller, unpublished. data) In 1988, a D-6 bulldozer, a small ball mill, a jig plant, and a retort furnace were on the mine site.

Production notes:

From 1982 to 1986, about 165 flasks of mercury were produced from the Mountain Top Mine (Bundtzen and others, 1987; Miller and others, 1989).

Reserves:

According to Sorg and Estlund (1972), there were 200 flasks of mercury 'in sight' in 1971.

Additional comments:

References:

Cady and others, 1955; White and Robertson, 1962; Sorg and Estlund, 1972; Cobb, 1976 (OFR 76-606); Reifentstahl and others, 1984; Robinson, 1984 (RI 84-11); Bundtzen and others, 1987; Wells and Ghiorso, 1988; Miller and others, 1989; Gray, Gent, and others, 1997.

Primary reference: Sorg and Estlund, 1972; this record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Hill Top**Site type:** Occurrence**ARDF no.:** SM059**Latitude:** 61.4477**Quadrangle:** SM B-6**Longitude:** 157.9612**Location description and accuracy:**

The Hill Top occurrence is located on the southwest flank of a prominent, unnamed hill east of the upper reaches of the south fork of the Oskawalik River. It is about 3.6 miles north of the Mountain Top Mine (SM058), at an elevation of about 2,200 feet, about 0.3 mile west of the center of section 30, T. 16 N., R. 48 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** As, Au**Other:** Ag, Hg**Ore minerals:** Arsenopyrite**Gangue minerals:****Geologic description:**

The Hill Top occurrence consists of a rhyolite breccia zone in a felsic sill complex that intrudes sandstone and shale of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; Decker and others, 1995). The sills are part of a large, prominent northeast-trending sill complex in the central Sleetmute quadrangle (Cady and others, 1955). One grab sample of rhyolite breccia collected by the Alaska Division of Geological and Geophysical Surveys contained 927 parts per million (ppm) arsenic, 300 parts per billion (ppb) gold, 600 ppb silver, and 2.9 ppm mercury (Robinson, 1984 [RI 84-11]; Miller and others, 1989).

Alteration:**Age of mineralization:**

Unknown. Decker and others (1995) report 40K/40Ar ages of from 67 to 70 Ma for a nearby sill swarm that is probably similar to the sills at this occurrence.

Deposit model:**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

The Alaska Division of Geological and Geophysical Surveys investigated the Hill Top occurrence in the 1980s (Robinson, 1984 [RI 84-11]; Decker and others, 1995).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Robinson, 1984 (RI 84-11); Miller and others, 1989; Decker and others, 1995.

Primary reference: Robinson, 1984 (RI 84-11)

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Unnamed (eastern Chuilnuk Mountains)**Site type:** Occurrence**ARDF no.:** SM060**Latitude:** 61.3154**Quadrangle:** SM B-5**Longitude:** 157.7487**Location description and accuracy:**

This occurrence is in the eastern Chuilnuk Mountains, in the headwall cirque of an unnamed tributary of the Chuilnuk River. It is at an elevation of about 2,700 feet, about 0.6 mile east of peak 3310 and 0.6 mile north-northwest of peak 3110, in the SW1/4 sec. 8, T. 14 N., R. 47 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Bi, Sn**Other:** As, Au, Sb**Ore minerals:** Unspecified sulfides**Gangue minerals:** Quartz, tourmaline**Geologic description:**

This occurrence consists of a series of quartz-tourmaline-sulfide-bearing greisen veins in the 68-Ma-old Chuilnuk Mountains pluton (Cady and others, 1955). The Chuilnik Mountains pluton is a mesozonal intrusion composed of medium-grained, hornblende-biotite granodiorite that intrudes shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Decker and others, 1995).

The veins vary from 1 to 4 inches thick and occur at a density of about 1 vein per foot. The sulfide content of the veins is low, less than 2.0 percent, but tourmaline makes up as much as 20 percent of the vein material. The greisen veins can be traced perpendicular to its strike for about 1,300 feet across the cirque headwall. Individual veins strike N5-15E and dip nearly vertically and they extend up the headwalls of the cirque here for at least 300 feet. Two grab samples of the veins collected at the base of the cirque contained up to 63 parts per billion (ppb) gold, 2,300 ppb silver, 515 parts per million (ppm) arsenic, 405 ppm bismuth, 59 ppm antimony, and 123 ppm tin (T. K. Bundtzen, unpublished data, 1998).

Alteration:

Development of tourmaline-quartz-sulfide greisen.

Age of mineralization:

Unknown. Decker and others (1995) report a 40K/40Ar biotite age of 68 Ma for the Chuilnuk Mountains pluton.

Deposit model:

Silver-polymetallic veins or tin veins (Cox and Singer, 1986; models 20b or 15b).

