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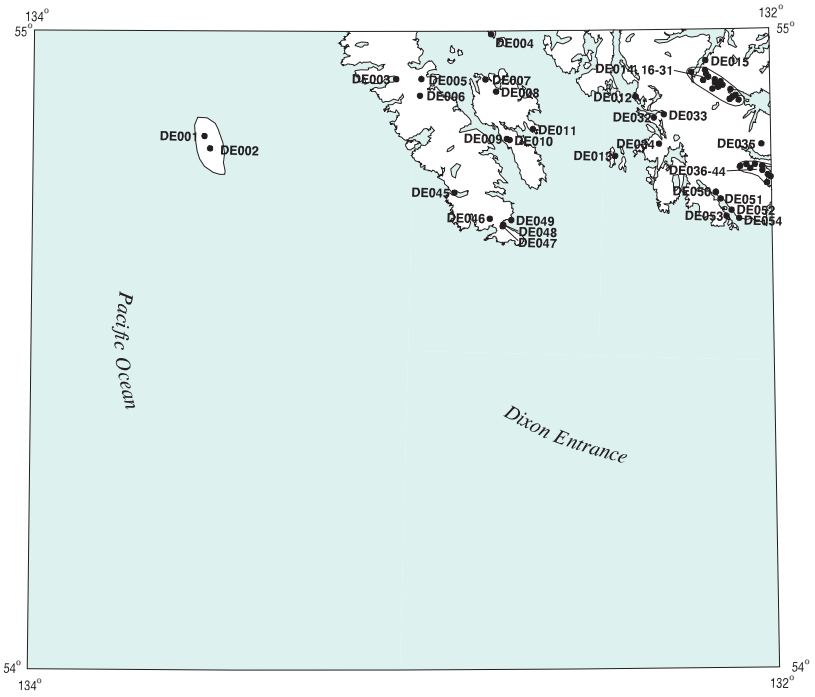
Alaska Resource Data File

Dixon Entrance 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 Dixon Entrance 1:250,000-scale quadrangle, Alaska

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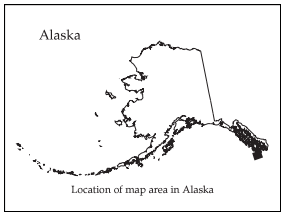

OPEN-FILE REPORT 2004-1055

Site name(s): Unnamed (near the north end of Forrester Island)

Site type: Occurrence

ARDF no.: DE001

Latitude: 54.8361 **Quadrangle:** DE D-5

Longitude: 133.5356

Location description and accuracy:

This occurrence consists of two sample sites on the shoreline near the north tip of Forrester Island. One is about 0.2 mile southwest of Point Forrester; the other is about 0.7 mile southwest of Point Forrester. The coordinates are for the first site. Both are in section 24, T. 81 S., R. 79 E., and the locations are accurate.

Commodities:

Main: Mo

Other:

Ore minerals: Molybdenite, pyrite

Gangue minerals: Quartz

Geologic description:

During reconnaissance surveys in 1969, Clark and others (1971) identified a porphyry molybdenum deposit on the north end of Forrester Island. A similar occurrence is near Wood Cove (DE002) about 1.3 miles to the southeast. Forrester Island consists mainly of Cretaceous(?) diorite and quartz monzonite (Clark, Berg, and others, 1971; Gehrels and Berg, 1992). At the northeast corner of the island, the pluton intrudes Silurian or Ordovician conglomerate that is contact metamorphosed near the pluton. Several samples of quartz-veined metaconglomerate and pyritized quartz monzonite contained up to 200 parts per million molybdenum.

Alteration:

The quartz monzonite and diorite associated with the deposit is strongly propylitized; the metaconglomerate adjacent to the pluton is hornfelsed and is cut by numerous quartz veins.

Age of mineralization:

Probably related to the Cretaceous(?) diorite and quartz monzonite pluton that makes up most of Forrester Island.

Deposit model:
Porphyry molybdenum (Cox and Singer, 1986; model 21b).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
21b

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:
Clark and others (1971) suggest that the resource potential of these occurrences is extremely limited.

Additional comments:
The occurrence is in the Forrester Island National Wildlife Refuge and the area is closed to exploration.

References:
Cobb and others, 1968; Clark and others, 1971; Cobb, 1978; Gehrels and Berg, 1992.

Primary reference: Clark, Berg, and others, 1971

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (north of Wood Cove, Forrester Island)

Site type: Occurrence

ARDF no.: DE002

Latitude: 54.8168 **Quadrangle:** DE D-5

Longitude: 133.5204

Location description and accuracy:

This occurrence consists of two sample sites on the eastern shoreline of Forrester Island about 0.5 mile north of Wood Cove. They are near the center of section 30, T. 81 S., R. 80 E; the location is accurate.

Commodities:

Main: Mo

Other: Cu

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

Gangue minerals: Quartz

Geologic description:

During reconnaissance surveys in 1969, Clark and others (1971) identified a porphyry molybdenum deposit near Wood Cove on the north end of Forrester Island. A similar occurrence (DE001) is on the northern tip of Forrester Island. Forrester Island consists mainly of Cretaceous(?) diorite and quartz monzonite (Clark and others, 1971; Gehrels and Berg, 1992). At the northeast corner of the island, the pluton intrudes Silurian or Ordovician(?) conglomerate that has been metamorphosed near the pluton.

At one location at this site, stockwork-type molybdenum-porphyry mineralization occurs in an area approximately 300 feet by 100 feet. The host rock varies from quartz monzonite to granodiorite; it is propylitically altered, strongly pyritized, and cut by numerous quartz veinlets containing molybdenite, epidote, and pyrite. The host rock also contains disseminated molybdenite, as well as small amounts of magnetite, chalcopyrite, and pyrrhotite. The molybdenum content of 11 samples varied from 5 to 500 parts per million (ppm) molybdenum with an average of about 200 ppm. At another locality, molybdenite occurs in quartz veins 1 to 6 inches thick that cut hornfelsed metaconglomerate near the contact with the pluton. Samples contained 500-700 ppm molybdenum.

Alteration:

The quartz monzonite and diorite host rock has been strongly propylitized; the metaconglomerate adjacent to the pluton has been hornfelsed and is cut by numerous quartz veins.

Age of mineralization:
Probably related to the Cretaceous(?) diorite and quartz monzonite pluton that makes up most of Forrester Island.

Deposit model:
Porphyry molybdenum (Cox and Singer, 1986; model 21b).

Deposit model number (After Cox and Singer, 1986 or Bliss, 1992):
21b

Production Status: None

Site Status: Inactive

Workings/exploration:
There are no workings and probably no exploration has taken place.

Production notes:

Reserves:
Clark and others (1971) suggest that the resource potential of these occurrences is extremely limited.

Additional comments:
The occurrence is in the Forrester Island National Wildlife Refuge and is closed to exploration.

References:
Cobb and others, 1968; Clark and others, 1971; Cobb, 1972; Cobb, 1978; Gehrels and Berg, 1992.

Primary reference: Clark and others, 1971

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (at east end of Gold Harbor)

Site type: Occurrences

ARDF no.: DE003

Latitude: 54.9253 **Quadrangle:** DE D-4

Longitude: 133.0153

Location description and accuracy:

These occurrences are at the head of Gold Harbor where the Bureau of Mines took numerous samples along about a mile of shoreline (Maas and others, 1991). The coordinates are approximately at the center of the sample area, in the NW1/4 section 23, T. 80 S., R. 82 E. The location is accurate.

Commodities:

Main: Ag, Au, Cu, Mo

Other:

Ore minerals: Chalcopyrite, molybdenite, pyrite, tennantite

Gangue minerals:

Geologic description:

A small Cretaceous granitic pluton intrudes pre-Ordovician marble at the head of Gold Harbor. Mass and others (1991) extensively sampled four contact zones of the granite. Two of the contact zones have sulfides. Samples from one zone that contained tennantite assayed up to 4.39 ounces of silver per ton and 0.142 part per million (ppm) gold. The other mineralized zone is hornfels that contains pyrite, molybdenite, and chalcopyrite across a width of 10 to 15 feet. Samples of this zone contained up 431 ppm molybdenum and 0.4 percent copper.

Alteration:

Contact metamorphism of marble adjacent to Cretaceous granite.

Age of mineralization:

Related to the contact zone of Cretaceous granite.

Deposit model:

Sulfides in contact zone of granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
None; no indication of work beyond sampling along the shoreline by government geologists.

Production notes:

Reserves:

Additional comments:

References:
Maas and others, 1991; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Lakeside

Site type: Mine

ARDF no.: DE004

Latitude: 54.9952 **Quadrangle:** DE D-3

Longitude: 132.7565

Location description and accuracy:

This is an old mine on a narrow neck of land on the west side of Sukkwan Island. It is about 0.4 mile north of the southern tip of the island in the NE1/4 section 28, T. 79 S., R. 84 E. The location is accurate.

Commodities:

Main: Cu

Other: Co, Ni

Ore minerals: Chalcopyrite

Gangue minerals:

Geologic description:

The Lakeside Mine was first described by Chapin in 1918 and little work has been done on it since. The rocks in the vicinity consist of locally pegmatitic, Ordovician gabbro and hornblendite and Silurian or Ordovician basaltic volcanic rocks (Gehrels, 1991). The gabbro has been dated at 440 Ma and 449 Ma (Eberlein and others, 1983).

According to Chapin (1918), two shear zones contain chalcopyrite. One shear zone is about 5 feet wide, strikes N20W and dips NE; the other is about two feet wide, vertical, and strikes N20W. In 1916, the workings consisted of a 41-foot shaft and a 41-foot cross-cut that interested both shear zones. Roehm (1941) indicated that the deposit had been developed by a 100-foot shaft with 50-foot drifts at the 50-foot level and at the bottom of the shaft. He also indicated that there had been copper production in 1917 and 1918.

Maas and others (1991, p. 47) indicate that the chalcopyrite occurs in irregular pods, disseminations, and seams in two fault zones that strike N35W; the faults are near a gabbro-basalt contact. Their best samples contained 1.57 percent copper, 0.28 percent nickel, and 892 parts per million cobalt; all of the samples contained less than 5 parts per billion platinum-group metals. (Wilcox (1937 [PE 121-2]) mentioned the potential for Pt-group metals at this site.)

Alteration:

Age of mineralization:
Silurian or Ordovician or younger.

Deposit model:
The deposit may be magmatic (syngenetic) and contemporaneous with the Ordovician gabbro hostrock, or it may be epigenetic and younger.

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

Production Status: Yes

Site Status:

Workings/exploration:
Roehm (1941) indicated that the deposit had been developed by a 100-foot shaft with 50-foot drifts at the 50-foot level and the bottom of the shaft.

Production notes:
Roehm (1941) states that there was copper production in 1917 and 1918.

Reserves:

Additional comments:

References:
Chapin, 1918; Wilcox, 1937 (PE 121-2); Roehm, 1941; Cobb, 1972; Cobb, 1978; Eberlein and others, 1983; Maas and others, 1991; Gehrels, 1991; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Mount Vesta

Site type: Prospect

ARDF no.: DE005

Latitude: 54.9254 **Quadrangle:** DE D-3

Longitude: 132.9466

Location description and accuracy:

This prospect is at an elevation of about 720 feet about 0.6 mile west-southwest of the head of Vesta Bay. It is near the northwest corner of section 20, T. 80 S., R. 83 E. The location is probably on the four patented mining claim shown on current (2003) U.S. Forest Service maps. The location is accurate to within one-quarter mile.

Commodities:

Main: Ag, Au, Cu, Pb

Other: Bi, Sb

Ore minerals: Chalcopyrite, galena, malachite, sphalerite, tetrahedrite

Gangue minerals: Calcite

Geologic description:

The Mount Vesta prospect was found before 1902 and was explored intermittently until at least 1906 by several open cuts and an adit 89 feet long (Brooks, 1902; Wright and Wright, 1905, 1906, 1908; Smith 1914). The rocks in the vicinity consist of pre-Ordovician marble to the west of a regionally-extensive normal fault, and mixed pre-Ordovician marble and metamorphosed dacitic rocks to the east of the fault (Gehrels, 1991). It is unclear which side of the fault the Mount Vesta prospect is on, but the host rocks at the prospect are mainly marble cut by a mafic dike.

Maas and others (1991) mapped an 89-foot adit that follows an S-shaped vein 0.17 to 0.33 feet wide that has tetrahedrite, malachite, and calcite near the portal. Samples contained up to 25.95 ounces of silver per ton, 1.2 percent copper, 3.34 percent lead, 1.14 parts per million (ppm) gold, and more than 2,000 ppm bismuth and antimony. Other mineralized zones may be present. Wright and Wright (1906) mention the occurrence of chalcopyrite, galena, and sphalerite.

Alteration:

Oxidization of copper minerals.

Age of mineralization:

Unknown, other than that the prospect is younger than the pre-Ordovician host rocks.

Deposit model:
Shear zone cuts marble and contains tetrahedrite, chalcopyrite, galena, and sphalerite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Developed by open cuts and an 89-foot adit by 1906. Probably no substantial work since.

Production notes:

Reserves:

Additional comments:
Located on four patented mining claims. The adjacent lands in the area have been conveyed to the Sealaska Corporation or are under application.

References:
Brooks, 1902; Wright and Wright, 1905; Wright and Wright, 1906; Wright and Wright, 1908; Smith, 1914; Wedow, 1953; Cobb, 1972; Cobb, 1978; Gehrels, 1991; Maas and others, 1991; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Lucky Strike

Site type: Prospect

ARDF no.: DE006

Latitude: 54.8993 **Quadrangle:** DE D-3

Longitude: 132.9506

Location description and accuracy:

The Lucky Strike prospect is poorly known and can be located no more closely than somewhere high on the ridge between Grace Harbor and Gooseneck Harbor in the center of Dall Island. The location may be anywhere within a mile or more of the SE1/4 section 30, T. 80 S., R. 83 E. Maas and others (1991) were unable to locate the prospect in the dense vegetation and there has apparently been little if any work on it since 1916.

Commodities:

Main: Cu

Other:

Ore minerals: Chalcopyrite, limonite, pyrite

Gangue minerals: Quartz

Geologic description:

The Lucky Strike prospect is near a regional-scale normal fault that separates pre-Ordovician marble and metamorphosed dacitic rocks to the west from pre-Ordovician, metamorphosed dacitic rocks to the east (Gehrels, 1991). As described by Chapin in 1918, the prospect is in a shear zone that contains chalcopyrite, pyrite, and much limonite. The host rocks are cut by quartz veinlets that carry pods of chalcopyrite. Chapin notes little development and there has apparently been little or no work on the property since 1918. Maas and others (1991) were unable to locate this prospect in the thick vegetation.

Alteration:

Oxidization of pyrite.

Age of mineralization:

Unknown, other than that it is younger than the pre-Ordovician host rocks.

Deposit model:

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

Production Status:

Site Status: Inactive

Workings/exploration:

Probably little if any development; there apparently has been little or no work on this prospect since at least 1918. Bufvers (1967) indicates that it was discovered by Aaron Shellhouse.

Production notes:

Reserves:

Additional comments:

The surface and subsurface rights to the land in the vicinity have been conveyed to the Sealaska Corporation or are under application.

References:

Chapin, 1918; Bufvers, 1967; Cobb, 1978; Maas and others, 1991; Maas and others, 1995.

Primary reference: Chapin, 1918

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near Cleva Bay)

Site type: Prospect

ARDF no.: DE007

Latitude: 54.9242 **Quadrangle:** DE D-3

Longitude: 132.7725

Location description and accuracy:

Thirteen patented mining claims staked for cement-grade limestone are located on the south side of Cleva Bay on the north end of Long Island. They are accurately located in the NE1/4 section 20, and NW1/4 section 21, T. 80 S., R. 84 E. There are numerous other occurrences of possibly commercial limestone or marble on the northern Long Island that have been staked or prospected (Maas and others, 1991).

Commodities:

Main: Limestone

Other:

Ore minerals: Calcite

Gangue minerals:

Geologic description:

Twenty-one claims were staked in 1963 for cement-grade limestone and the deposit was sampled and diamond drilled by at least ten holes. In 1970, a patent for 13 claims was issued (Mineral Survey 2237). Maas and others (1991) collected several representative samples of the more massive marble; they contained more than 98 percent calcium carbonate and 1.35 percent magnesium oxide.

Alteration:

None.

Age of mineralization:

The limestone is pre-Ordovician.

Deposit model:

Sedimentary limestone.

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

Production Status: None

Site Status: Active

Workings/exploration:

Twenty-one claims were staked in 1963 for cement-grade limestone in 1963. The claims were sampled and diamond drilled by at least ten holes. In 1970, a patent for 13 claims was issued (Mineral Survey 2237).

Production notes:

Reserves:

The resource of cement-grade limestone on Cleva Bay is very large, although no figures have been released. There has apparently been little if any development of the property since the drilling required to patent the claims. There are also other large areas of pre-Ordovician marble on northern and eastern Long Island that could be exploited under favorable economic conditions.

Additional comments:

The subsurface rights to the land in the vicinity are held by the Sealaska Corporation.

References:

Maas and others, 1991; Gehrels, 1991; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near Dova Mountain)

Site type: Occurrence

ARDF no.: DE008

Latitude: 54.9051 **Quadrangle:** DE D-3

Longitude: 132.7439

Location description and accuracy:

This occurrence is at an elevation of about 1,000 feet on the northeast side of what is locally called Dova Mountain (hill 1185), on the north end of Long Island. The occurrence is in the NW1/4 section 27, T. 80 S., R. 84 E.

Commodities:

Main: Ag, Au, Cu, Pb, Zn

Other:

Ore minerals:

Gangue minerals:

Geologic description:

The rocks near this occurrence consist of dacitic metavolcanic rocks, marble, and phyllite of the pre-Middle Ordovician Wales Group (Gehrels, 1991). In 1988, Hedderly-Smith (1999) collected a rock chip sample from an orange-weathering, iron-stained zone in calcareous, gray mica schist that contains unidentified disseminated sulfides. The sample contained 1,412 parts per million (ppm) copper, 5,370 ppm lead, 5,100 ppm zinc, 4.62 ounces of silver per ton, and 163 parts per billion gold. The zone was resampled in 1990 but the sample did not contain any anomalous metals.

Alteration:

The rocks are oxidized and iron stained.

Age of mineralization:

In pre-Ordovician rocks.

Deposit model:

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Only surface sampling.

Production notes:

Reserves:

Additional comments:
The subsurface rights to the land in the vicinity are held by Sealaska Corporation.

References:
Gehrels, 1991; Hedderly-Smith, 1999.

Primary reference: Hedderly-Smith, 1999

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near Lake Seclusion)

Site type: Occurrence

ARDF no.: DE009

Latitude: 54.8311 **Quadrangle:** DE D-3

Longitude: 132.7155

Location description and accuracy:
This occurrence is southeast of Lake Seclusion. It is in rock pit LI-1300-7 on logging road 1300, in about the middle of section 21, T. 81 S., R. 85 E. The location is accurate.

Commodities:

Main: Ag, Au, Cu, Pb, Zn

Other:

Ore minerals: Galena, malachite?, tetrahedrite

Gangue minerals: Calcite

Geologic description:
This occurrence is a 4-inch-thick galena vein discovered in the bottom of a rock pit by Sealaska Corporation geologists in 1988 (Hedderly-Smith, 1999). The rocks in the vicinity are pre-Ordovician dacitic metavolcanic rocks, marble, and argillite (Gehrels, 1991). A rock chip sample contained 2.40 percent copper, 10.30 percent lead, 7.54 percent zinc, 80.98 ounces of silver per ton, and 0.207 ounce of gold per ton. Workers in the area are said to have collected vein samples up to 6 inches thick. This or a similar vein in the same pit was sampled by Maas and others (1991) who describe it as a thin, vertical, calcite vein that strikes north-northwest and contains tetrahedrite and copper carbonates. Their best sample contained 41.62 ounces of silver per ton, 4.2 parts per million (ppm) gold, 1.38 percent copper, and 7,036 ppm zinc.

Alteration:
Oxidization of sulfides.

Age of mineralization:
Vein cuts pre-Ordovician rocks.

Deposit model:
Silver-bearing calcite vein in metamorphic rocks.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Exploration consists only of sampling the vein in outcrop by private and government geologists.

Production notes:

Reserves:

Additional comments:
The subsurface rights to the land in the vicinity are held by the Sealaska Corporation.

References:
Gehrels, 1991; Maas and others, 1991; Maas and others, 1995; Hedderly-Smith, 1999.

Primary reference: Hedderly-Smith, 1999

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Foster

Site type: Prospect

ARDF no.: DE010

Latitude: 54.8294 **Quadrangle:** DE D-3

Longitude: 132.7078

Location description and accuracy:

Roehm (1942) described the geology of this prospect in considerable detail but his location is ambiguous. It most likely is at an elevation of about 400 feet, close to the ridge between upper Coning Inlet and Seclusion Lake, near the center of the west boundary of section 22, T. 81 S., R. 85 E., but it may be a mile or more from there. The prospect was found with difficulty in 1952 by Glover (1954 [PE121-4]), but he does not provide an unambiguous location. In recent years, several other geologists (Maas and others, 1991; Hedderly-Smith, 1999) have unsuccessfully searched for the Foster prospect in heavily overgrown terrain that has been disturbed by logging.

Commodities:

Main: Ag, Pb, Zn

Other: Au

Ore minerals: Chalcopyrite, galena, pyrite, sphalerite

Gangue minerals: Calcite, quartz

Geologic description:

The rocks in the vicinity of the likely location of the Foster prospect are pre-Ordovician dacitic metavolcanic rocks, marble, and argillite (Gehrels, 1991). Roehm (1942) describes the prospect as a quartz lens or vein about 170 feet long and 12 to 15 feet thick. The lens or vein strikes N42W and dips 75E; it is parallel to the schist, limestone, and argillite host rocks and contains numerous limestone fragments. The schist footwall is highly mineralized with small quartz lenses. The surface exposure of the vein appears barren due to surface oxidization, but a 10-foot-deep trench exposed abundant pyrite, chalcopyrite, sphalerite, and galena. Two 5-foot channel samples showed nil to 0.02 ounce of gold per ton, 0.10 to 0.30 ounce of silver per ton, 0.47 to 1.20 percent copper, up to 0.55 percent lead, and 0.18 to 1.22 percent zinc. The prospect was reexamined by Glover (1954 [PE 121-4]), but his oxidized surface samples contained little metal.

Alteration:

Much surface oxidation that has almost totally leached the sulfides.

Age of mineralization:
Pre-Ordovician or younger.

Deposit model:
Stratiform base metal deposit or volcanogenic massive-sulfide deposit.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
A 10-foot-long trench apparently has been obliterated by forest growth and logging.

Production notes:

Reserves:

Additional comments:
The subsurface rights to the land in the vicinity are held by the Sealaska Corporation.

References:
Roehm, 1942; Glover, 1954 (PE 121-4); Gehrels, 1991; Maas and others, 1991; Maas and others, 1995; Hedderly-Smith, 1999.

Primary reference: Roehm, 1942

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near Coning Point)

Site type: Occurrence

ARDF no.: DE011

Latitude: 54.8463 **Quadrangle:** DE D-2

Longitude: 132.6446

Location description and accuracy:

Maas and others (1991) describe this occurrence as a large, sulfide-bearing marble boulder near a rock pit about a mile north-northwest of Coning Point. The source of the boulder has not been found but similar marble is nearby. The boulder is about at the center of section 13, T. 81 S., R. 85 E. Hedderly-Smith (1999) describes a 4-inch-thick quartz-sulfide vein nearby.

Commodities:

Main: Ag, Cu, Pb, Zn

Other:

Ore minerals: Chalcopyrite, galena, sphalerite

Gangue minerals: Calcite

Geologic description:

This occurrence consists of a chalcopyrite-, galena-, sphalerite-, and silver-bearing marble boulder (Maas and others, 1991). A sample contained 20.4 parts per million silver, 0.92 percent copper, 0.60 percent lead, and 5.0 percent zinc. The source of the boulder is not known, but Gehrels (1991) maps a large area of pre-Ordovician marble just to the north.

Hedderly-Smith (1999) describes a 4-inch-thick quartz-sulfide vein nearby that cross-cuts siliceous chlorite schist. Two chip samples contained 1.50 and 0.81 percent copper, 0.84 and 1.90 percent lead, 9.92 and 7.52 percent zinc, 0.92 and 1.79 ounces of silver per ton, and less than 0.002 and 0.006 ounce of gold per ton.

Alteration:

Age of mineralization:

Deposit model:

Base metals and silver in pre-Ordovician marble.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
None, other than sampling by industry and government geologists.

Production notes:

Reserves:

Additional comments:
The subsurface rights to the land in the vicinity are held by the Sealaska Corporation.

References:
Maas and others, 1991; Gehrels, 1991; Maas and others, 1995; Hedderly-Smith, 1999.

Primary reference: Maas and others, 1991; Hedderly-Smith, 1999

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Cordova

Site type: Prospects

ARDF no.: DE012

Latitude: 54.8955 **Quadrangle:** DE D-2

Longitude: 132.3642

Location description and accuracy:

The Cordova Group consists of 8 claims about one-quarter mile north of the abandoned village of Klinkwan. The claims are just west of the head of the northwest arm of Klinkwan Cove, near the center of the NW1/4 section 31, T. 80 S., R. 87 E.

Commodities:

Main: Ag, Au, Cu

Other:

Ore minerals: Bornite, chalcopyrite, pyrite

Gangue minerals: Calcite, quartz

Geologic description:

Just above the high tide line at the head of the northwest arm of Klinkwan Cove, a small pit exposes carbonaceous slate that is cut by quartz stringers that contain some pyrite and chalcopyrite (Wilcox, 1937 [PE 121-2]). Wilcox collected two samples of the most highly mineralized slate-quartz rock; the best one contained 2.08 ounces of gold per ton and 0.6 ounce of silver per ton. About one-quarter mile 'back' of Klinkwan, an outcrop of greenstone is highly fractured. The fractures, which vary from 1 to 10 inches wide, are filled with calcite that contain sparse, disseminated pyrite and chalcopyrite, some of which is altered to bornite. A sample of the most highly mineralized material contained only a trace of gold and silver. Gehrels (1992) has mapped the rocks in the area as mudstone and siltstone of the Devonian Karheen Formation; several major, northwest-trending faults are nearby.

Alteration:

Age of mineralization:

The mineralized fractures cut Devonian rocks.

Deposit model:

Sulfide-bearing, quartz and calcite veinlets in slate and greenstone.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Only a few surface pits.

Production notes:

Reserves:

Additional comments:
These prospects are in the South Prince of Wales Wilderness, which is closed to prospecting and mineral exploration.

References:
Wilcox, 1937 (PE 121-2); Gehrels, 1992.

Primary reference: Wilcox 1937 (PE 121-2)

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (in Barrier Islands)

Site type: Occurrences

ARDF no.: DE013

Latitude: 54.8031 **Quadrangle:** DE D-2

Longitude: 132.4222

Location description and accuracy:

This site represents six, geologically similar occurrences of massive-sulfide mineralization. They are scattered along a broad, east-west band about 7 miles long that extends through the middle of the Barrier Islands. The site is about at the center of the area of occurrences, near the center of section 33, T. 81 S., R. 86 E. The occurrences are described individually by Gehrels and others (1983).

Commodities:

Main: Ag, Ba, Pb, Zn

Other: Cu

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

Gangue minerals:

Geologic description:

As first identified by Gehrels and others (1983), the six massive sulfide occurrences represented by this site are virtually identical in hostrock, mineralogy, and genesis. Gehrels and others described the hostrocks as two volcanic units of the Silurian or Ordovician Descon Formation: one basalt or andesite; the other dacite or rhyolite. They distinguished the hostrocks from Cambrian or older Wales Group rocks to the north by the absence of a penetrative metamorphic fabric. S.M. Karl (oral communication, 2003), however, believes that the rocks are more metamorphosed than the Descon Formation and that they are a distinct Silurian or Ordovician metamorphic unit on southern Prince of Wales Island.

Most of the deposits are associated with layers several meters thick of fragmental, intermediate to silicic volcanic rocks. The sulfide minerals generally form thin layers less than 5 centimeters (cm) thick in the volcanic rocks, or form rinds around 5- to 20-cm-long volcanic fragments that may be flattened pillows. Sulfide minerals also occur in layers less than 5 cm thick in siliceous black slate and silicic volcanic rocks. The dominant sulfide is pyrite; the presence of arsenopyrite, galena, and sphalerite is indicated by spectrographic analysis of samples. Selected samples contain up to 30 parts per million (ppm) silver, more than 5,000 ppm barium, 30 ppm copper, 1,500 ppm lead, and 3,000 ppm

zinc. The occurrences are probably syngenetic, submarine, and exhalative in origin. Later low-grade metamorphism resulted in local remobilization of the the metals.

Maas and others (1991) collected samples of iron-stained schist, volcanic rocks, tuff, slate, and graywacke at several of these occurrences. Chip and representative samples across iron-stained bands 0.1 to 20 feet wide contain up to 62 parts per billion gold, 10.8 ppm silver, 570 ppm copper, 0.15 percent lead, 0.66 percent barium, and 1.34 percent copper.

Alteration:

Not specified, but the hostrocks probably are propylitically altered, as is common in submarine, exhalative massive-sulfide deposits in intermediate to felsic volcanic rocks.

Age of mineralization:

Silurian or Ordovician.

Deposit model:

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

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

28a

Production Status: None

Site Status: Inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

All of these occurrences are in the South Prince of Wales Wilderness, which is closed to prospecting and mineral exploration.

References:

Gehrels, 1991; Gehrels and others, 1983; Nokleberg and others, 1987; Maas and others, 1991; Maas and others, 1995.

Primary reference: Gehrels and others, 1983

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near head of South Arm, Moira Sound)

Site type: Prospect

ARDF no.: DE014

Latitude: 54.9333 **Quadrangle:** DE D-1

Longitude: 132.2130

Location description and accuracy:
This prospect is near sealevel at the north head of the South Arm of Moira Sound. It is near the mouth of the creek in the NW1/4 section 18, T. 80 S., R. 88 E. The location is accurate.

Commodities:

Main: Au

Other:

Ore minerals: Gold, pyrite

Gangue minerals: Calcite

Geologic description:
The rocks in the area consist of Silurian or Ordovician basaltic to andesitic volcanic rocks of the Descon Formation, and Ordovician granodiorite and diorite (MacKevett, 1963; Gehrels, 1992). Near the prospect, both units are offset by a north-northwest-trending fault. The deposit is in highly fractured, metavolcanic rocks and consists of gold-bearing calcite veins that contain pyrite, chlorite, and secondary iron oxides.

Alteration:

Age of mineralization:
Silurian or Ordovician or younger.

Deposit model:
Gold-bearing calcite vein.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
The only workings are a narrow, 8-foot-long open cut.