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

20b or 15b

Production Status: None**Site Status:** Inactive

Workings/exploration:

The geology of the Chuilnik Mountains area was mapped by the U.S. Geological Survey in the 1940s and by the Alaska Division of Geological and Geophysical Surveys in the 1980s (Cady and others, 1955; Decker and others, 1995). This occurrence was discovered in 1998 (T.K. Bundtzen, unpublished data, 1998).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Decker and others, 1995.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Timber Creek**Site type:** Prospect**ARDF no.:** SM061**Latitude:** 61.0103**Quadrangle:** SM A-8**Longitude:** 158.9083**Location description and accuracy:**

Timber Creek has been prospected for placer gold for about a mile at the southwest end of the Buckstock Mountains. The coordinates are at about the center of the prospecting. The site is at an elevation of about 630 feet in the W1/2, sec. 29, T. 11 N., R. 54 W., of the Seward Meridian. The prospect is locality 38 of Miller and others (1989). The location is approximate.

Commodities:**Main:** Au**Other:****Ore minerals:** Placer gold**Gangue minerals:****Geologic description:**

Cady and others (1955) cite reports of placer gold prospects on upper Timber Creek. No other information on this prospect is available. The rocks in the area are shale and sandstone of the Upper Cretaceous. Kuskokwim Group. The rocks are intruded by an extensive swarm of mafic to felsic dikes and sills similar to those associated with placer deposits in other parts of the Kuskokwim mineral belt (Bundtzen and Miller, 1997).

Alteration:**Age of mineralization:**

Unknown, but probably 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:**

There were surface sampling and prospecting before 1951. One of the reporters of this record (T.K. Bundtzen) sampled the site in 1998.

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Bundtzen and Miller, 1997.

Primary reference: Cady and others, 1955

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/6/2003

Site name(s): Unnamed (southwestern Buckstock Mountains)**Site type:** Occurrence**ARDF no.:** SM062**Latitude:** 61.0974**Quadrangle:** SM A-8**Longitude:** 158.8698**Location description and accuracy:**

This occurrence is located on a northwest-facing spur overlooking an unnamed eastern tributary of Timber Creek. The occurrence is at an elevation of about 1,100 feet, about 0.3 mile south-southwest of the center of sec. 28, T. 12 N., R54 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** V, Zn**Other:** Mn**Ore minerals:****Gangue minerals:** Axinite, quartz**Geologic description:**

This occurrence is adjacent to a dike swarm that intrudes the the Mesozoic Gemuk Group that here consists of tan, volcanoclastic sandstone with pebble conglomerate and minor limestone clasts (Cady and others, 1955). The occurrence consists of an irregular zone of axinite-quartz breccia that can be found as rubble crop over an area of about 150 by 100 feet in size. Brown to purple axinite grains and masses up to 2 inches thick make up to 10 percent of the breccia. One sample contained 1.20 percent manganese, 320 parts per million (ppm) zinc, and 310 ppm vanadium (T.K. Bundtzen, unpublished data, 1993).

Alteration:

Development of axinite-quartz greisen.

Age of mineralization:**Deposit model:****Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

The prospect was discovered during surface sampling and mapping by government geologists (T.K. Bundtzen, unpublished data, 1993).

Production notes:**Reserves:****Additional comments:**

References:

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (southwest edge of Buckstock Mountains)**Site type:** Occurrence**ARDF no.:** SM063**Latitude:** 61.1533**Quadrangle:** SM A-8**Longitude:** 158.8521**Location description and accuracy:**

This occurrence is on the summit of a prominent, northeast-trending ridge at the head of two, north-flowing, unnamed tributaries of the Aniak River. The occurrence is at an elevation of about 1,800 feet, about 0.7 mile southwest of hill 2303 near the southwest corner of section 3, T. 12 N., R. 54 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Au**Other:** Bi**Ore minerals:** Pyrite**Gangue minerals:** Quartz**Geologic description:**

This occurrence is a vuggy quartz vein that cuts sedimentary rocks of the Mesozoic Gemuk Group, adjacent to a large, sericitized, felsic dike (Cady and others, 1955; T.K. Bundtzen, unpublished field data, 1999). The dike strikes northeast and dips about 40N; the quartz vein parallels the dike. One grab sample of the quartz vein contained 63 parts per billion (ppb) gold, 4,000 ppb silver, and 21 parts per million (ppm) bismuth. A sample of gossan collected in a dike swarm to the north of the this occurrence contained 188 ppm arsenic, 338 ppm copper, and 230 ppm zinc (D. Bradley, unpublished analytical data, 1999).

Alteration:

Sericite in felsic dike.

Age of mineralization:

Unknown. Miller and others (2002) report a U-Pb age of 59.2 Ma from the Buckstock pluton.

Deposit model:

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

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

22c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey investigated the occurrence in 1999.