Production notes:

Reserves:

Additional comments:

References:
MacKevett, 1963; Cobb, 1978; Gehrels, 1992.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Geiger

Site type: Prospect

ARDF no.: DE015

Latitude: 54.9511 **Quadrangle:** DE D-1

Longitude: 132.1742

Location description and accuracy:

The Geiger prospect is at an elevation of about 50 feet, 0.4 mile north-northeast of the mouth of Perkins Creek where it enters the South Arm of Moira Sound. The prospect is near the center of the east boundary of the NE1/4 section 8, T. 80 S., R. 88 E. The location of the Geiger prospect relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Cb, REE, Ta, Th, U, Y, Zr

Other: F, Ge, Pb, Zn

Ore minerals: Columbite-tantalite, galena, REE minerals, sphalerite, uranothorite, zircon

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE016 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic

rocks are cut by numerous pegmatite, andesite, dacite, and aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Geiger prospect has a few small pits on claims located in 1956. The deposit consists of unidentified radioactive and REE minerals in quartz veinlets in mineralized, altered felsic dikes. The dikes, probably originally rhyolite or quartz latite, cut metavolcanic rocks of the Descon Formation outboard of the Bokan Mountain peralkaline granite (MacKevett, 1963).

Warner and Barker (1989) describe the deposit as an apparently continuous system of one to five or more, parallel felsic dikes of variable composition that strike N15E to N30W; the dikes can be traced for about 8,700 feet in float, outcrop, and test pits. Individual dikes are up to 8.5 feet thick. Warner and Barker infer that the uranium and thorium are mainly in uranothorite, and the columbium and tantalum are probably in columbite-tantalite; zircon is present, as well as minor galena, sphalerite, and fluorite.

According to Warner and Barker (1989), the indicated resources along 3,100 feet of dike are 7,497,000 pounds of columbium, 402,000 pounds of thorium, 852,000 pounds of uranium, 6,458,000 pounds of yttrium, 8,820,000 pounds of zirconium, 19,061,000 pounds of REE, and 578,000 pounds of tantalum, in 2,450,000 short tons of rock. The total inferred resource along 5,600 feet of dike is 14,361,000 pounds of columbium, 770,000 pounds of thorium, 1,652,000 pounds of uranium, 12,371,000 pounds of yttrium, 168,948,000 pounds of zirconium, 36,512,000 pounds of REE, and 1,108,000 pounds of tantalum, in 4,693,000 short tons of rock (Warner and Barker, 1989).

Alteration:

This prospect and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit associated with peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only a few prospect pits.

Production notes:

Reserves:

According to Warner and Barker (1989), the indicated resources along 3,100 feet of dike are 7,497,000 pounds of columbium, 402,000 pounds of thorium, 852,000 pounds of uranium, 6,458,000 pounds of yttrium, 8,820,000 pounds of zirconium, 19,061,000 pounds of REE, and 578,000 pounds of tantalum, in 2,450,000 short tons of rock. The total inferred resource along 5,600 feet of dike is 14,361,000 pounds of columbium, 770,000 pounds of thorium, 1,652,000 pounds of uranium, 12,371,000 pounds of yttrium, 168,948,000 pounds of zirconium, 36,512,000 pounds of REE, and 1,108,000 pounds of tantalum, in 4,693,000 short tons of rock.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Boots

Site type: Prospect

ARDF no.: DE016

Latitude: 54.9357 **Quadrangle:** DE D-1

Longitude: 132.1754

Location description and accuracy:

The Boots prospect is about 1.6 miles north-northwest of Bokan Mountain in about the center of the E1/2 NE1/4 section 17, T. 80 S., R. 88 E. The location of the Boots prospect relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: REE, Th, U

Other:

Ore minerals: Uranothorite?

Gangue minerals: Albite, biotie, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 and DE17 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Boots prospect is on claims located in 1956 (MacKevett, 1963). The only workings are a few shallow prospect pits. The deposit consists of a dikelike mass of aplite cut by several pegmatite dikes at the northwest edge of the Bokan Mountain peralkaline granite. The area is moderately radioactive but no specific uranium, thorium, or REE minerals have been identified.

Alteration:

Iron staining and argillization.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit associated with peralkaline granite.

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

Production Status:

Site Status:

Workings/exploration:

Only a few surface prospect pits.

Production notes:

Reserves:

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Sunday Lake

Site type: Prospect

ARDF no.: DE017

Latitude: 54.9295 **Quadrangle:** DE D-1

Longitude: 132.1724

Location description and accuracy:

The Sunday Lake prospect is at an elevation of about 750 feet, about 1.2 miles northwest of Bokan Mountain and about 0.7 mile east-southeast of the center of section 17, T. 80 S., R. 88 E. Its location relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Cb, REE, Th, U, Y, Zr

Other:

Ore minerals: Allanite, REE minerals

Gangue minerals:

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015, DE016, and DE18 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Sunday Lake prospect consists of two short trenches and a small pit (Warner and Barker, 1989). The deposit is controlled by steeply dipping, north-northwest-trending shear zones and fractures which can be traced for about 300 feet in riebeckite granite. Allanite is locally abundant. Where exposed, the deposit is 3 to 7 feet thick and consists of highly radioactive, mottled, iron- and manganese-stained gouge and crushed rock. According to Warner and Barker (1989), the deposit has an inferred resource of 27,000 short tons of material that contains 26,000 pounds of columbium, 1,728,000 pounds of thorium, 270,000 pounds of uranium, 437,000 pounds of yttrium, 151,000 pounds of zirconium.

Alteration:

This prospect and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit associated with peralkaline granite.

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

Production Status:

Site Status:

Workings/exploration:

Two short trenches and a small prospect pit.

Production notes:

Reserves:

According to Warner and Barker (1989), the deposit has an inferred resource of 27,000 short tons of material that contains 26,000 pounds of columbium, 1,728,000 pounds of thorium, 270,000 pounds of uranium, 437,000 pounds of yttrium, 151,000 pounds of zirconium.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Old Crow

Site type: Prospect

ARDF no.: DE018

Latitude: 54.9251 **Quadrangle:** DE D-1

Longitude: 132.1668

Location description and accuracy:

The Old Crow prospect of the Lazo Group is about 0.8 mile northwest of Bokan Mountain at about the midpoint of the north boundary of the NW1/4 section 21, T. 80 S., R. 88 E. The location of the Old Crow prospect relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Th, U

Other:

Ore minerals: Uranothorite?

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE 15 to DE017 and DE019 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Old Crow prospect of the Lazo Group consists of a small cut and several shallow pits on claims staked in 1955 (MacKevett, 1963). The deposit is on a fault zone about a foot thick that strikes N70E and dips 80NW. The fault contains strongly iron stained and argillized peralkaline granite that is cut by numerous veinlets with quartz, calcite, hematite, fluorite, and minor radioactive minerals.

Alteration:

This prospect and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit in a fault zone that cuts peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

A shallow trench and a few small prospect pits.

Production notes:

Reserves:

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Wennie (Lazo Group); I and L No. 1 and 2

Site type: Prospects

ARDF no.: DE019

Latitude: 54.9200 **Quadrangle:** DE D-1

Longitude: 132.1810

Location description and accuracy:

The Wennie prospect of the Lazo Group and the adjacent I & L No. 1 and 2 prospect are centered about 1.0 mile west-northwest of Bokan Mountain, near the center of the NE1/4 section 20, T. 80 S., R. 88 E. Their locations relative to the other uranium and REE prospects in the vicinity of Bokan Mountain are best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Cb, REE, Th, U

Other:

Ore minerals: Hematite, pyrite, uranothorite?

Gangue minerals: Aegirine, albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE018 and DE020 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The I and L No. 1 and 2, and Wennie prospects consist of a few shallow pits on claims staked in 1955 (MacKevett, 1963, Warner and Barker, 1989). At the I & L prospect, the deposit consists of radioactive, hematite-pyrite-manganese-rich gouge about an inch thick along a NW-striking fault in aegirine granite. A similar thin radioactive fault is at the Wennie prospect; this fault has a 2.5-foot-thick hanging wall of manganese- and hematite-stained, pyritic material and a footwall with many thin quartz veins that cut aegirine granite. Sampling indicates significant thorium values, minor columbium, and enrichment in heavy REE.

Alteration:

These prospects and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit associated with peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only a few shallow prospect pits.

Production notes:

Reserves:

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson,

1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Little Jim; Little Joe No. 1, Little Joe No. 2

Site type: Prospects

ARDF no.: DE020

Latitude: 54.9209 **Quadrangle:** DE D-1

Longitude: 132.1491

Location description and accuracy:

The geologically similar Little Jim and Little Joe prospects are scattered over an area about one-half mile long. The center of the prospect area is about 0.4 mile north-northeast of Bokan Mountain in the NE1/4 section 21, T 80 S., R. 88 S. The location of these prospects relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main:

Other: Cb, REE, Th, Ti, U, Zr

Ore minerals: REE minerals, uranothorite?

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE019 and DE021 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex

and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Little Jim and Little Joe prospects consist of small prospect pits on claims staked in 1956 (MacKevett, 1963; Warner and Barker, 1989). The deposits consist of pegmatite dikes and masses up to 2 feet thick and 800 feet long in riebeckite granite of the the Bokan Mountain stock. Locally the pegmatite dikes contain scattered uranium and thorium minerals. Samples of the Little Jim deposit contained up to 2,900 parts per million columbium, but only minor uranium, thorium, REE, and yttrium. Some samples of the Little Joe deposit contained elevated columbium, hafnium, titanium, yttrium, and zirconium, and lesser amounts of rare-earth elements, tantalum, and thorium. The sampling indicates that the prospects contain negligible mineral resources.

Alteration:

These prospects and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit in pegmatite associated with peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only a few prospecting pits.

Production notes:

Reserves:

Sampling indicates negligible resources.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): I,L, and M; ILM; I, L, and M Nos. 1-3

Site type: Prospect

ARDF no.: DE021

Latitude: 54.9157 **Quadrangle:** DE D-1

Longitude: 132.1488

Location description and accuracy:

The three I, L, and M prospects are centered about 0.3 mile east of Bokan Mountain near the midpoint of the east boundary of the SE1/4 section 21, T. 80 S., R. 88 E. The prospects are aligned southeasterly over a distance of about 1,000 feet. Their location relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Cb, REE, Th, Y, U, Zr

Other:

Ore minerals: Allanite, arsenopyrite, columbite-tantalite, REE minerals, uranothorite, uranothorianite, zircon

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE020 and DE022 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and ar-

gillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The I,L, and M prospects consist of a few shallow pits and trenches on 3 claims located in 1955 (MacKevett, 1963). The prospects are well within the Bokan Mountain peralkaline granite, which here is strongly jointed and cut by pegmatite dikes. The No. 1 prospect is on an altered zone about 30 feet wide and 200 feet long. The Nos. 2 and 3 prospects are associated with pegmatite dikes and irregular masses of pegmatite. All of the deposits are only weakly to moderately radioactive. Little has been done with their mineralogy. But assuming that it is similar to other deposits in the area, the major ore minerals are probably uranothorite, columbite-tantalite, zircon, and a variety of REE minerals. Arsenopyrite, allanite, and fluorite also occur locally.

Warner and Barker (1989) defined an ore zone about 1,500 feet long that contains about 586,000 short tons of rock. The ore zone contains 1,054,000 pounds of columbium, 115,000 pounds of uranium; 732,000 pounds of yttrium, 20,200,000 pounds, of zirconium, and 2,749,000 pounds of REE. The average grade of this zone is 1,230 parts per million (ppm) columbium, 3,000 ppm REE, 140 ppm uranium, 650 ppm yttrium, and 2.47 percent zirconium.

Alteration:

These prospects and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit associated with peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only a few small prospect pits.

Production notes:

Reserves:

Warner and Barker (1989) defined an ore zone about 1,500 feet long that contains about 586,000 short tons of rock. The ore zone contains 1,054,000 pounds of columbium, 115,000 pounds of uranium; 732,000 pounds of yttrium, 20,200,000 pounds, of zirconium, and 2,749,000 pounds of REE. The average grade of this zone is 1,230 parts per million (ppm) columbium, 3,000 ppm REE, 140 ppm uranium, 650 ppm yttrium, and 2.47 percent zirconium.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Irene-D

Site type: Prospect

ARDF no.: DE022

Latitude: 54.9179 **Quadrangle:** DE D-1

Longitude: 132.1334

Location description and accuracy:

The Irene-D prospect is at the head of Perkins Creek at an elevation of about 850 feet. It is about 0.9 mile east-northeast of Bokan Mountain, near the center of section 22, T. 80 S., R. 88 E. Its location relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Cb, REE, U, Y, Zr

Other:

Ore minerals: Pyrite, uranothorite?

Gangue minerals: Albite, ilmenite, magnetite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE021 and DE22 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Irene-D prospect was located in the 1960's; it consists of an area about 200 feet wide of radioactive pegmatite rubble (Warner and Barker, 1989). Warner and Barker traced the pegmatite about 3,000 feet to the south by magnetometer surveys and in outcrop. The pegmatite is notable for its high content of magnetite or ilmenite, which locally makes up 15 percent of the rock. The magnetite occurs as bladed crystals up to 0.25 inch long, but more commonly as disseminated grains in the pegmatite or as masses up to 1 inch in diameter. The pegmatite commonly has a quartz core bordered by albite(?), quartz, and riebeckite phenocrysts. The riebeckite is commonly altered to aegirine which forms masses up to 1 foot in diameter. Ilmenite is more abundant than magnetite in the southern part of the pegmatite. Pyrite and unidentified radioactive minerals occur as accessory minerals in the pegmatite. The pegmatite forms a band 30 to 50 feet wide in aplite and aegirine granite. The pegmatite is bounded on the west by aegirine- and riebeckite-aegirine granite of the Bokan Mountain complex and on the east by Silurian or Ordovician quartz monzonite. Thompson and others (1982, 1997) considered this pegmatite to be the outer zone of a ring dike complex.

Warner and Barker (1989) indicate that the pegmatite at the Irene-D prospect contains relatively low values of columbium, REE, yttrium, and zirconium. A few samples contained minor uranium and traces of gold. Based on their work, the values are too low to constitute a significant resource.

Alteration:

This prospect and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit in pegmatite at the margin of a peralkaline granite intrusion.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only limited surface prospecting by private parties; considerable sampling and magne-

tometer surveys by government geologists.

Production notes:

Reserves:

Warner and Barker (1989) indicate that the pegmatite at the Irene-D prospect contains relatively low values of columbium, REE, yttrium, and zirconium. A few samples contained minor uranium and trace gold. Based on their work, the values are too low to constitute a significant resource.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): I and L; I and L Nos. 3-5

Site type: Prospects

ARDF no.: DE023

Latitude: 54.9130 **Quadrangle:** DE D-1

Longitude: 132.1345

Location description and accuracy:

The I & L Nos. 3-5 prospects occupy an area about 1,000 feet in diameter centered about 0.9 mile east-southeast of Bokan Mountain. The center of the area is just north of the midpoint of the south boundary of section 22, T. 80 S., R. 88 E. Their location relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Cb, Th, U

Other: Ce, Dy, Er, F, Gd, Ho, La, Nd, Pb, Y, Yb, Zn, Zr

Ore minerals: Aeschynite, allanite, bastnaesite, brannerite, columbite-tantalite, euxenite-polycrase, fergusonite, fluorite, galena, monazite, parisite, phenacite, pyrite, samarskite, sphalerite, synchysite, tengerite, thalenite, thorite, unnamed REE fluorocarbonate, uranothorite, xenotime, zircon

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE022 and DE024 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes

up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

As described by MacKevett (1963) and Warner and Barker (1989), the I and L prospects are on six principal and many smaller northwest-trending, quartz-cored, pegmatite dikes that cut riebeckite granite porphyry and aegirine granite of the Bokan Mountain peralkaline stock near its southeast border. Transverse pegmatite dikes are also present. The dikes contain scattered concentrations and discrete grains of uranium, thorium, and REE minerals. The largest and northernmost dike--the No. 1 dike--is at least 900 feet long and up to 18 feet thick. The other dikes are parallel, vary from 100 to 500 feet in length, and are a few inches to 6 feet thick. The dikes are generally vertical but drilling on the No. 1 dike indicates that it is irregular in width and shape, and bends markedly at depth. Intense argillic alteration is common along the contacts of the dikes, and the better mineralization is generally associated with faults.

In a study of the mineralogy of the IL & M dikes, Staatz (1978) found that the uranium is generally in thorium-bearing uraninite, whereas brannerite predominates in some transverse dikes. Thorite is the principal thorium mineral in the northwest and central parts of the prospect area; allanite predominates in the southeastern part of the area and in transverse dikes. Rare earth minerals include bastnaesite, xenotime, monazite and an unidentified fluorocarbonate. The distribution of the individual rare earth minerals varies markedly. One part of a dike may contain predominantly cerium-group minerals, for example bastnaesite; another part may contain predominantly yttrium-bearing minerals, for example xenotime. Small amounts of sulfides including galena, sphalerite, and pyrite are common in many of the dikes. Zircon and fluorite are commonly present in minor amounts and two samples contained the beryllium mineral phenacite. The gangue is mostly quartz and albite. Scanning electron microscope study by Warner and Barker (1989) shows that the REE minerals are mainly thalenite, bastnaesite, and allanite; tengerite, parisite, synchysite, an unnamed REE flurocarbonate mineral, monazite, and xenotime also occur. The columbium-bearing mineral is mainly euxenite-polycrase, although columbite-tantalite, samarskite, fergusonite, and aeschynite are present. The main radioactive mineral is thorite but uranothorite is also present.

The dikes have an indicated resource of 100,000 short tons of rock that contain 181,000 pounds of columbium, 41,000 pounds of thorium, and 34,000 pounds of uranium. There is an additional inferred resource of 73,000 pounds of columbium (Warner and Barker, 1989).

Alteration:

These prospects prospect and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization,

and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:
Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:
U-th-REE deposit related to a peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
The prospects have been explored by numerous pits and trenches, and in 1977 were drilled to a depth of 260 feet.

Production notes:

Reserves:
The dikes have an indicated resource of 100,000 short tons of rock that contain 181,000 pounds of columbium, 41,000 pounds of thorium, and 34,000 pounds of uranium. There is an additional inferred resource of 73,000 pounds of columbium (Warner and Barker, 1989).

Additional comments:

References:
Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Atom Marietta

Site type: Prospect

ARDF no.: DE024

Latitude: 54.9122 **Quadrangle:** DE D-1

Longitude: 132.1283

Location description and accuracy:

The Atom Marietta prospect is about 1.1 miles east-southeast of Bokan Mountain, near the center of the west boundary of the SE1/4 SE1/4 section 22, T. 80 S., R. 88 E. Its location relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Th, U

Other:

Ore minerals: Brannerite?, davite?, uraninite, uranophane

Gangue minerals: Calcite, chlorite, fluorite, hematite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE023 and DE025 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Atom Marietta prospect consists of a few hand-dug cuts and pits on several claims located in 1955 (MacKevett, 1963). The prospect is in aplite near the southeastern edge of the Bokan Mountain peralkaline complex. The deposit is near the intersection of a major northeast-trending fault zone with a group of steep northwest faults. The deposit is associated with intensely altered and fractured dacite dikes that cut the aplite in or near the fault zones. The uranium-thorium minerals occur in narrow veinlets, as disseminations, and as irregular, sublinear masses. The primary radioactive mineral is uranothorite, although uraninite and other unidentified minerals, possibly brannerite or davite, also occur. Secondary uranophane is present.

Alteration:

Not specifically described; the dikes and their wallrocks are probably albitized and chloritized like those at other deposits in the area.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit associated with peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only a few hand-dug pits and trenches.

Production notes:

Reserves:

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and

others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Ross-Adams

Site type: Mine

ARDF no.: DE025

Latitude: 54.9092 **Quadrangle:** DE D-1

Longitude: 132.1406

Location description and accuracy:

The Ross-Adams Mine is about 0.7 mile southeast of Bokan Mountain. It is shown as a mine symbol on the U.S.G.S., 1:63,360-scale topographic map in the NW1/4 section 27, T. 80 S., R. 88 E. The location of the Ross-Adams mine relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: U

Other: REE, Th

Ore minerals: Bassetite, beta-uranophane, bornite, brannerite, chalcopyrite, coffinite, galena, gummite, novacekite, pyrite, pyrrhotite, sklodowskite, sphalerite, uraninite, uranothorite

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE024 and DE026 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and ar-

gillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Ross-Adams Mine was found in 1955 by Don Ross with an airborne radiometric survey; a radioactive anomaly over the future site of the mine was then prospected on the ground by Kelly Adams. In 1957, about 15,000 tons of ore with a grade of more than 0.80 percent U3O8 was mined from an open pit by Climax Molybdenum Company. Bay West Inc. leased the property in 1961 and began underground exploration and mining from a haulage adit beneath the open pit. Standard Metals Corporation took control of the property in 1963 and Newmont Exploration Ltd. operated the property until 1971. From 1957 to 1971, a total of 79,500 metric tons of ore was mined with an average grade of 0.76 percent U3O8 (MacKevett, 1963, Anonymous, 1980; Warner and Barker, 1989; Roppel, 1991). Thorium was not recovered.

The Ross-Adams deposit is in the Bokan Mountain peralkaline complex near its southeast boundary (MacKevett, 1959, 1963; Thompson, 1980; Thompson and others, 1982; Thompson, 1988 [FIR]; Thompson 1988 [PGR]; Warner and Barker, 1989; Philpotts and others, 1996; Thompson, 1997). The ore deposit is an irregularly-shaped pipelike body about 800 feet long and 20 to 100 feet in diameter, inclined to the south. The body is gently inclined at its north end where it was mined from an open pit . The southern two-thirds inclines to a plunge of about 40 degrees to the south. This southern portion was mined over a vertical extent of about 450 feet from two haulage levels.

The mineralized pipe is offset by several large faults, and cut by many smaller fractures and microfractures. The fractures tend to localize the ore body, but its general form and location is probably related to a contact between aegirine granite porphyry and aegirine syenite. The pipe typically has a core with more than 0.5 percent U3O8 and an outer shell 2-20 feet thick of lower grade material. The pipe is intensely albitized and chloritized and the effects of this alteration often extend as much as 50 feet beyond the ore body.

The primary ore mineral is uranothorite; uraninite and uranothorinite also occur, and, rarely, brannerite and coffinite. The pipe is oxidized at the surface where it was mined in an open pit. Several secondary uranium minerals have been identified, including gummite, sklodowskite, beta-uranophane, bassetite, and novacekite. Sulfides commonly make up as much as 2 percent of the ore; they include pyrite, pyrrhotite, chalcopyrite, sphalerite, galena, and bornite.

Thompson and others (1980, 1982, 1997) propose the following genesis of the Ross-Adams deposit: 1) emplacement of a sodium-rich oxidized magma with a normal uranium and thorium content; 2) low initial calcium and titanium, preventing the formation of early accessory minerals; 3) development of a separate volatile phase with high uranium, thorium, and REE content; 4) rapid degassing of the magma chamber, resulting in a silica-saturated magma and a volatile phase emplaced in a zone of structural weakness; and 5) precipitation of the uranium, thorium, and REE minerals.

In 1980 (after the last mining), Standard Metals Corp. identified the remaining reserves

as 365,000 short tons of ore with an average grade of 0.17 percent U3O8 and 0.46 percent thorium (Anonymous, 1980). Based on an analysis of drill core, Warner and Barker (1989) estimated an additional resource 'on the order of" 2,300,000 pounds of yttrium, 537, 000 pounds of REE, and 1,752,000 pounds of zirconium.

Alteration:

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit associated with a peralkaline granite.

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

Production Status: Yes; medium

Site Status: Probably inactive

Workings/exploration:

The ore deposit is an irregularly-shaped pipelike body about 800 feet long and 20 to 100 feet in diameter, inclined to the south. The body is gently inclined at its north end where it was mined from an open pit . The southern two-thirds inclines to a plunge of about 40 degrees to the south. This southern portion was mined over a vertical extent of about 450 feet from two haulage levels.

Production notes:

In 1957, about 15,000 tons of ore with a grade of more than 0.80 percent U3O8 was mined from an open pit by Climax Molybdenum Company. Bay West Inc. leased the property in 1961 and began underground exploration and mining from a haulage adit beneath the open pit. Standard Metals Corporation took control of the property in 1963 and Newmont Exploration Ltd. operated the property until 1971. From 1957 to 1971, a total of 79,500 metric tons of ore was mined with an average grade of 0.76 percent U3O8 (MacKevett, 1963, Anonymous, 1980; Warner and Barker, 1989). Thorium was not recovered.

Reserves:

In 1980, Standard Metals Corp. identified the remaining reserves as 365,000 short tons of ore with an average grade of 0.17 percent U3O8 and 0.46 percent thorium (Anonymous, 1980). Based on an analysis of drill core by the U.S. Bureau of Mines, they indicated an additional resource 'on the order of' 2,300,000 pounds of yttrium, 537, 000 pounds of REE, and 1,752,000 pounds of zirconium (Warner and Barker, 1989; Maas and others, 1995).

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1959; MacKevett, 1963; Lanphere and others, 1964; Eakins, 1970; Stevens, 1971; Eakins, 1975; Cobb, 1978; Staatz, 1978; Anonymous, 1980; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Roppel, 1991; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Thompson and others, 1988; Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Pieper's Purple

Site type: Prospect

ARDF no.: DE026

Latitude: 54.9064 **Quadrangle:** DE D-1

Longitude: 132.1561

Location description and accuracy:

The Pieper's Purple prospect is about 0.7 mile south of Bokan Mountain at about the center of the NE1/4 section 28, T. 80 S., R. 88 E. Its location relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: F, Th, U

Other:

Ore minerals: Fluorite

Gangue minerals:

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE025 and DE027 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Pieper's Purple prospect consists of a few shallow pits and trenches (MacKevett, 1963). The workings are: 1) on an altered mafic dike along a fault at or near the contact between the Bokan Mountain peralkaline granite and slate of the Descon Formation; and 2) on aplite or pegmatite dikes just inside the border of the granite. The mafic dike is cut by fluorite-rich veinlets a few millimeters thick that also contain minor quartz, pyrite and unidentified radioactive minerals. The dikes are argillically altered and chloritized.

Alteration:

Argillic alteration and chloritization.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-F deposit associated with peralkaline granite.

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

Production Status: None

Site Status: Inactive

Workings/exploration:

Only a few pits and trenches.

Production notes:

Reserves:

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Carol Ann; Carol Ann No. 1; Carol Ann No. 2; Carol Ann No 3; Dotson

Site type: Prospects

ARDF no.: DE027

Latitude: 54.9053 **Quadrangle:** DE D-1

Longitude: 132.1072

Location description and accuracy:

The three Carol Ann prospects are associated with a series of parallel mineralized dikes that extend about N45W for at least 3,000 feet. The coordinates are at near the center of the prospect area, about 1.9 miles southeast of Bokan Mountain, near the middle of the N1/2 section 26, T. 80 S., R. 88 E. The locations of the Carol Ann prospects relative to the other uranium and REE prospects in the vicinity of Bokan Mountain are best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Cb, REE, Th, U, Y

Other:

Ore minerals: Aeschynite, allanite, bastnaesite, columbite-tantalite, euxenite-polycrase, fergusonite, fluorite, monazite, parisite, pyrite, samarskite, synchysite, tengerite, thalenite, thorite, unnamed REE fluorocarbonate, uranothorite, xenotime, zircon

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE026 and DE028 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive

body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

MacKevett (1963) describes three prospects under the name Carol Ann as surface pits on three claims located in 1955. The prospects are on a series of steep, subparallel, allanite-bearing andesite dikes that strike about N60-75W for at least 3,500 feet. The dikes radiate out from the Bokan Mountain peralkaline granite into Silurian or Ordovician quartz monzonite.

Warner and Barker (1989) describes these prospects under the name Dotson and extend the dikes northwest to the I & L Nos. 3-5 prospects (DE023) at the periphery of the Bokan Mountain alkaline granite. Several parallel dikes occur over a width of less than 100 feet to 200 feet; the individual dikes vary in width from 0.6 feet to 3.1 feet. To northwest , near the Bokan Mountain granite, the dikes are pegmatitic; to the southeast, they generally are medium- to fine-grained and equigranular. The mineralization occurs in microfractures or in the interstices between silicate grains. The dominant radioactive mineral is allanite. Scanning electron microscope study shows that the REE minerals are mainly thalenite, bastnaesite, and allanite, with subordinate tengerite, parisite, synchysite, an unnamed REE flurocarbonate mineral, monazite, and xenotime. The columbium-bearing mineral is mainly euxenite-polycrase, accompanied by subordinate columbite-tantalite, samarskite, fergusonite, and aeschynite. The main radioactive mineral is thorite but uranothorite is also present.

Warner and Barker (1989) estimate a total indicated resource of 2,039,000 short tons of rock in the Dotson dike system that contains 2,353,000 pounds of columbium, 326,000 pounds of uranium, 3,666,000 pounds of yttrium, 2,541,000 pounds of thorium, and 4,567,000 pounds of REE. The total inferred resource is 8,490,000 short tons of rock that contains 12,260,000 pounds of columbium, 7,726,000 pounds of thorium, 1,647,000 pounds of uranium, 18,457,000 pounds of yttrium, 33,280,000 pounds of zirconium, and 30,428,000 pounds of REE.

Alteration:

These prospects and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:
U-Th-REE deposit associated with peralkaline granite.

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

Production Status:

Site Status:

Workings/exploration:
Only prospect pits.

Production notes:

Reserves:
Warner and Barker (1989) estimate a total indicated resource of 2,039,000 short tons of rock in the Dotson dike system that contains 2,353,000 pounds of columbium, 326,000 pounds of uranium, 3,666,000 pounds of yttrium, 2,541,000 pounds of thorium, and 4,567, 000 pounds of REE. The total inferred resource is 8,490,000 short tons of rock that contains 12,260,000 pounds of columbium, 7,726,000 pounds of thorium, 1,647,000 pounds of uranium, 18,457,000 pounds of yttrium, 33,280,000 pounds of zirconium, and 30,428,000 pounds of REE.

Additional comments:

References:
Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Upper Cheri

Site type: Occurrence

ARDF no.: DE028

Latitude: 54.8898 **Quadrangle:** DE D-1

Longitude: 132.1096

Location description and accuracy:

The Upper Cheri occurrence is centered about 0.6 mile south of the head of the West Arm of Kendrick Bay; it is near the center of section 35, T. 80 S., R. 88 E. Its location relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Be, Cb, REE, Th, U, Y, Zr

Other:

Ore minerals: Allanite (but also see DE027)

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE 027 and DE029 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

There was no evidence of prospecting at this site, or any reference to this deposit prior to the work of Warner and Barker (1989). They identified a radioactive dike system trending about N45W that is about 200 feet wide and continues along strike for at least 1,200 feet; individual dikes are 0.2 to 1.3 feet thick. The dike system is subparallel to the dikes at the Cheri prospects (DE029) about 2,000 feet to the northeast. According to Warner and Barker, the mineralization at the two sites is geologically similar put provide no details.