Production notes:

Reserves:**Additional comments:****References:**

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/10/2003

Site name(s): Unnamed (western edge of Buckstock Mountains)**Site type:** Occurrence**ARDF no.:** SM064**Latitude:** 61.1788**Quadrangle:** SM A-8**Longitude:** 158.8393**Location description and accuracy:**

This occurrence is located on a north-south-trending ridge line on the western side of the Buckstock Mountains to the east of an unnamed tributary of the Buckstock River. The occurrence is about 0.2 mile south of hill 2170, in the NE1/4 sec. 31, T. 13 N., R. 53 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** As, Sb**Other:****Ore minerals:** Arsenopyrite, stibnite**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of a quartz-sulfide vein and sulfides disseminated in granite porphyry that is part of a dense dike swarm that intrudes shale and sandstone of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955). The swarm strikes east-west, dips vertically, and includes granite porphyry, granodiorite, and minor mafic dikes. Most dikes have undergone various degrees of sericitic alteration. At least 10 different dikes, each ranging from 10 to 50 feet thick cross a ridge over a distance of about 1,600 feet. One quartz vein, which strikes about N80W and dips vertically, contains masses of up to 20 percent arsenopyrite and 1 to 3 percent stibnite (T.K. Bundtzen, unpublished data, 1992). One sample reported by Gray, Mootooka, and Theodorakos (1997) contained 73 parts per million (ppm) bismuth, 130 ppm arsenic, and 48 ppm copper.

Alteration:

Sericitization of dikes.

Age of mineralization:**Deposit model:**

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

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

22c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

An old, shallow, caved-in prospect pit exposed some of the arsenopyrite bearing mineralized. This occurrence was investigated and sampled in 1992 (T.K. Bundtzen, unpublished data, 1992).

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Gray, Motooka, and Theodorakos, 1997.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (southwestern Buckstock Mountains)**Site type:** Occurrence**ARDF no.:** SM065**Latitude:** 61.0936**Quadrangle:** SM A-8**Longitude:** 158.8148**Location description and accuracy:**

This occurrence is on a northeast-trending, broad ridge near the head of a northeast fork of Timber Creek, in the southwest corner of the Buckstock Mountains. The occurrence is about 0.3 mile southeast of Hill 2331. It is at an elevation of about 2,200 feet in the NW1/4 sec. 35, T. 12 N., R. 54 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** As**Other:** Au**Ore minerals:** Arsenopyrite**Gangue minerals:** Quartz**Geologic description:**

This occurrence is a large quartz vein with minor disseminated sulfides that intrudes tuffaceous sediments of the Mesozoic Gemuk group (Cady and others, 1955; T.K. Bundtzen unpublished field data, 1993). Based on rubble crop, the quartz vein strikes N20W and can be traced for about 1,600 feet. The vein is from about 1 foot to 10 feet wide. One arsenopyrite-bearing sample of the quartz vein contained 4,500 parts per million arsenic and 200 parts per billion gold (T.K. Bundtzen, unpublished analytical data, 1993).

Alteration:**Age of mineralization:****Deposit model:**

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

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

Production Status: None**Site Status:** Inactive**Workings/exploration:**

This occurrence was found in 1993 during a cooperative study by the Alaska Division of Geological and Geophysical Surveys and the U.S. Geological Survey in the Buckstock Mountains.

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Unnamed (near hill 2548 west of Buckstock River)**Site type:** Occurrence**ARDF no.:** SM066**Latitude:** 61.2172**Quadrangle:** SM A-8**Longitude:** 158.7873**Location description and accuracy:**

This occurrence is at an elevation of about 2,200 feet along a ridge in the west, central part of the Buckstock Mountains. The occurrences is about 0.3 mile south of peak 2548, about 0.2 mile east of the center of section 16, T. 13 N., R. 53 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Au**Other:** As, Bi, Sb, Zn**Ore minerals:** Goethite after sulfide**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of quartz veinlets and iron-stained breccia in coarse-grained hornfels formed from the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955; T.K. Bundtzen and D. Bradley, unpublished field data, 1999). The hornfels strike N46E and dip 42NW. The breccias and quartz veinlets may parallel cleavage which strikes N30E and dips 70SE (T.K. Bundtzen, unpublished field data, 1999). The mineralization is sparse and weak. One grab sample of hornfels with quartz veinlets contained 301 parts per billion (ppb) gold, 34 parts per million (ppm) antimony, and 198 ppm arsenic. Another grab sample collected at the northeast end of the mineralized zone contained 798 ppm arsenic, 33.0 ppm bismuth, and 264 ppm zinc (T.K. Bundtzen and D. Bradley, unpublished analytical data, 1999).

Alteration:

Hornfelsing of clastic rocks.

Age of mineralization:**Deposit model:**

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

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

22c?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The U. S. Geological Survey sampled the occurrence in 1999.