Warner and Barker (1989) calculate an inferred resource in the Upper Cheri deposit of 481,000 short tons of rock that contain 664,000 pounds of columbium, 114,000 pounds of uranium, 3,271,000 pounds of zirconium, 209,000 pounds of thorium, 1,203,000 pounds of yttrium, and 3,361,000 pounds of REE.

Alteration:

This prospect and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit in dikes associated with peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only sampling by government geologists.

Production notes:

Reserves:

Warner and Barker (1989) calculate an inferred resource of 481,000 short tons of rock that contain 664,000 pounds of columbium, 114,000 pounds of uranium, 3,271,000 pounds of zirconium, 209,000 pounds of thorium, 1,203,000 pounds of yttrium, and 3,361,000 pounds of REE.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Cheri; Cheri No. 1

Site type: Prospects

ARDF no.: DE029

Latitude: 54.8924 **Quadrangle:** DE D-1

Longitude: 132.1035

Location description and accuracy:

The Cheri prospects are centered about 0.7 mile south-southeast of the head of the West Arm of Kendrick Bay, near the center of the NE1/4 section 35, T. 80 S., R. 88 E. Their locations relative to the other uranium and REE prospects in the vicinity of Bokan Mountain are best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Be, Cb, REE, Th, U, Y, Zr

Other:

Ore minerals: Allanite, hematite, magnetite, pyrite (but also see DE027)

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE028 and DE030 to DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

MacKevett (1963) identified small pits and trenches at the Cheri prospects on several claims staked in 1956. The rocks in the vicinity consist of Ordovician, albitized quartz diorite and diorite, and a pendant of quartzite of the Descon Formation that cannot be delineated exactly in the heavily vegetated cover. The deposit at the Cheri prospects consists of system of radioactive andesite(?) dikes that strike about N45W and can be traced for at least 3,000 feet along strike (Warner and Barker, 1989). The zone of dikes is about 100 feet wide; it consists of several parallel dikes, 0.8 to 1.3 feet thick. The dikes are fine grained and siliceous. At one location, pyroxene-rich masses with minor pyrite, rare fluorite, and secondary uranium minerals, occur in a dike. Chlorite, magnetite, pyrite, and epidote commonly occur at the margins of the dikes. Allanite is the principal radioactive mineral and the mineralogy is probably similar to that at the nearby Carol Ann/Dotson prospects (DE027), where similar dikes occur. The radioactive minerals are mainly concentrated in quartz veinlets or along mineralized fractures. At the Cheri No. 1 prospect, allanite in the interstices of quartzite is accompanied by abundant hematite and less-abundant albite, quartz, calcite, epidote, and chlorite.

Warner and Barker (1989) estimate an indicated resource of 73,000 tons of rock in two portions of the Cheri dike system that contain 91,000 pounds of columbium, 32,000 pounds of thorium, 109,000 pounds of zirconium, 13,000 pounds of beryllium, 15,000 pounds of uranium, and 349,000 pounds of REE. There is an additional indicated resource of 458,000 short tons of rock in another portion of the dike system that contains 1,122,000 pounds of columbium, 338,000 pounds of thorium, 1,602,000 pounds of yttrium, 4,397,000 pounds of zirconium, 101,000 pounds of beryllium, 153,000 pounds of uranium, and 3,593,000 pounds of REE.

Alteration:

These prospects and the other uranium, thorium, and REE deposits associated with the Bokan Mountain peralkaline granite are marked by albitization, chloritization, and argillization. Minor calcite, fluorite, quartz, sulfide minerals, and tourmaline are common in the altered rocks and hematite often occurs in the periphery of high-grade ore zones.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit in dikes associated with peralkaline granite.

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

Production Status:

Site Status:

Workings/exploration:

Only a few prospect pits.

Production notes:

Reserves:

Warner and Barker (1989) estimate an indicated resource of 73,000 tons of rock in two portions of the Cheri dike system that contain 91,000 pounds of columbium, 32,000 pounds of thorium, 109,000 pounds of zirconium, 13,000 pounds of beryllium, 15,000 pounds of uranium, and 349,000 pounds of REE. There is an additional indicated resource of 458,000 short tons of rock in another portion of the dike system that contains 1,122,000 pounds of columbium, 338,000 pounds of thorium, 1,602,000 pounds of yttrium, 4,397,000 pounds of zirconium, 101,000 pounds of beryllium, 153,000 pounds of uranium, and 3,593,000 pounds of REE.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Shore

Site type: Occurrence

ARDF no.: DE030

Latitude: 54.8960 **Quadrangle:** DE D-1

Longitude: 132.0935

Location description and accuracy:

The Shore occurrence is in the intertidal zone in the vicinity of the point that juts out into the West Arm of Kendrick Bay, near the northwest corner of section 36, T. 80 S., R. 88 E. The location of this occurrence relative to the other uranium and REE prospects in the vicinity of Bokan Mountain is best shown on Plate 1 of MacKevett (1963).

Commodities:

Main: Be, Cb, REE, Th, Ti, U, Y, Zn, Zr

Other: Pb, Sn, Sr, Ta

Ore minerals: Allanite?, pyrite REE minerals? (Also see DE027)

Gangue minerals: Albite, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE029 and DE031) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic rocks are cut by numerous pegmatite, andesite, dacite, and

aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Shore occurrence is in the intertidal zone on the south side of the West Arm of Kendrick Bay (Warner and Barker, 1989). Radioactive, granitic dike rubble and a few outcrops of dike occur along about 1,000 feet of shoreline. The dikes are in a 100-foot-wide zone near the contact of quartz monzonite and quartz diorite. The dikes strike N50W and dip steeply to vertical. They are generally 0.2 to 0.5 feet thick wide and there are intervals where thinner dikes closely parallel each other. The dikes vary from coarse grained to pegmatitic and commonly contain disseminated fluorite, pyrite, allanite(?), and REE(?) minerals. The quartz monzonite near the dikes locally is cut by pyritic, siliceous zones up to 30 feet wide. Samples contained anomalously high columbium, uranium, thorium, REE, yttrium, zirconium, zinc, titanium, and beryllium. Some samples also contained elevated tin, tantalum, lead, and strontium. Three channel samples 1.1 feet long averaged 760 parts per million columbium. The dikes are unusually enriched in REE, especially cerium and neodymium; samples of dike material contained up to 2.5 percent REE. Although the REE and columbium content of the dikes is relatively high, their narrow width suggests doubtful potential for a significant tonnage of mineralized rock.

Alteration:

Not stated, but the dikes and their the wallrock are probably albitized and chloritized, like those at other deposits in the area.

Age of mineralization:

Genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit in dikes associated with peralkaline granite.

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

Production Status:

Site Status:

Workings/exploration:

Only surface sampling by government geologists.

Production notes:

Reserves:

Although the REE and columbium content of the dikes is relatively high, their narrow width suggests doubtful potential for significant tonnage of mineralized rock.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference: Warner and Barker, 1989

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Geoduck

Site type: Occurrences

ARDF no.: DE031

Latitude: 54.8887 **Quadrangle:** DE D-1

Longitude: 132.0853

Location description and accuracy:

The Geoduck occurrences are south of the West Arm of Kendrick Bay. They are related to a dike system that extends N40-50W for about 10,000 feet, nearly diagonally through the center of section 36, T. 80 S., R. 88 E. and into the NW1/4 of section 2, T. 81 S., R. 89 E. The site is approximately at the midpoint of the most continuous and thickest dike, where resource calculations have been made.

Commodities:

Main: Be, Cb, REE, Th, U, Y, Zr

Other:

Ore minerals: (See DE313)

Gangue minerals: Feldspar, quartz

Geologic description:

This and several other nearby uranium-thorium-REE deposits (DE015 to DE030) are spatially and genetically related to a stock of Jurassic, peralkaline granite about 2 miles in outcrop diameter centered on Bokan Mountain. It commonly is referred to as the Bokan Mountain peralkakline granite or Bokan Mountain complex. The intrusion and its deposits have been mapped in detail several times using slightly different subdivisions of the granite (MacKevett, 1963; Thompson and others, 1980, 1982; Saint-Andre and others, 1983; Gehrels, 1992; Thompson, 1997). This description largely follows Gehrels' (1992) map units. The intrusion is a ring-dike complex with an outer border zone up to 14 meters thick of pegmatite and aplite; a nearly complete intermediate zone of aegirine granite porphyry, 15 to 180 meters thick; and a core of several varieties of riebeckite granite porphyry. It has been dated by several methods at 151 Ma to 191 Ma (Lanphere and others, 1964; Saint-Andre and others, 1983; Armstrong, 1985; Gehrels, 1992; Thompson, 1997). The peralkaline granite mainly intrudes a regionally extensive body of Silurian or Ordovician quartz monzonite, granite, and quartz diorite that makes up much of the southeast tip of Prince of Wales Island. The south and west sides of the peralkaline granite are in contact with a band up to about 3,000 feet wide of shale and argillite of the Silurian or Ordovician Descon Formation. The Bokan Mountain complex and surrounding Paleozoic

rocks are cut by numerous pegmatite, andesite, dacite, and aplite dikes. The dikes are genetically related to the complex and commonly are associated with the uranium, thorium, and REE deposits. The deposits are marked by intense albitization, pervasive or fracture-controlled chloritization, calcite-fluorite replacement of aegirine, and hematitization. Three types of U-Th-REE deposits occur in the Bokan Mountain complex: 1) irregular cylindrical pipes; 2) steep, shear-zone-related pods or lenses ('veins'); and 3) quartz veins.

The Geoduck occurrences are related to a system of eqigranular, fine- to medium-grained, andesite dikes that strike N40-50W for about 10,000 feet, west of the head of Kendrick Bay (MacKevett, 1963; Warner and Barker, 1989). The dikes have steep to vertical dips, cut Silurian or Ordovician quartz monzonite, granite, and quartz diorite, and typically have wall rocks marked by chlorite and epidote alteration. The ore mineralogy has not been worked out in detail but it is probably similar to that in the mineralized dikes at the Carol Ann/Dotson prospects (DE027), which may be extensions of the Geoduck dikes. In the northwest part of the Geoduck dike system, individual dikes average about 1.4 feet thick; in the southeast part, they average about 0.8 feet thick. Many samples contain elevated values of beryllium, thorium, yttrium, REE, columbium, uranium, and zirconium.

A 3,000-foot section of the most continuous and thickest dike, which averages 1.5 feet thick, has an indicated resource of 1,378, 000 short tons of rock that contains 278,000 pounds of beryllium, 752,000 pounds of thorium, 8,116,000 pounds of yttrium, 8,786,000 pounds of REE, 2,844,000 pounds of columbium, 358,000 pounds of U, and 12,953,000 pounds of zirconium (Warner and Barker, 1989). There is a inferred reserve in 95,28,000 short tons of rock of 1,906,000 pounds of beryllium, 3,525,000 pounds of thorium, 29,975,000 pounds of yttrium, 14,864,000 pounds of columbium, 1,944,000 pounds of uranium, and 55,262,000 pounds of zirconium.

Alteration:

The dikes are probably albitized and chloritized; the wall rocks are marked by chlorite and epidote alteration.

Age of mineralization:

Associated with dikes that are genetically related to the Jurassic, Bokan Mountain peralkaline granite.

Deposit model:

U-Th-REE deposit in dikes associated with peralkaline granite.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Only surface sampling by government geologists.

Production notes:

Reserves:

A 3,000-foot section of the most continuous and thickest dike which averages 1.5 feet thick has an indicated resource of 1,378, 000 short tons of rock that contains 278,000 pounds of beryllium, 752,000 pounds of thorium, 8,116,000 pounds of yttrium, 8,786,000 pounds of REE, 2,844,000 pounds of columbium, 358,000 pounds of U, and 12,953,000 pounds of zirconium (Warner and Barker, 1989). There is a inferred reserve in 95,28,000 short tons of rock of 1,906,000 pounds of beryllium, 3,525,000 pounds of thorium, 29,975,000 pounds of yttrium, 14,864,000 pounds of columbium, 1,944,000 pounds of uranium, and 55,262,000 pounds of zirconium.

Additional comments:

References:

Denny, 1962; Freeman, 1963; Matzko and Freeman, 1963; MacKevett, 1963; Lanphere and others, 1964; Cobb, 1978; Staatz, 1978; Thompson and others, 1980; Collett, 1981; Thompson and others, 1982; Saint-Andre and others, 1983; Armstrong, 1985; Thompson, 1988 (FIR); Thompson, 1988 (OGR); Warner and Barker, 1989; Gehrels, 1992; Maas and others, 1995; Philpotts and others, 1996; Thompson, 1997.

Primary reference:

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Highline

Site type: Prospect

ARDF no.: DE032

Latitude: 54.8624 **Quadrangle:** DE D-1

Longitude: 132.3160

Location description and accuracy:

The Highline Group is on the south side of Hunter Bay at an elevation of about 650 feet; it is about 1,500 feet back from the shoreline, opposite the abandoned cannery on Hunter Bay. The site consists of two claims about 0.3 mile northeast of the center of section 7, T. 81 S., R. 88 E.

Commodities:

Main: Ag, Au

Other:

Ore minerals:

Gangue minerals: Quartz

Geologic description:

As mapped by Gehrels (1992), the rocks in the area are part of the Devonian Karheen Formation. The geographic limits of the specific rock units are uncertain, but the Karheen Formation includes limestone, porphyritic volcanic rocks, basaltic and andesitic volcanic rocks, and sandstone.

The deposit consists of a quartz vein that can be traced for 200 feet. The vein is about 4 feet thick where it is exposed in a open cut about 38 feet long (Wilcox, 1937). The vein is in calcareous wallrock. Practically no ore minerals are visible in the quartz, two samples of which contained a trace of gold and 0.4 ounce of silver per ton.

Alteration:

Age of mineralization:

The quartz vein cuts Devonian rocks.

Deposit model:

Low-sulfide quartz vein.

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

Production Status: None

Site Status: Inactive

Workings/exploration:
The workings consist of an open cut about 38 feet long.

Production notes:

Reserves:

Additional comments:
This prospect is in the South Prince of Wales Wilderness, which is closed to prospecting and mineral exploration.

References:
Wilcox, 1937; Gehrels, 1992.

Primary reference: Wilcox, 1937

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): R. and L.; Goodhope

Site type: Prospect

ARDF no.: DE033

Latitude: 54.8673 **Quadrangle:** DE D-1

Longitude: 132.2889

Location description and accuracy:
The location of the R. and L. Group of four claims is well documented. It is on the northeast shore of the head of Hunter Bay, near the northeast corner of section 8, T. 81 S., R. 88 E. The Goodhope prospect is about 0.5 mile away in an uncertain direction. The location of the R. and L. Group is accurate.

Commodities:

Main: Ag, Au, Cu, Fe

Other:

Ore minerals: Chalcopyrite, magnetite, pyrite

Gangue minerals: Calcite, quartz

Geologic description:
The R. and L. Group consists of four claims. Wilcox (1937) described the country rock as greenstone; Gehrels (1992) identified the rocks in the vicinity as basaltic and andesitic volcanic rocks with a narrow band of northwest-trending limestone, all part of the Silurian or Ordovician Descon Formation.