Production notes:

Reserves:**Additional comments:****References:**

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Unnamed (southwestern Buckstock Mountains)**Site type:** Occurrence**ARDF no.:** SM067**Latitude:** 61.1413**Quadrangle:** SM A-8**Longitude:** 158.7658**Location description and accuracy:**

This occurrence is a 0.6-mile-long area on a northeast-trending ridge overlooking an unnamed tributary of the Buckstock River. The coordinates are for the center of the area which is at elevation of about 1,900 feet in the SE1/4 sec. 12, T. 12 N., R. 53 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, As**Other:** Au, Sb**Ore minerals:** Unspecified gray sulfide**Gangue minerals:** Axinite, quartz, tourmaline**Geologic description:**

This occurrence consists of a large swarm of hydrothermally altered of dikes of granite porphyry to alaskite that intrudes sedimentary rocks of the Mesozoic Gemuk Group (Cady and others, 1955; T.K. Bundtzen, unpublished field data, 1999). The altered area includes numerous quartz-tourmaline-axinite-bearing veins that are associated with highly altered felsic dikes that, based on rubble-crop, strike northeast and dip steeply. The zone of alteration can be traced N70E about 0.6 mile and has a width of from 50 to 300 feet. The quartz veins contains blades of an unidentified gray sulfide mineral in small hairline fractures. In some areas the alteration zone contains tourmaline and axinite-bearing breccias that replace alaskite dikes. Grab samples of tourmaline-quartz veins contain up to 437 parts per million (ppm) arsenic, 700 parts per billion (ppb) silver, 18 ppb gold, and 29 ppm antimony (T.K. Bundtzen, unpublished analytical data, 1999).

Alteration:

Development of tourmaline-axinite-quartz greisen.

Age of mineralization:

Unknown. Miller and others (2002) give a U-Pb age of 59.2 Ma for the Buckstock pluton.

Deposit model:

Silver-polymetallic veins? (Cox and Singer, 1986; model 20b).

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

20b?

Production Status: None**Site Status:** Inactive**Workings/exploration:**

Surface sampling and mapping was completed by the U.S. Geological Survey in 1999.

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Unnamed (southwest forks of Buckstock River)**Site type:** Occurrence**ARDF no.:** SM068**Latitude:** 61.1677**Quadrangle:** SM A-8**Longitude:** 158.7441**Location description and accuracy:**

This occurrence is at an elevation of about 2,100 feet on the crest of an east-west trending ridge between two, unnamed, northeast flowing tributaries of the Buckstock River. It is about 0.4 mile west-northwest of hill 2280 near the southwest corner of section 35, T. 13 n., R. 53 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Ag, Au**Other:** As, Cd, Sb, W**Ore minerals:** Arsenopyrite, pyrite, stibnite**Gangue minerals:** Quartz**Geologic description:**

This occurrence consist of quartz-sulfide veins and stringers that cut altered sandstone and siltstone of either the Upper Cretaceous, Kuskokwim Group or the Mesozoic Gemuk Group (Cady and others, 1955; M. L. Miller, W. Keith, and T.K. Bundtzen, unpublished field data, 1999). The occurrence is near the projected (fault?) contact between the Gemuk and Kuskokwim Groups. Pyrite is ubiquitous in the quartz veins and stringers; arsenopyrite and stibnite, which occur as isolated grains and blades, are less common. One grab sample of stibnite- and arsenopyrite-bearing vein material contained 14,800 parts per billion (ppb) gold, 5,700 ppb silver, 1,090 parts per million (ppm) antimony, 1.38 percent arsenic, and 13.7 ppm tungsten (W. J. Keith and T.K. Bundtzen, unpublished analytical data, 1999).

Alteration:

Vein appears to be hydrothermally bleached.

Age of mineralization:**Deposit model:**

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

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

22c

Production Status: None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey investigated the site in 1999.

Production notes:

Reserves:**Additional comments:****References:**

Cady and others, 1955.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Unnamed (western Buckstock Mountains)**Site type:** Occurrence**ARDF no.:** SM069**Latitude:** 61.1776**Quadrangle:** SM A-8**Longitude:** 158.7279**Location description and accuracy:**

This occurrence is in the canyon of an unnamed, north-northeast- flowing, tributary of the Buckstock River in the western Buckstock Mountains. The occurrence is at an elevation of about 1,300 feet, about 0.4 mile north-northeast of the center of sec. 35, T. 13 N., R. 53 W., of the Seward Meridian. The location is approximate.

Commodities:**Main:** As, Bi**Other:****Ore minerals:** Pyrite**Gangue minerals:****Geologic description:**

The rocks in the area consist of sandstone and shale of the Upper Cretaceous, Kuskokwim Group that have been intruded by numerous, felsic and intermediate dikes and sills (Cady and others, 1955; Gray, Motooka, and Theodorakos, 1997). One sample collected here of graywacke hornfels containing disseminated pyrite, 150 parts per million (ppm) arsenic, and 8.4 ppm bismuth (Gray, Motooka, and Theodorakos, 1997). Several anomalous stream sediment and panned concentrate samples were collected in the vicinity (Gray, Motooka, and Theodorakos, 1997). Stream sediment samples contain up to 10 parts per billion (ppb) gold and 1.3 parts per million (ppm) bismuth. Panned concentrate samples contain up to 1,000 ppm bismuth, 1,000 ppm tungsten, 30 ppm gold, and 10 ppm silver.

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:**

Samples were collected by the U.S. Geological Survey in 1995 (Gray, Motooka, and Theodorakos, 1997).

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Gray, Motooka, and Theodorakos, 1997.

Primary reference: Gray, Motooka, and Theodorakos, 1997

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

Site name(s): Unnamed (northeast of upper Buckstock River)**Site type:** Prospect**ARDF no.:** SM070**Latitude:** 61.2187**Quadrangle:** SM A-7**Longitude:** 158.6141**Location description and accuracy:**

This prospect is at the head of an unnamed, north-flowing, tributary of the Buckstock River in the central Buckstock Mountains. The occurrence is at an elevation of about 1,600 feet, about 0.2 mile north-northwest of the center of sec. 16, T. 13 N., R. 52 W., of the Seward Meridian. The location is approximate.

Commodities:**Main:** As, Cu, Sb**Other:** Ag, Au, Bi, Hg, W**Ore minerals:** Arsenopyrite, pyrite**Gangue minerals:** Quartz**Geologic description:**

The deposit at this prospect consists of: 1) graywacke hornfels with quartz veinlets; 2) silicified granite porphyry with iron oxides; and 3) pyrite-arsenopyrite-bearing, vuggy quartz veins in granite porphyry (Gray, Motooka, and Theodorakos, 1997). The area is underlain by the Cretaceous Buckstock pluton and associated dikes and sills that intrude the sandstone and shale of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955). The Buckstock pluton has a U-Pb age of 59.2 Ma (Miller and others, 2002). Four grab samples contained up to 1,100 parts per million (ppm) arsenic, 3.4 ppm bismuth, 590 ppm copper, 1.6 ppm mercury, 34 parts per billion (ppb) gold, and 290 ppm antimony (Gray, Motooka, and Theodorakos, 1997).

The prospect is in the southwest corner of an area of anomalous stream-sediment and panned-concentrate samples (Gray, Motooka, and Theodorakos, 1997). Stream sediments contained up to 1.3 ppm gold, 150 ppm arsenic, 14 ppm bismuth, and elevated antimony and tungsten. Pan concentrates contained up to 200 ppm gold, 100 ppm silver, 500 ppm antimony, 3,000 ppm tungsten, and more than 2,000 ppm bismuth.

Alteration:

Silicification and iron-oxide alteration of granite porphyry.

Age of mineralization:

Uncertain. Miller and others (2002) report a U-Pb age of 59.2 Ma from the Buckstock pluton that makes up much of the area.

Deposit model:

Polymetallic replacement deposit? (Cox and Singer, 1986; model 19a).

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

19a?

Production Status: None**Site Status:** Inactive

Workings/exploration:

Surface sampling was done by the U.S. Geological Survey in 1995 (Gray, Motooka, and Theodorakos, 1997).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Gray, Motooka, and Theodorakos, 1997; Miller and others, 2002.

Primary reference: Gray, Motooka, and Theodorakos, 1997

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Girl Creek**Site type:** Occurrence**ARDF no.:** SM071**Latitude:** 61.2286**Quadrangle:** ID A-7**Longitude:** 158.4466**Location description and accuracy:**

Gold has been found on the upper part of Girl Creek for about 1.0 mile. The coordinates are at about the center of the occurrence at an elevation of about 1,000 feet in the SW 1/4 sec. 9, T. 13N., R. 51W., of the Seward Meridian. The occurrence is locality 36 of Miller and others (1989). The location is accurate.

Commodities:**Main:** Au**Other:****Ore minerals:** Cinnabar, gold, ilmenite, magnetite, scheelite**Gangue minerals:****Geologic description:**

Cady and others (1955) cite reports of placer gold prospects on Girl Creek. The rocks in the area consist of shale and sandstone of the Upper Cretaceous, Kuskokwim Group, siliceous sedimentary rocks of the Mesozoic Gemuk Group, and an extensive swarm of mafic to felsic dikes and sills similar to those associated with placer deposits in other parts of the Kuskokwim mineral belt (Bundtzen and Miller, 1997).

Girl Creek occupies a nearly straight, northeast-striking, steep-walled canyon that was mapped by Cady and others (1955) as a high angle fault, an interpretation confirmed by more recent mapping (M.L. Miller, D. Bradley, and T.K. Bundtzen, written communication, 2002). Massive slump blocks that occur along the canyon suggest that the Girl Creek fault has been active recently.

Panned concentrates from three sites along the creek contain scheelite, abundant cinnabar, small grains of gold, magnetite, and ilmenite (T.K. Bundtzen, written communication, 1999). Sulfide-bearing tourmaline breccias was observed in outcrops along the north side of the Girl Creek canyon (T.K. Bundtzen and M.L. Miller, unpublished field data, 1999).