The mineral deposits are in and adjacent to fault zones (Wilcox, 1937). At the No. 2 claim, a minor fault zone with calcite stringers and some pyrite is exposed for about 60 feet. A sample contained only a trace each of gold and silver. A 6-foot sample of outcrop mineralized with magnetite and pyrite at the No. 3 claim contained 0.2 ounce of gold per ton and a trace of silver.

Chapin (1916) provides the only description of the deposit at the Goodhope prospect, which Wilcox (1937) places about a half mile from the R. and L. Group. The Goodhope prospect consists of irregular masses of magnetite, chalcopyrite, and pyrite in quartz veins in greenstone near a contact with granitic rocks.

Alteration:

Age of mineralization:

Deposit model:
Magnetite, chalcopyrite, and pyrite in quartz vein or calcite stringers in volcanic rocks.

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

Production Status: None

Site Status:

Workings/exploration:
The only workings are a 40-foot adit on the Goodhope prospect. Several claims were staked in the area in the late 1930's.

Production notes:

Reserves:

Additional comments:
These prospects are in the South Prince of Wales Wilderness which is closed to prospecting and mineral exploration.

References:
Chapin, 1916; Wilcox, 1937; Cobb, 1972; Cobb, 1978; Gehrels, 1992.

Primary reference: Wilcox, 1937

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Ranger

Site type: Prospect

ARDF no.: DE034

Latitude: 54.8214 **Quadrangle:** DE D-1

Longitude: 132.3030

Location description and accuracy:

The Ranger prospect is at an elevation of about 500 feet, 1.3 miles south to south-southeast from southeast tip of Tah Island. It is about 0.4 mile northwest of the center of section 29, T. 81 S., R. 88 E. The location is accurate.

Commodities:

Main: Cu

Other:

Ore minerals: Chalcopyrite, magnetite

Gangue minerals:

Geologic description:

A major fault in the area juxtaposes sandstone of the Devonian Karheen Formation to the west against Ordovician diorite to the east (Gehrels, 1992). In 1918, Chapin described the Ranger prospect as an outcrop of magnetite up to 25 feet across that locally contains chalcopyrite. The country rock is greenstone (probably fine-grained granodiorite or volcanic rock), tuff, volcanic breccia, graywacke, and grit; the greenstone is cut by many granitic dikes and quartz veins.

The prospect was restaked in the early 1950's. Glover (1954 [MI 121-1]) describes the deposit as a body of magnetite about 10 by 15 feet in outcrop area. The original discovery, on which a short tunnel was driven early in the 20th century, was located about 100 feet north of the magnetite body staked in the 1950's. Glover also found several other lenses and pods of magnetite in greenstone, none of which was of substantial size. He found no chalcopyrite in any of the magnetite bodies. The greenstone porphyry in the vicinity is mildly radioactive, averaging about 0.005 percent eU.

Alteration:

Age of mineralization:

Deposit model:

Chalcopyrite(?) in magnetite body.

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

Production Status: None

Site Status: Inactive

Workings/exploration:

The prospect was explored by a 10-foot adit and some surface clearing prior to 1918. A magnetite body nearby was restaked in the 1950's.

Production notes:

Reserves:

Additional comments:

This prospect is in the South Prince of Wales Wilderness, which is closed to prospecting and mineral exploration.

References:

Chapin, 1918; Cobb, 1972; Cobb, 1978; Glover, 1954 (MI 121-1); Gehrels, 1992.

Primary reference: Chapin, 1918; Glover, 1954 (MI 121-1)

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (north of Mc Lean Arm)

Site type: Occurrences

ARDF no.: DE035

Latitude: 54.8195 **Quadrangle:** DE D-1

Longitude: 132.0253

Location description and accuracy:
This prospect consists of one or more claims at an elevation of about 2,200 feet. The area is 1.3 mile north of McLean Arm, probably in the W1/2 of section 30, T. 81 S., R. 90 E. The location is a general one and the site may anywhere within a mile or so of the co-ordinates.

Commodities:

Main: Fe

Other:

Ore minerals: Magnetite

Gangue minerals:

Geologic description:
In 1958, Utah Construction Company staked one or more claims on a magnetic anomaly identified from an aeromagnetic survey (MacKevett, 1963). Magnetite is associated with hornblende-rich phases of Silurian or Ordovician quartz monzonite or diorite (Gehrels, 1992).

Alteration:

Age of mineralization:
Magnetite in Silurian or Ordovician granitic rocks.

Deposit model:
Concentration of magnetite minerals in granitic rocks.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
None; claims staked on an anomaly determined from an aeromagnetic survey.

Production notes:

Reserves:

Additional comments:

References:
MacKevett, 1963; Gehrels, 1992.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Spik; Hanson

Site type: Prospect

ARDF no.: DE036

Latitude: 54.7848 **Quadrangle:** DE D-1

Longitude: 132.0837

Location description and accuracy:

The Spik prospect reportedly is about 2 miles south of the head of McLean Arm in the SW1/4 section 2, T. 82 S., R. 89 E (Cobb, 1978). The coordinates are at that location, but the prospect has hardly been mentioned in a primary reference since 1918, and it may be a mile or more from there, or possibly is one of several prospects one or two miles to the east (DE037 to DE039).

Commodities:

Main: Cu

Other:

Ore minerals: Bornite, chalcopyrite, pyrrhotite

Gangue minerals:

Geologic description:

This prospect was originally identified as the Hanson copper prospect (Smith, 1914). Chapin (1918) called it the Spik prospect and described the deposit as masses of bornite, chalcopyrite, and pyrrhotite in greenstone that has been intruded by granite. ('Greenstone' as used in many early reports is often fine-grained diorite or granodiorite.) The prospect was explored by a few open cuts and a short adit. Buddington and Chapin's (1929) description is probably based on Chapin's earlier report. Gehrels (1992) has mapped the rocks in the area as Silurian or Ordovician syenite and granite.

Alteration:

Age of mineralization:

Deposit is in syenite and granite of Silurian or Ordovician age.

Deposit model:

Bornite, chalcopyrite, and pyrrhotite in greenstone.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Only a few open cuts and a short adit.

Production notes:

Reserves:

Additional comments:

References:
Smith, 1914; Chapin, 1918; Buddington and Chapin, 1929; Cobb, 1978; Gehrels, 1992.

Primary reference: Chapin, 1918

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Johnson and Gouley; unnamed

Site type: Occurrences

ARDF no.: DE037

Latitude: 54.7876 **Quadrangle:** DE D-1

Longitude: 132.0670

Location description and accuracy:

The Johnson and Gouley prospect is reported to be about a mile south of the head of McLean Arm at an elevation of about 1,500 feet (Cobb, 1978) . Maas and others (1991) could not find the prospect, but they did locate two other mineral occurrences in the vicinity. The occurrences are at elevations of 1,450 and 1,480 feet, near the center of the E1/2 of section 2, T. 82 S., R. 89 E. Their location is accurate within 0.2 mile. The Johnson and Gouley prospect is often combined with the Polson and Ickis prospect (DE039), about a mile to the east.

Commodities:

Main: Ag, Au, Cu, Mo

Other:

Ore minerals: Chalcopyrite, malachite, pyrite

Gangue minerals: Calcite, quartz

Geologic description:

Although Maas and others (1991) could not find the Johnson and Gouley prospect, which reportedly is near this site, they found two other mineral occurrences nearby. Those occurrences are described in this record. The rocks in the area consist of Silurian or Ordovician syenite and quartz monzonite (Gehrels, 1992).

One occurrence is at at elevation of about 1,480 feet. It consists of silicified monzonite that contains clots of pyrite-bearing quartz and calcite. A selected sample contained 208 parts per billion (ppb) gold, 4.4 parts per million (ppm) silver, and 364 ppm molybdenum. The other occurrence is at an elevation of 1,450 feet. It is in monzonite and consists of a quartz-calcite vein up to 0.4 foot thick. The vein contains pyrite, chalcopyrite, and malachite and the monzonite in the wall rock is silicified. Two samples, 0.3 and 0.4 feet long, across the vein contained 1.25 and 7.54 percent copper, 49 and 52 ppb gold, and 17.5 and 46.4 ppm silver. Samples of silicified monzonite wall rock contained 635 to 932 ppm copper, 0.3 to 0.5 ppm silver, and 8 to 14 ppb gold.

Alteration:

The monzonite wall rock of the vein is silicified.

Age of mineralization:
Silurian or Ordovician or younger.

Deposit model:
Quartz-calcite vein with copper, silver, molybdenum, and gold.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Although a prospect is reported in this area, the only work that can be documented is the sampling of mineralization by government geologists.

Production notes:

Reserves:

Additional comments:

References:
U.S. Bureau of Mines, 1944; Cobb, 1978; Maas and others, 1991; Gehrels, 1992; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (west of Mallard Bay)

Site type: Prospect

ARDF no.: DE038

Latitude: 54.7815 **Quadrangle:** DE D-1

Longitude: 132.0565

Location description and accuracy:

This prospect area was identified from the air by Ralph Yetka, a helicopter pilot who supported drilling in the area in the early 1970's by one of the major oil companies (D.J. Grybeck, unpublished field notes, 1984). There are at least 5 diamond drill sites in the N1/2NW1/4 section 12, and the S1/2SW1/4 of section 1, T. 82 S., R. 89 E. The coordinates are at about the center of the area of drill sites.

Commodities:

Main: Cu?, Mo?

Other:

Ore minerals:

Gangue minerals:

Geologic description:

This prospect was identified from the air by Ralph Yetka, a helicopter pilot who supported drilling in the area in the early 1970's by one of the major oil companies (D.J. Grybeck, unpublished field notes, 1984). There are at least 5 diamond drill sites scattered over an area at least 0.2 mile in diameter. Nothing about the drilling has been made public. The rocks in the area are Silurian or Ordovician syenite, part of a batholithic complex that forms the southeast tip of Prince of Wales Island (Gehrels, 1992).

Alteration:

Age of mineralization:

Deposit model:

Porphyry copper? Porphyry molybdenum?

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
There are at least five drill pads.

Production notes:

Reserves:

Additional comments:

References:
Gehrels, 1992.

Primary reference: This record

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Polson & Ickis; Apex, Hillside, Wano, Adit, Astor, Daly-West, Veda, Thompson

Site type: Prospects

ARDF no.: DE039

Latitude: 54.7877 **Quadrangle:** DE D-1

Longitude: 132.0439

Location description and accuracy:

This site covers an area about 1,500 feet long and 400 feet wide that trends west-northwest. Within the area, there are numerous claims, pits and trenches, and several adits, many of which date from before World War I. Over the years, these have been described collectively and separately under various names by several workers, and some of the names are probably the names of claims. The best known are the Polson and Ickis prospects, which have a long history under that name and it is the name used by MacKevett (1963). Roehm (1938) and Maas and others (1991, 1995), however, describe them under the name Apex. The Hillside and Wano prospects, which were probably included with the Polson and Ickis in early reports, are described separately by MacKevett (1963) and by Maas and others (1991,1995). In this record they are included with the Polson and Ickis. The Veta prospect has been included with the Polson and Ickis prospects in several early reports but it is described separately in this report (DE040).

The site is about at the center of the main workings of the Polson and Ickis/Apex prospects, about 0.2 mile east of the center of section 1, T. 82 S., R. 89 E. The Hillside and Wano prospects are about 800 feet to the northwest. The 1994 edition of the USGS D-1, 1:63,360-scale topographic map outlines a patented claim block(?) that probably includes most of the Polson & Ickis property.

Commodities:

Main: Ag, Au, Cu

Other: Ba

Ore minerals: Azurite, barite, bornite, chalcopyrite, chrysocolla, gold, hematite, malachite, pyrite

Gangue minerals: Calcite, quartz

Geologic description:

The rocks in the region consist of various phases of a Silurian or Ordovician batholith and include quartz monzonite, syenite, quartz diorite, and diorite (Gehrels, 1992). (A fine-grained phase of the quartz diorite and diorite apparently was often called

'greenstone' in early reports.) The prospect area is cut by several large faults and by many smaller ones, some of which localize mineralized quartz-calcite-barite veins.

The prospects were explored by at least 5 adits that total about 520 feet of underground workings, and by numerous pits and trenches. Exploration in the area began before World War I, but there apparently has been no production (Wright, 1909; Knopf, 1910, 1911; Smith 1914; Chapin, 1916, 1918).

The ore deposits consist of quartz-calcite-barite veins a few feet or less thick that commonly are along fault zones (Roehm, 1936; MacKevett, 1963; Maas and others, 1991, 1995). The veins typically contain modest to abundant amounts of pyrite, minor chalcopyrite, hematite, and chrysocolla, and small amounts of bornite and gold. Post-ore faulting is common and there is usually intense argillic alteration for several feet into the granitic wallrock. The veins are well exposed in the three adits of the Polson and Ickis prospects. They are in a series of steep fault zones that strike N to N25E in monzonite that grades into syenite. At the Wano prospect, the principal structure is a fault that strikes N25E and dips 70SE in a salient of monzonite in fine-grained diorite. The monzonite is intensely silicified and sericitized.

Work by the U.S. Bureau of Mines (1944) defined a shear zone with copper-gold-silver mineralization that extends for at least 1,000 feet. The Bureau calculated the reserves as 2,263,000 tons of material that contains 0.51 percent copper, 0.01 ounce of gold per ton, and 0.81 ounce of silver per ton.

Maas and others (1991, 1995) extensively sampled the deposits. In the lower adit of the Polson and Ickis prospect, a 4-foot-thick quartz-calcite-barite vein contains pyrite, chalcopyrite, bornite, malachite, azurite, and limonite. A 0.3-foot chip sample across the best copper mineralization contained 2.16 percent copper and 212 parts per billion (ppb) gold. Samples from a similar fault zone in the the middle adit contained 0.59 to 0.63 percent copper and 0.330 to 2.312 ppb gold. Samples across 1.9 feet of vein in the highest adit contained 0.28 percent copper and 17 ppb gold. Maas and others (1991) found three adits and 7 open cuts at the Hillside and Wano prospects that expose mineralization along a fault zone. Chip and other representative samples that vary from 1 to 5.6 feet long contained 666 to 12,580 parts per million (ppm) copper and 82 to 435 ppb gold. Selected high-grade samples contained up to 2.79 percent copper, 11.2 ppm silver, and 7.15 ppm gold.

Alteration:

Post-ore faulting is common and the granitic wallrock commonly is intensely argillized for several feet from the veins. At one location, the monzonite is intensely silicified and sericitized.

Age of mineralization:

The veins cut Silurian or Ordovician granitic wall rocks.

Deposit model:

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

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

22c

Production Status:

Site Status:

Workings/exploration:

At least five adits with a total of about 520 feet of underground workings. Numerous trenches and prospect pits.

Production notes:

Reserves:

Work by the U.S. Bureau of Mines in 1944 defined a shear zone with copper-gold-silver mineralization that extends for at least 1,000 feet. It contains indicated reserves of 2,263,000 tons of mineralized rock that average 0.51 percent copper, 0.01 ounce of gold per ton, and 0.81 ounce of silver per ton.

Additional comments:

References:

Wright, 1909; Knopf, 1910; Knopf, 1911; Smith, 1914; Chapin, 1916; Chapin, 1918; Brooks, 1921; Roehm, 1936; Smith, 1938; Smith, 1939; U.S. Bureau of Mines, 1944; MacKevett, 1963; Eakins, 1970; Maas and others, 1991; Gehrels, 1992; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Veta

Site type: Prospect

ARDF no.: DE040

Latitude: 54.7849 **Quadrangle:** DE D-1

Longitude: 132.0243

Location description and accuracy:

The Veta prospect is about 0.2 mile northwest of the head of Mallard Bay, and about 0.2 mile south of the center of section 6, T. 82 S, R. 90 E. (The Veta prospect is often included with the Polson and Ickis prospects (DE039) in early reports).

Commodities:

Main: Ag, Au, Cu

Other:

Ore minerals: Bornite, chalcopyrite, chrysocolla, hematite, malachite(?), pyrite

Gangue minerals: Quartz

Geologic description:

The rocks in the area are Silurian or Ordovician quartz monzonite, syenite, and quartz diorite that are part of a batholith that makes up the southeastern tip of Prince of Wales Island (Gehrels, 1992). There are several prominent northwest-trending faults near the prospect.

The workings consist of two flooded vertical shafts, one 30 feet deep and the other 78 feet deep, and about 78 feet of drifts and crosscuts (Knopf, 1910; MacKevett, 1963; Maas and others, 1991). The working are in fine-grained diorite along a fault zone about 3 feet wide that strikes N50W and dips 80NE. The fault zone and its wallrocks are pervasively altered to secondary iron minerals and clay. Quartz veins in the fault contain pyrite and chalcopyrite, along with less-abundant bornite, malachite(?), chrysocolla, and hematite. The sulfides are also disseminated through the wall rocks. Maas and others (1991) collected several samples from rubble crop and dumps that contained 1,833 parts per million (ppm) to 6.41 percent copper, 5.6 to 25.7 ppm silver, and 94 to 7,258 parts per billion gold.

Alteration:

Pervasive alteration of the fault zone and granitic wall rocks to secondary iron oxides and clay minerals.

Age of mineralization:
The vein cuts Silurian or Ordovician granitic rocks.

Deposit model:
Quartz vein with copper, gold, and silver values. (Cox and Singer, 1986; model 22c).

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
The workings consist of two flooded vertical shafts, one 30 feet deep and the other 78 feet deep, and about 78 feet of drifts and crosscuts.

Production notes:

Reserves:

Additional comments:

References:
Knopf, 1910; MacKevett, 1963; Maas and others, 1991; Maas and others, 1995.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (south of Mallard Bay)

Site type: Occurrences

ARDF no.: DE041

Latitude: 54.7780 **Quadrangle:** DE D-1

Longitude: 132.0238

Location description and accuracy:
This site represents one or more claims on the ridge about 0.6 mile south of the head of Mallard Bay. All or most of the claim(s) are probably in the N1/2 section 7, T. 82 S. R. 90 E. The location is a general one and the site may be a mile or more from the coordinates.

Commodities:

Main: Fe

Other:

Ore minerals: Magnetite

Gangue minerals:

Geologic description:
In 1958, Utah Construction Company staked one or more claims on a magnetic anomaly identified from an aeromagnetic survey. Magnetite occurs in a band of Silurian or Ordovician pyroxenite (MacKevett, 1963; Gehrels, 1992).

Alteration:

Age of mineralization:
Magnetite in Silurian or Ordovician pyroxenite.

Deposit model:
Magnetite in pyroxenite.

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

Production Status: None

Site Status: Inactive

Workings/exploration:
None; claims were staked on an anomaly determined from an aeromagnetic survey.

Production notes:

Reserves:

Additional comments:

References:
MacKevett, 1963; Gehrels, 1992.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near Mallard Bay)

Site type: Occurrence

ARDF no.: DE042

Latitude: 54.7713 **Quadrangle:** DE D-1

Longitude: 132.0094

Location description and accuracy:
This occurrence is about 0.3 mile north of the northwest head of Stone Rock Bay, in the NW1/4 SW1/4 section 8, T. 82 S., R. 90 E.

Commodities:

Main: Au, Ce, Cu, La, U

Other: Y, Zn

Ore minerals: Chalcopyrite, monazite(?), REE minerals

Gangue minerals: Chlorite, clay minerals, hematite, quartz

Geologic description:
The only work at this prospect is a few small pits on several claims. A network of quartz-hematite veins occurs in radioactive, altered andesite(?) dikes that cut Silurian or Ordovician syenite (MacKevett, 1963; Gehrels, 1992). The dikes are largely altered to chlorite and clay minerals and are cut by late-stage calcite veinlets that lack any radioactive minerals. Maas and others (1991) speculatively identified monazite in the quartz-hematite veinlets. They collected several samples of the dikes and syenite that contained up to 132 parts per billion gold, 0.27 percent copper, 331 parts per million (ppm) zinc, 1,080 ppm uranium, 1.44 percent cerium, 0.723 percent lanthanum, and 54 ppm yttrium. A sample nearby of silicified syenite with disseminated chalcopyrite contained 229 to 402 ppb gold and 3,162 to 6,206 ppm copper.

Alteration:
The radioactive dikes are almost completely altered to chlorite and clay minerals. Syenite nearby is silicified.

Age of mineralization:

Deposit model:
U-REE-bearing dikes.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Only a few small prospecting pits.

Production notes:

Reserves:

Additional comments:

References:
MacKevett, 1963; Eakins, 1975; Cobb, 1978; Maas and others, 1991; Gehrels, 1992; Maas and others, 1995.

Primary reference: MacKevett, 1963

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (north shore, Stone Rock Bay)

Site type: Prospect

ARDF no.: DE043

Latitude: 54.7680 **Quadrangle:** DE D-1

Longitude: 132.0019

Location description and accuracy:

This prospect is near the southeast tip of the peninsula that juts out to the east between Mallard and Stone Rock Bays. It is just north of the midpoint of the south boundary of section 8, T. 82 S, R. 90 E. This prospect may be in the Prince Rupert quadrangle or extend into it.

Commodities:

Main: Au, Ce, Cu, La, U

Other: Y, Zn

Ore minerals: Monazite, REE minerals

Gangue minerals: Calcite, hematite, quartz

Geologic description:

This prospect is on several claims that have been explored by only a few shallow pits. The deposit consists of radioactive andesite(?) dikes that cut Silurian or Ordovician syenite (MacKevett, 1963; Gehrels, 1992). The dikes are highly altered and consist mainly of chlorite and clay minerals. The dikes contain two sets of veinlets. The older set contains sparse radioactive minerals, probably monazite, and is rich in quartz and hematite. The younger set is not radioactive and consists mainly of calcite. The prospects were sampled by Maas and others (1991). Several samples contained up to 132 parts per billion gold, 0.27 percent copper, 331 parts per million (ppm) zinc, 1,080 ppm uranium, 1.44 percent cerium, 0.723 percent lanthanum, and 54 ppm yttrium.

Alteration:

Radioactive dikes are almost completely altered to chlorite and clay minerals.

Age of mineralization:

Related to radioactive dikes of unknown age that cut Silurian or Ordovician syenite.

Deposit model:

Radioactive dikes with REE minerals.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Explored by a few shallow pits.

Production notes:

Reserves:

Additional comments:

References:
MacKevett, 1963; Maas and others, 1991; Gehrels, 1992; Maas and others, 1995.

Primary reference: Maas and others, 1995

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Decker & West

Site type: Prospect

ARDF no.: DE044

Latitude: 54.7587 **Quadrangle:** DE D-1

Longitude: 132.0119

Location description and accuracy:
The location of this old prospect is known no more closely than that it is near Stone Rock Bay. For this record, it is arbitrarily plotted on the tip of the small peninsula that juts out of the west shore of Stone Rock Bay. Its location could easily be a mile or more away.

Commodities:

Main: Cu

Other:

Ore minerals:

Gangue minerals:

Geologic description:
All that is known about this site is that it is a copper prospect near Stone Rock Bay (Smith, 1914). The rocks in the vicinity are Silurian or Ordovician quartz monzonite, syenite, quartz diorite, and pyroxenite that are part of a batholith that makes up the southeastern tip of Prince of Wales Island (Gehrels, 1992).

Alteration:

Age of mineralization:

Deposit model:

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

Production Status: Undetermined.

Site Status: Undetermined

Workings/exploration:

Production notes:

Reserves:

Additional comments:

References:
Smith, 1914; Cobb, 1978.

Primary reference: Smith, 1914; Cobb, 1978; Gehrels, 1992

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near Security Cove)

Site type: Occurrence

ARDF no.: DE045

Latitude: 54.7473 **Quadrangle:** DE C-3

Longitude: 132.8581

Location description and accuracy:
This occurrence, which was first sampled and described by Maas and others (1991), is near the tip of a small peninsula that juts out on the north side of Security Cove just inside its entrance. It is near the center of the east boundary of the NE1/4 section 21, T 82 S., R. 84 E.

Commodities:

Main: Ag, Ba, Zn

Other: As, Au

Ore minerals: Pyrite

Gangue minerals:

Geologic description:
The rocks in the vicinity of this occurrence are pre-Ordovician basaltic metavolcanic rocks, dacitic metavolcanic rocks, phyllite, and marble (Gehrels, 1991). As described by Maas and others (1991), the occurrence is a 20-foot zone with thin layers of pyrite 0.1 to 0.5 foot thick, interbedded with marble and chlorite schist. Their best sample across a 0.5-foot-thick layer of pyrite contained 357 parts per billion gold, 6.3 parts per million (ppm) silver, 2,885 ppm zinc, 1,103 ppm arsenic, and 2.3 percent barite. The pyrite layers apparently do not continue to the south across Security Cove.

Alteration:

Age of mineralization:
Probably contemporaneous with the pre-Ordovician host rocks.

Deposit model:
Probably a Kuroko massive-sulfide-type deposit (Cox and Singer, 1986; model 28a).

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Only sampling by government geologists.

Production notes:

Reserves:

Additional comments:

References:
Gehrels, 1991; Maas and others, 1991; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Virginia; McLeod

Site type: Prospects

ARDF no.: DE046

Latitude: 54.7062 **Quadrangle:** DE C-3

Longitude: 132.7631

Location description and accuracy:

The Virginia prospects consist of several old shallow shafts and pits and the remains of a cabin, and several pits dating from the 1980s, scattered throughout an area about 500 feet in diameter. The center of this area is at an elevation of about 200 feet along the creek in the NE1/4 section 6, T. 83 S., R. 85 E., that flows into the head of Wolk Harbor. (In many reports, this and the Elk prospects (DE047) are combined under the name 'McLeod' or 'McLeod Bay'.)

Commodities:

Main: Au

Other: Ag, Cu, Pb, Zn

Ore minerals: Chalcopyrite, galena, pyrite

Gangue minerals: Quartz

Geologic description:

The Virginia and other prospects at this site are often considered to be an extension of the mineralized structure at the Elk prospects (DE047) near the head of McLeod Bay. The two areas are often described together and they were prospected and explored at about the same time. Most of the work, however, apparently was at the Elk prospects. There are several pits and shallow shafts in the Virginia prospect area; some pre-date World War I but some date from the 1980's, when several companies were working in the area and staked claims (D.J. Grybeck, unpublished field notes, 1984).

The rocks in the area of the Virginia prospects consist of pre-Ordovician, deformed and metamorphosed sandstone and siltstone with thin marble layers, which trend about about N55W and dip NE (Gehrels, 1991).

Most of the mineralization in the Virginia prospects consists of thin, erratic lenticular quartz veins and pods along the foliation of the phyllite and other metamorphic rocks (Wright and Wright, 1905,1906, 1908; Wright 1907; Chapin 1918). The apparently sparse sulfides include chalcopyrite, galena, and pyrite. Maas and others (1991) collected 14 samples of the quartz veins in the Virginia prospect area. Their highest gold value was 1.4 parts per million (ppm) and highest silver value was 33.9 ppm. Other metals were

mostly negligible, although one sample contained 670 ppm copper, 2,170 ppm lead, and 957 ppm zinc.

Alteration:

Not noted specifically, but some of the quartz veins are brecciated and the country rock commonly is bleached.

Age of mineralization:

Deposit model:

Gold-quartz veins and pods along the foliation of metamorphosed sandstone and siltstone.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Prior to WWI, the area was explored by several pits and shallow shafts along about 0.4 mile of what informally has been called Wolk Creek, which flows into Wolk Harbor. From about 1984 to 1990, several companies, including Noranda Minerals, Houston Oil and Minerals, and Long Lac Minerals were active in the area and staked claims (Eakins and others, 1985; Bundtzen and others, 1986, 1987, 1988, 1990; Green and others, 1989).

Production notes:

Reserves:

Additional comments:

References:

Wright and Wright, 1905; Wright and Wright, 1906; Wright, 1907; Wright and Wright, 1908; Chapin, 1918; Brooks, 1921; Eakins and others, 1985; Bundtzen and others, 1986; Bundtzen and others, 1987; Bundtzen and others, 1988; Green and others, 1989; Bundtzen, and others, 1990; Gehrels, 1991; Maas and others, 1991; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Elk; Delaware; Elks Pup; Golden Chariot; McLeod; New York; No Name

Site type: Prospects

ARDF no.: DE047

Latitude: 54.6944 **Quadrangle:** DE C-3

Longitude: 132.7284

Location description and accuracy:

Although the area is densely vegetated and the workings are caved or obscured, the location of the Elk and related prospects is well known. Several adits were driven and many trenches explored a mineralized structure oriented about N45W that extends for about 800 feet along strike. The center of these workings is at an elevation of about 450 feet, about 0.4 mile south of the southwest corner of the head of McLeod Bay. The location in the SW1/4 section 4, T. 83 S., R. 85 E. is accurate. (These prospects and the Virginia prospects (DE046) are often combined under the name 'McLeod' or 'McLeod Bay'.)

Commodities:

Main: Ag, Au, Cu, Pb, Zn

Other:

Ore minerals: Chalcopyrite, galena, gold, pyrite

Gangue minerals: Quartz

Geologic description:

The first claims on the Elk and nearby prospects were staked in 1897 by William McLeod, and prior to WWI there was considerable activity in the area (Wright and Wright, 1905, 1906, 1908; Wright 1907; Chapin 1918). By 1918, many claims had been staked along a wide mineralized structure with several quartz veins that could be traced for over 800 feet along strike and were explored by 2 adits and numerous open cuts There was considerable exploration from at least 1983 to 1990 by several companies.

The rocks in the area consist of pre-Ordovician, deformed and metamorphosed sandstone and siltstone that persistently trend about N55W and dip NE. A thin marble layer coincides with the trend of the prospects. A 554 Ma (Cambrian) quartz diorite-granodiorite pluton is about a mile south of the prospects and similar granitic rocks compose much of the southern tip of Dall Island (Gehrels, 1991).

There are several descriptions of the mineralization that differ in detail. Wright and Wright (1906) described the Elk Group as a band of decomposed schist 50 feet or more wide that constitutes a low-grade gold deposit. Chapin (1918) described a quartz vein 40-

60 feet wide that parallels stringer lodes along the sides of a mineralized zone 200-600 feet wide that follows the contact between limestone and schist. Chapin and the Wrights agree that the quartz in the mineralized zone is brecciated; that the quartz contains chalcopyrite, pyrite, galena, and free gold; and that while locally there are rich pods of quartz, in aggregate the prospects probably constitute a large, low-grade deposit. Bufvers (1967) cited sampling in 1947 that defined a zone about 500 feet long and six feet wide that contains about $4 in gold per ton (about 0.11 ounce of gold per ton). Maas and others (1991) sampled in the area and while they were not able to gain access to much of the vein material because of the thick vegetation and slumping in the old pits, they did collect several rich samples. A 1.5-foot-long sample across a quartz vein contained 3.416 ounces of gold per ton, 14.88 ounces of silver per ton, 1.13 percent copper, and 2.17 percent lead.