Alteration:**Age of mineralization:**

Undated, but probably 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:**

Surface prospecting took place prior to 1951 (Cady and others, 1955). In 1999, one of the compilers of this site (Bundtzen) collected three panned concentrate samples here.

Production notes:

Reserves:

Additional comments:

References:

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Bundtzen and Miller, 1997.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/6/2003

Site name(s): Unnamed (head of Boss Creek)**Site type:** Occurrence**ARDF no.:** SM072**Latitude:** 61.0808**Quadrangle:** SM A-7**Longitude:** 158.2557**Location description and accuracy:**

This occurrence is at the head of Boss Creek, a north-flowing tributary of the Holokuk River. The occurrence is at an elevation of about 1,400 feet in the SW1/4 sec. 36, T. 12 N., R. 50 W., of the Seward Meridian. The location is approximate.

Commodities:**Main:** As**Other:** Au, Sb**Ore minerals:** Pyrite**Gangue minerals:** Quartz**Geologic description:**

This occurrence consists of silicified graywacke of either the Upper Cretaceous, Kuskokwim Group or the Mesozoic Gemuk Group (Cady and others, 1955). The silicified graywacke is cut by quartz veins with disseminated pyrite (Gray, Motooka, and Theodorakos, 1997). No other information is available. One grab sample of silicified graywacke contained 1,000 parts per million (ppm) arsenic, 50 parts per billion (ppb) gold, and 6.1 ppm antimony (Gray, Motooka, and Theodorakos, 1997).

Alteration:

Silicification of graywacke.

Age of mineralization:**Deposit model:****Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey sampled the occurrence in 1995 (Gray, Motooka, and Theodorakos, 1997).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Gray, Motooka, and Theodorakos, 1997.

Primary reference: Gray, Motooka, and Theodorakos, 1997

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/8/2003

Site name(s): Fortyseven Creek Lode**Site type:** Prospect**ARDF no.:** SM073**Latitude:** 61.0500**Quadrangle:** SM A-6**Longitude:** 158.1969**Location description and accuracy:**

The Fortyseven Creek lode deposit extends for about 1.4 miles along the ridge at the head of Fortyseven Creek. The center of this deposit is about 0.3 mile north of hill 2137 in the SW1/4, sec. 8, T. 11 N., R. 50 W., of the Seward Meridian. The location is accurate. The deposit is locality 40 of Miller and others (1989).

Commodities:**Main:** Ag, Au, W**Other:** As, Bi, Sb, Sn**Ore minerals:** Argentite, arsenopyrite, gold, jamesonite, pyrite, scheelite, silver, stibnite, tellurides, wolframite**Gangue minerals:** Carbonate, quartz, tourmaline**Geologic description:**

The rocks in the vicinity of the Fortyseven Creek lode prospect are sandstone, siltstone, and shale of the Upper Cretaceous, Kuskokwim Group (Cady and others, 1955) that are intruded by small alaskite and granite porphyry bodies (Robinson, 1984 [RI 84-7]; Decker and others, 1995). Detailed geologic mapping of the prospect area (Bundtzen, unpublished, field data, 1983, 1998) indicates that a 3,300-foot section of the sedimentary rocks is complexly folded. Sub-isoclinal folds are overturned with vergence to the east-southeast. The prospect area is cut by a N25E-trending, vertically dipping fault zone that can be traced for a distance of at least 15 miles; the fault is sub-parallel to the trace of the Denali-Holitna fault zone which is about 2.4 miles to the southeast. This fault zone, informally called the Fortyseven Creek fault zone, contains a pronounced zone of shearing that ranges in width from about 160 to 3,000 feet. A zone of hornfels averaging about 1,000 feet thick parallels the southeast edge of the Fortyseven Creek fault zone. A small alaskite stock cuts the shear zone near the southern boundary of the prospect area (Bundtzen and Nokleberg, 1987). Decker and others (1995) reported a K-Ar age of 63.0 Ma from sericite in the mineralized portion of the Fortyseven Creek fault zone. However, Gray, Gent, and others (1997b) and Miller and others (2002) reported 40Ar/39Ar sericite age of 70.3 Ma from sericite in the mineralized portion of the Fortyseven Creek fault zone.

Mineralization in the Fortyseven Creek fault zone consists of conjugate, extensively sheared, quartz-carbonate-sulfide veins that strike N75E and N50W, and dip steeply. The individual veins range from 8 inches to 10 feet thick. Ore minerals occur in discontinuous pods in individual quartz-carbonate veins. The most abundant sulfides are arsenopyrite and pyrite, followed by argentite, jamesonite, scheelite, stibnite, wolframite and free gold. The scheelite grains in the quartz veins are locally quite large; individual grains and masses are up to 1.5 inches in diameter.