Alteration:

No description of specific types of alteration, but the rocks in the mineralized zone are locally brecciated and bleached.

Age of mineralization:

No information other than that the prospects occur in pre-Ordovician rocks.

Deposit model:

Thick mineralized zone with sulfide-bearing gold-quartz veins.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Prior to WWI, the deposit was explored by numerous pits and trenches along 800 feet of strike, and by two adits, one 265 feet long and the other 175 feet long. Bufvers (1967) cites a sampling program in 1947. From about 1984 to 1990, several companies, including Noranda Minerals, Houston Oil and Minerals, and Long Lac Minerals, were active in the area and staked numerous claims (Eakins and others, 1985; Bundtzen and others, 1986,1987, 1988, 1990; Green and others, 1989).

Production notes:

Reserves:

Additional comments:

References:

Wright and Wright, 1905; Wright and Wright, 1906; Wright, 1907; Wright and Wright, 1908; Chapin, 1918; Brooks, 1921; Bufvers, 1967; Eakins and others, 1985; Bundtzen and others, 1986; Bundtzen and others, 1987; Bundtzen and others, 1988; Green and oth-

ers, 1989; Bundtzen, and others, 1990; Gehrels, 1991; Maas and others, 1991; Maas and others, 1992; Maas and others, 1995.

Primary reference: Chapin, 1918

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near head of McLeod Bay)

Site type: Occurrence

ARDF no.: DE048

Latitude: 54.6969 **Quadrangle:** DE C-3

Longitude: 132.7268

Location description and accuracy:

This occurrence is a thin quartz vein exposed for several hundred feet along strike, just below the high-tide line in fresh, wave-washed argillite and meta-andesite. It is about 0.3 mile southeast of the southwest corner of the head of Mc McLeod Bay, in the SW1/4 section 4, T. 83 S., R. 85 E.

Commodities:

Main: Ag, Au

Other: Cu, Pb, W, Zn

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

Gangue minerals: Calcite, quartz

Geologic description:

Gehrels (1991) has mapped the rocks in the vicinity as pre-Ordovician, deformed and metamorphosed, sandstone and siltstone that persistently trend about N55W and dip NE.

This quartz vein is not specifically described in the literature, although it was probably known before WWI, when there was considerable prospecting and development in the McLeod Bay area. The vein is particularly well exposed and accessible, carries visible free gold, and is probably similar to the quartz veins higher on the hill to the southwest at the Elk prospect (DE047).

The vein varies from about 2 to 10 inches thick, strikes about N45W and dips 56NE, and can be traced for about 400 feet (D.J. Grybeck, unpublished field notes and analyses, 1984). Typically, calcite and 1 to 3 percent pyrite are scattered through the quartz, but one small pocket of quartz less than a foot long contained about 10 percent sulfides including chalcopyrite, galena, tetrahedrite, and sphalerite, and visible free gold. In general, the vein is parallel to the layering of the black argillite, meta-andesite, and metafelsite host rock. In detail, however, the vein locally crosscuts the host rock and thus is epigenetic. Samples of the vein near the sulfide-bearing pocket contained 50-100 parts per million (ppm) silver, 500-7,000 ppm copper, 100-2,000 ppm lead, up to 300 ppm tungsten, 300-1,500 ppm zinc, and 5 to 10 ppm gold.

Alteration:
Not prominent but some of the metafelsite host rock near the vein is bleached (oxidized?).

Age of mineralization:
Vein locally crosscuts pre-Ordovician host rock.

Deposit model:
Gold-quartz vein with sparse, scattered sulfides (Cox and Singer, 1986; model 36a).

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:

Production notes:

Reserves:

Additional comments:

References:
Gehrels, 1991.

Primary reference: This record

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Precious (on Daykoo Islands)

Site type: Prospects

ARDF no.: DE049

Latitude: 54.6995 **Quadrangle:** DE C-3

Longitude: 132.6991

Location description and accuracy:
Most of the Daykoo Islands in the E1/2 section 4 and W 1/2 section 3, T. 83 S., R. 85 E were staked in the early 1980's. There are numerous iron-stained, pyrite-rich layers in metafelsite on the islands, and the site is arbitrarily placed on the east end of the largest of the Daykoo Islands, where the iron staining is prominent.

Commodities:

Main: Au?

Other:

Ore minerals: Pyrite

Gangue minerals:

Geologic description:
The Daykoo Islands are composed of a heterogeneous sequence of pre-Ordovician metamorphosed sandstone, siltstone, and dacitic and rhyolitic metavolcanic rocks (Gehrels, 1991). Along the shoreline, there are many bright orange and yellow bands of oxidized, pyrite-bearing metavolcanic rocks, mainly metarhyolite, in layers about 12 inches to 6 feet thick (D.J. Grybeck, unpublished field notes, 1984). Maas and others (1991) sampled several of these zones but none contained more than 5 parts per billion gold.

Alteration:
The bright yellow and orange staining of the metarhyolite is probably due to oxidization of pyrite.

Age of mineralization:
The pyrite-bearing metarhyolite layers are pre-Ordovician.

Deposit model:
Probably related to a Kuroko massive-sulfide-type deposit (Cox and Singer, 1986; 28a).

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
No workings. Probably all of the islands were staked in the 1980's, when Noranda Minerals, Houston Oil and Minerals, and Long Lac Minerals were active in the area (Eakins and others, 1985; Bundtzen and others, 1986, 1987, 1988, 1990; Green and others, 1989).

Production notes:

Reserves:

Additional comments:

References:
Eakins and others, 1985; Bundtzen and others, 1986; Bundtzen and others, 1987; Bundtzen and others, 1988; Green and others, 1989; Bundtzen, and others, 1990; Gehrels, 1991; Maas and others, 1991; Maas and others, 1995.

Primary reference: This record

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Lucile; Feickert

Site type: Prospect

ARDF no.: DE050

Latitude: 54.7450 **Quadrangle:** DE C-1

Longitude: 132.1507

Location description and accuracy:

The Lucile prospect is about one-half mile up the eastern stream at the head of Nichols Bay; it is about in the center of section 20, T. 82 S, R. 89 E. Cobb (1972) shows this as one of the Feickert prospects. Maas and others (1991) recently sampled and described the prospect under the name Lucile.

Commodities:

Main: Cu, Pb, Zn

Other:

Ore minerals: Chalcopyrite

Gangue minerals: Quartz

Geologic description:

Mapping by Gehrels (1992) places the Lucile or Feickert prospect on or near a prominent, north-trending fault which he calls the Feickert Claims Fault. The rocks west of the fault are banded mudstone and siltstone with interbedded limestone of the Silurian or Ordovician Descon Formation. The rocks east of the fault are silicic volcanic rocks of the Descon Formation.

Chapin (1918) describes this site as one of the Feickert prospects--a chalcopyrite-bearing quartz vein in andesitic greenstone that was explored by a shaft and open cuts. Maas and others (1991) noted a shaft with a dump, and two adits, one 17 feet long and the other 18 feet long. They collected several samples that contained up to 9 parts per billion gold, 415 parts per million (ppm) copper, 3,870 ppm lead, and 4,865 ppm zinc. Gehrels (1992) shows numerous sites of 'mineralized rock' for about a half mile west of the Feickert Claims Fault at the head of Nichols Bay, but provides no details.

Alteration:

Age of mineralization:

The rocks at the Lucile prospect are sedimentary and silicic volcanics rocks of the Silurian or Ordovician Descon Formation, but it is unclear whether the deposit is syngenetic

or epigenetic.

Deposit model:

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

Production Status:

Site Status:

Workings/exploration:
Maas and others (1991) noted a shaft with a dump, and two adits, one 17 feet long and the other 18 feet long.

Production notes:

Reserves:

Additional comments:

References:
Chapin, 1918; Cobb, 1972; Cobb, 1978; Maas and others, 1991; Gehrels, 1992; Maas and others, 1995.

Primary reference: Maas and others, 1991

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (near east shore of upper Nichols Bay)

Site type: Prospect

ARDF no.: DE051

Latitude: 54.7344 **Quadrangle:** DE C-1

Longitude: 132.1381

Location description and accuracy:

This prospect is near the shoreline on the east side of upper Nichols Bay in the NE1/4 NE1/4 section 29, T. 82 S., R. 88 E. There is an old shaft, which may be one of the prospects described by Chapin (1918) on the east side of Nichols Bay. Maas and others (1991) called it the Nichols Bay shaft. The coordinates are at the old shaft, but Gehrels (1992) identified several massive sulfide layers along about a mile of shoreline near the shaft.

Commodities:

Main: Cu, Zn

Other: Ag, As, Ba, Pb

Ore minerals: Arsenopyrite, chalcopyrite, pyrite, sphalerite

Gangue minerals:

Geologic description:

Gehrels and others (1983) and Maas and others (1991) report an old shaft at this location. Gehrels and others describe several massive-sulfide layers in silicic volcanic rocks that are part of a sequence of interbedded graywacke, slate, and silicic volcanic rocks of the Silurian or Ordovician Descon Formation (Gehrels, 1992). The massive sulfide layers are generally parallel to the bedding. The most prominent massive sulfide layer is 3 meters thick and contains pyrite and sphalerite; it is exposed near the old shaft. Samples contained up to 30 parts per million (ppm) silver, 3,000 ppm arsenic, 1,500 ppm barium, 500 ppm copper, 1,000 ppm lead, and 2.3 percent zinc. Maas and others (1991) also sampled the massive-sulfide layers near the old shaft. Their samples across a 60-foot-wide band of silicified volcanic rocks with disseminated sulfides contained up to 66 parts per billion gold, 491 ppm lead, and 4,907 ppm zinc. Samples from pyrite-rich massive-sulfide layers contained up to 513 ppm lead and 1.8 percent zinc. They also collected seven samples along the east shore of Nichols Bay between this site and the head of the bay. Their best values were 42 parts per billion gold, 0.9 ppm silver, 82 ppm copper, 43 ppm lead, and 154 ppm zinc.

Alteration:

Age of mineralization:
The massive-sulfide layers are contemporaneous with the deposition of the Silurian or Ordovician Descon Formation.

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

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
There is an old shaft on the property and this probably was one of the prospects Chapin (1918) described on the east side of Nichols Bay. Gehrels and others (1983) indicated that claims had recently been staked in the area.

Production notes:

Reserves:

Additional comments:

References:
Gehrels and others, 1983; Maas and others, 1991; Gehrels, 1992; Maas and others, 1995.

Primary reference: Gehrels and others, 1983

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Alice

Site type: Prospect

ARDF no.: DE052

Latitude: 54.7164 **Quadrangle:** DE C-1

Longitude: 132.1088

Location description and accuracy:

The Alice prospect is probably near the mouth of the stream that enters the east side of Nichols Bay about 1.1 miles northwest of its entrance. The coordinates are near the middle of the west boundary of section 34, T. 82 S., R. 89 E. The location is somewhat uncertain because of conflicting descriptions of the geology.

Commodities:

Main: Cu

Other:

Ore minerals: Chalcopyrite

Gangue minerals:

Geologic description:

Little has been written about the Alice prospect since it was first briefly described by Chapin (1918) as chalcopyrite in irregular masses and veinlets in limestone associated with greenstone. Two shafts were filled with water in 1918. Recent mapping by Gehrels indicates that the rocks in the area are Silurian or Ordovician quartz monzonite and syenite. There is no indication of greenstone or limestone in the vicinity on his map. Gehrels names the fault that strikes through or near the likely position of this prospect as the 'Alice Claims Fault'.

Maas and others (1991) collected several samples in open cuts that may be the Alice prospect. The samples consisted of silicified syenite and quartz veins with (unidentified) sulfides and contained less than 5 to 172 parts per billion gold, less than 0.1 to 8.4 parts per million (ppm) silver; 132 to 1,400 ppm copper, 5 to 9,813 ppm lead, and 28 to 3,213 ppm zinc.

Alteration:

Age of mineralization:

Indeterminate.

Deposit model:
Masses of chalcopyrite in limestone and greenstone after Chapin (1918); quartz veins after Maas and others (1991).

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Two old shafts were filled with water in 1916 (Chapin, 1918); Maas and others (1991) sampled several open cuts at or near this site.

Production notes:

Reserves:

Additional comments:

References:
Chapin, 1918; Cobb, 1972; Cobb, 1978; Maas and others, 1991; Gehrels, 1992.

Primary reference: Chapin, 1918

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Unnamed (west shore of Nichols Bay)

Site type: Occurrences

ARDF no.: DE053

Latitude: 54.7071 **Quadrangle:** DE C-1

Longitude: 132.1228

Location description and accuracy:
This site represents two geologically similar occurrences along the west shoreline of Nichols Bay about 1.6 and 2.0 miles north-northwest of Point Nunez. One is near the center of section 4, T. 83 S., R. 89 E. The other, at the coordinates, is about at the center of the north boundary of the same section.

Commodities:

Main: Zn

Other: Ag

Ore minerals: Pyrite, sphalerite

Gangue minerals:

Geologic description:
This site, first described by Gehrels and others (1983), represents two occurrences, about a half mile apart, in Silurian or Ordovician (Descon Formation) strata (Gehrels, 1992). The northern occurrence consists of several centimeter-thick, pyrite-rich layers in fragmental silicic volcanic rocks. Samples contained up to 0.5 parts per million (ppm) silver and 140 ppm zinc. The 10-meter-wide unit that contains the pyrite-rich layers may extend to the southern occurrence. The southern occurrence consists of several 2- to 6-centimeter-thick lenses that contain much pyrite and microscopic sphalerite, in locally fragmental, silicic volcanic rocks. The mineralized rock is interbedded with andesitic pillow breccia and massive flows; andesite dikes cut the mineralized lenses. Samples contained up to 0.7 ppm silver and 140 ppm zinc.

Alteration:

Age of mineralization:
The massive-sulfide layers are contemporaneous with the deposition of the Silurian or Ordovician Descon Formation.

Deposit model:

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

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Only outcrop sampling.

Production notes:

Reserves:

Additional comments:

References:
Gehrels and others, 1983; Gehrels, 1992.

Primary reference: Gehrels and others, 1983

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

Site name(s): Feickert

Site type: Prospect

ARDF no.: DE054

Latitude: 54.7036 **Quadrangle:** DE C-1

Longitude: 132.0888

Location description and accuracy:
Cobb (1972) shows this prospect--one of the two Feickert prospects on Nichols Bay--just north of the radio beacon on the east side of the mouth of Nichols Bay. It is in the NE1/4 section 3, T. 83 S, R. 89 E. The other Feickert prospect is what is now being called the Lucile prospect (DE050).

Commodities:

Main: Cu

Other:

Ore minerals: Chalcopyrite

Gangue minerals: Quartz

Geologic description:
The rocks in the vicinity of this prospect are Silurian or Ordovician quartz monzonite and syenite (Gehrels, 1992). There has been little note taken of this prospect since Chapin first described it in 1918 as a chalcopyrite-bearing quartz vein in granite and quartz diorite. The vein is about one foot thick, strikes N50E, and is nearly vertical. There was some surface stripping on it in 1916.

Alteration:

Age of mineralization:
Quartz vein cuts Silurian or Ordovician quartz monzonite and syenite.

Deposit model:
Chalcopyrite-bearing quartz vein.

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

Production Status: None

Site Status: Probably inactive

Workings/exploration:
Surface stripping in 1916.

Production notes:

Reserves:

Additional comments:

References:
Chapin, 1918; Cobb, 1972; Cobb, 1978; Gehrels, 1992.

Primary reference: Chapin, 1918

Reporter(s): D.J. Grybeck (Applied Geology)

Last report date: 9/1/03

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