Selected samples of mineralization contain up to 34 parts per million (ppm) gold (Hawley, 1989). Robinson (1984 [RI 84-7]) reported grades of up to 2.4 ppm gold and 16.7 ppm silver from grab samples at the Fortyseven Creek lode. Six chip-channel samples collected by T.K. Bundtzen along a 1.2 mile of the fault zone (unpublished data, 1998) contained up to 332 parts per billion (ppb) gold, 65.2 ppm silver, 3.54 percent arsenic, 287 ppm bismuth, and 62 ppm tin.

Alteration:

Sericite in quartz veins.

Age of mineralization:

A $^{40}\text{Ar}/^{39}\text{Ar}$ date of 70.3 Ma was obtained on sericite in a quartz vein (Gray, Gent, and others, 1997; Miller and others, 2002). A K-Ar age of 63.0 Ma that was obtained from sericite in a quartz vein was reported by Decker and others (1995). This is the approximately the same age range as reported for mineralization at the Donlin Creek lode gold deposit in the Iditarod quadrangle (Bundtzen and Miller, 1997).

Deposit model:

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

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

22c

Production Status: None

Site Status: Inactive

Workings/exploration:

The lode deposit was found by Russell Schaeffer in 1947, when he also discovered nearby placer deposits (SM074). Holitna Mining and Exploration, Inc. trenched several of the quartz veins in the main shear zone in 1985 (Hawley, 1989). Additional sampling and trenching also occurred in the 1990s (T.K. Bundtzen, unpublished data, 1998).

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Robinson, 1984 (RI 84-7); Bundtzen and Nokleberg, 1987; Hawley, 1989; Miller and others, 1989; Decker and others, 1995; Gray, Gent, and others, 1997; Gray, Motooka, and Theodorakos, 1997; Bundtzen and Miller, 1997; Miller and others, 2002.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/4/2003

Site name(s): Fortyseven Creek Placer**Site type:** Mine**ARDF no.:** SM074**Latitude:** 61.0476**Quadrangle:** SM A-6**Longitude:** 158.1609**Location description and accuracy:**

Fortyseven Creek has been placer mined for about 1.2 miles. The center of this mining is near the mine symbol shown on the 1:63,360-scale USGS topographic map. The mine is at an elevation of about 1,050 feet in the northern half of sec. 16, T. 11 N., R. 50 W., of the Seward Meridian. The mine is locality 41 of Miller and others, 1989.

Commodities:**Main:** Au, W**Other:** Ag**Ore minerals:** Placer gold, scheelite**Gangue minerals:** Garnet, ilmenite, magnetite**Geologic description:**

The Fortyseven Creek placer deposit is near the head of Fortyseven Creek. The upper portion of the stream valley above the Denali-Holitna fault zone (that is marked by the sharp break in topography and the mountain front at an elevation of about 1,000 feet) has a pronounced asymmetry in which the north facing slope is steepened and frozen and the south-facing slope is more gradual and is thawed. Fluvial gravels 6 to 15 feet thick and up to 65 feet wide have been mined for placer gold and byproduct scheelite. There are two areas of heavy mineral placer concentrations: 1) in the steep gulch immediately downslope from lode prospects described in ARDF SM073; and 2) in Fortyseven Creek below the Denali-Holitna Fault zone. Both paystreaks are about 2,000 feet long. There is only a weak concentration of heavy minerals from the steep upper portion of the creek to the fault zone. The stream gradient averages about 250 feet per mile in the upper pay zone and about 100 feet per mile in the lower paystreak. The principal heavy minerals in the placer include gold, scheelite, ilmenite, magnetite, and a trace of red garnet. According to Hawley (1989), Holitna Basin Mining and Exploration, Inc. recovered 949 ounces of placer gold from 1981 to 1986.

Alteration:**Age of mineralization:**

Unknown, but probably 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**Site Status:** Inactive

Workings/exploration:

Placer gold and scheelite were discovered on Fortyseven Creek by Russell Schaeffer in 1947. The exploration consisted of bulldozer cuts prior to and during the mining process.

Production notes:

Cady and others (1955) reported that gold and scheelite were produced on Fortyseven Creek by Russell Schaeffer by 1951. According to Hawley (1989), Holitna Basin Mining and Exploration, Inc. recovered 949 ounces of gold from 1981 to 1986. Miller and others (1989) estimated that the Fortyseven Creek placers produced a total of about 2,500 ounces of gold from 1950 to 1986.

Reserves:**Additional comments:****References:**

Cady and others, 1955; Cobb, 1972 (MF 368); Cobb, 1976 (OFR 76-606); Miller and others, 1989; Hawley, 1989; Gray, Gent, and others, 1997; Gray, Matooka, and Theodorakos, 1997; Keith and Miller, 1997; Wilson and others, 1998.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/3/2003

Site name(s): Unnamed (north of VABM Point)**Site type:** Prospect**ARDF no.:** SM075**Latitude:** 61.0127**Quadrangle:** SM A-1**Longitude:** 156.0324**Location description and accuracy:**

This prospect is near the top an an unnamed, northeast trending ridge at the head of an eastern tributary of the Hoholtna River. The prospect is at an elevation of about 1,400 feet, about 0.6 mile north-northwest of triangulation station 'Point' and about 0.2 mile southwest of the center of section 28, T. 11 N., R. 38 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Au, Bi, Cu, W**Other:** Ag, As, Sn, U**Ore minerals:** Goethite after sulfide**Gangue minerals:** Diopside, garnet**Geologic description:**

This prospect is a garnet-diopside-quartz skarn that is developed in coarsely crystalline limestone adjacent to a medium grained, equigranular, hornblende, biotite granite of unknown age (M.L. Miller, unpublished field data, 1999). The limestone was included in the Holitna Group of Cady and others (1955), and the Farewell terrane of Decker and others (1994). LePain and others (2000) have mapped the limestone that hosts the skarn prospect as an algal-rich, lime mudstone of Silurian age.

A granitic pluton exposed 3 kilometers northeast of this skarn occurrence has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 67 Ma (R. Wilson, oral communication, 2003). The skarn is developed for about 300 feet but practically all of the skarn minerals are developed at the contact between granite and limestone; the granite has been altered to chlorite at its contact zone. The skarn has abundant, pink-colored garnet and green masses of diopside. This occurrence is geologically and geochemically similar to the Nixon Fork (MD 061) and Nixon Fork-Crystal (MD062) Mines in the Medfra quadrangle (Bundtzen, 1999; Bundtzen and Miller, 1997).

Late stage? quartz veins with abundant goethite that formed from the sulfides cut the skarn zone. No sulfides were identified. Three grab samples of goethite-rich quartz vein from the skarn zone contained up to 800 parts per billion (ppb) gold, 400 ppb silver, 381 parts per million (ppm) bismuth, 880 ppm copper, 3,530 ppm tungsten, 809 ppm arsenic, 79 ppm tin, and 195 ppm uranium (M.L. Miller, unpublished analytical data, 1999).

Alteration:

Diopside-epidote skarn formed at the contact of limestone and granite.

Age of mineralization:

Unknown. A granitic pluton exposed about 2 miles northeast of this skarn has a $^{40}\text{Ar}/^{39}\text{Ar}$ age of 67 Ma (R. Wilson, oral communication, 2003).

Deposit model:

Copper-gold skarn (Cox and Singer, 1986; model 18b).

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

18b

Production Status: None**Site Status:** Inactive**Workings/exploration:**

There are old prospect pits, now caved-in and grown over, in the skarn zone. The U.S. Geological Survey examined the occurrence in 1999.

Production notes:**Reserves:****Additional comments:****References:**

Cady and others, 1955; Decker and others, 1994; Bundtzen and Miller, 1997; Bundtzen, 1999; LePain and others, 2000.

Primary reference: This record**Reporter(s):** T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)**Last report date:** 5/9/2003

Site name(s): Unnamed (south of lake 780)**Site type:** Occurrence**ARDF no.:** SM076**Latitude:** 61.0454**Quadrangle:** SM A-1**Longitude:** 156.0168**Location description and accuracy:**

This occurrence is near the top of the isolated knob, hill 1333, about 0.7 mile south-southeast of lake 780. The occurrence is about 0.4 mile east-northwest of the center of section 16, T. 11 N., R. 38 W., of the Seward Meridian. The location is accurate.

Commodities:**Main:** Zn**Other:** Cd, W**Ore minerals:** Hematite**Gangue minerals:** Quartz, tourmaline**Geologic description:**

This occurrence is a zone of hematite-rich quartz veins in fine-grained hornfels derived from what has been mapped as the Upper Cretaceous Kuskokwim Group (Cady and others, 1955; LePain and others, 2000). The protolith might also be the Kahiltna assemblage (Wilson and others, 1998). A high level, aphanitic rhyolite intrusive body underlies the hornfels (M. L. Miller, unpublished field data, 1999). Hematite locally makes up a large percentage of the quartz vein. Three grab samples collected of the hematite-rich quartz vein contained up to 2.88 parts per million (ppm) cadmium, 795 ppm zinc, and 14.5 ppm tungsten (M. L. Miller, unpublished analytical data, 1999).

Alteration:

Hematite replacement in hornfels.

Age of mineralization:

Unknown. The rhyolite body under this occurrence has a $40\text{Ar}/39\text{Ar}$ age of 67 Ma (R. Wilson, oral communication, 2003).

Deposit model:**Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):****Production Status:** None**Site Status:** Inactive**Workings/exploration:**

The U.S. Geological Survey sampled the site in 1999.

Production notes:**Reserves:**

Additional comments:**References:**

Cady and others, 1955; Wilson and others, 1998; LePain and others, 2000.

Primary reference: This record

Reporter(s): T.K. Bundtzen (Pacific Rim Geological Consulting, Inc.) and M.L. Miller (U.S. Geological Survey)

Last report date: 5/9/2003

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