Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
K52-01 42°54'N 130°54'E	Slavyanovskoe Laoelin	As As quartz vein	Small.

Consists of a series of north-south-striking, elongate quartz veins hosted in Paleozoic (Silurian?) mica-graphite schist and metasandstone. Quartz veins, up to 4 to 5 m thick, can traced for several hundred m. Arsenopyrite is the dominant ore mineral, and occurs both as disseminations and as lenticular accumulations in quartz. Minor galena also occurs Lenses of sphalerite also occur conformable to bedding of the metasedimentary rocks. The genesis of the deposit is questionable. Vein formation is interpreted as related to Cretaceous accretion and associated metamorphism of Paleozoic island arc volcanic and associated sedimentary rocks.

A.F. Frizh, written commun., 1932; N.E. Gritsenko, written commun., 1958; V.V. Ratkin, this study.

K53-01 43°36'N 133°45'E	Skalistoe Samarka	Mo W Porphyry Mo	Small. Average grade of 0.02-0.2% Mo, 0.15-2.8% W_2O_3.

Consists of molybdenite, pyrite, and wolframite that occur as thin veinlets and small masses in lenticular quartz and quartz-sericite zones up to 10 m thick. Local chlorite-sericite alternation and some garnet-amphibole skarn. Ore bodies are traced to a depth of 100 m. Deposit is hosted along contact of a hypabyssal stock of Paleogene granite porphyry and occurs both within and outside the pluton, between the country-rock and a miarolitic phase of the granite. Granite porphyry intrudes Jurassic turbidite deposits.

Pokalov, 1972.

K53-02 43°37'N 134°15'E	Nizhnee Luzhkinsky	Sn, Pb, Zn Sn polymetallic vein	Small. Average grade of 0.002-0.02% Pb; 0.33-1.53% Sn; 2.0% Zn. Mined in 1970's.

Consists of Pb, Zn, Cu, and Fe sulfides and cassiterite that occur in the central parts of altered zones that contain tourmaline-chlorite-quartz and tourmaline-chlorite-quartz-hydrosericite alteration. Altered zones occur in mineralized fracture zones that are located along the margin of a caldera formed of intermediate composition, Late Cretaceous volcanic and interlayered volcanic-sedimentary rocks that exhibit intense propylitic and biotite alteration.

Petrachenko, 1974.

K53-03 43°35'N 134°28'E	Shcherbakovskoe Taukha	Pb, Zn Sn Polymetallic vein	Small. Average grade of 3-5% Pb;1-4% Sn; 2-9% Zn.

Consists of northeast-trending, steeply-dipping, elongate (up to 300 m) veins, from 0.1 to 1.5 m thick that occur in Early Cretaceous sandstone and siltstone. Major ore minerals are sphalerite, galena, pyrrhotite, pyrite, and marcasite. Gangue minerals are quartz and calcite. Galena-sphalerite-pyrrhotite aggregates dominate and commonly occur along schistosity with pyrrhotite and sphalerite boudins coated by lenticular galena envelopes. Fractured sulfide ores are filled with sulfide-carbonate cement that contains jamesonite and secondary galena and sphalerite. Greisen-like cassiterite-bearing topaz-fluorite-mica veinlets cut sulfide ore. No definite relationships between mineralization and granitic intrusions is observed. Deposit includes small bodies of pre-ore gabbro and felsic and andesitic dikes that are genetically related to Late Cretaceous volcanic rocks that surround the deposit.

Radkevich and others, 1960.

K53-04 43°35'N 134°42'E	Fasolnoe Taukha	Pb, Zn Sn Polymetallic vein	Small. Average grade of 0.1-30.0% Pb; 0.01-0.3% Sn; 0.1% Zn.

Consists of small en-echelon veins within a northwest-striking zone in a sequence of Upper Cretaceous (Cenomanian-Turonian) felsic volcanic rocks. Ore minerals are magnetite, sphalerite, galena, pyrrhotite, pyrite, arsenopyrite, cassiterite, valleriite, and cubanite. Host volcanic rocks are intensely altered to chlorite minerals with local garnet. Magnetite and cassiterite are closely associated with chloritic alteration.

Radkevich and others, 1960.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
K53-05 43°25'N 134°20'E	Soyuz Taukha	Ag, Au Au-Ag epithermal vein	Small. Average grade of 1.27 g/t Au; 127.9 g/t Ag.

Consists of veins, veinlet zones, and adularia-quartz, quartz, and mica-quartz bodies with sulfides and sulfosalts. Gold occurs in a quartz-adularia-argentite-sulfosalt assemblage. Quartz-sulfide veinlets lack gold. Deposit hosted by argillic-altered calc-alkalic, Late Cretaceous (88-65 Ma) rhyolite and related tuff. Ore bodies occur along faults. No relationship with intrusive rocks is observed.

E.D. Petrachenko, written commun., 1975.

K53-06 43°06'N 133°43'E	Benevskoe Samarka	W W skarn	Small. Average grade of 0.44 to 3.15% W_2O_3.

Consists of two zones containing skarn and hydrothermal alteration that contain approximately 30 ore bodies ranging from a few m to 200 m long and from 0.6 to 6 m thick. Skarns consist of magnetite, garnet, pyroxene-garnet, garnet-epidote, and garnet-orthoclase types. Scheelite is dominant ore mineral, with minor magnetite, arsenopyrite, pyrite, and rare cassiterite. Gangue minerals are quartz, feldspar, amphibole, epidote, biotite, and tourmaline. Late stages alterations consist of quartz-sericite and zeolitie.Late-stage quartz-feldspar and quartz-amphibole overgrowths replace skarn and contain nest-like veinlets and disseminated ore minerals. Skarns occur in veins and lenses that are located along the contact of Early Cretaceous biotite alaskite, granite porphyry, and granodiorite. Granitic rocks intrude sandstone and siltstone that are part of a Middle and Late Jurassic accretionary wedge complex is cut by numerous dikes of aplite, diorite and basalt porphyry, quartz diorite, granite porphyry, and granodiorite porphyry.

V.D. Shlemchenko and others, written commun., 1983.

K53-07 42°54'N 132°29'E	Krinichnoe Sergeevka	Au Granitoid-related Au	Small. Contains up to 2.8 g/t Au and up to 171 g/t Ag.

Consists of gold-pyrite-quartz, and quartz-carbonate zones in a Late Cretaceous granitic pluton that intrudes metamorphosed Paleozoic volcanic and sedimentary rocks. Sulfide-poor gold-pyrite-quartz occurs in ore bodies of variable shape and size.

S.M. Rodionov, written commun., 1991.

K53-08 42°44'N 132°20'E	Askold Sergeevka	Au Granitoid-related Au	Medium. Average grade of 5.9-7.6 g/t Au.

Consists of a gold-quartz vein stockwork in a greisenized Mesozoic granite that intrudes Paleozoic volcanic and sedimentary rocks. Deposit prospected to depths of more than 100 m.

M.I. Efimova and others, written commun., 1971; Efimova and others, 1978.

K53-09 42°58'N 132°57'E	Balykovskoe Sergeevka	Au Granitoid-related Au	Small

Consists of: (1) Ore-bearing thrust zones with gold-pyrite-quartz veins; and (2) quartz veins with galena, sphalerite, and silver. Deposit formed in two stages. Deposit occurs in Late Cretaceous granite that surrounds and intrudes early Cambrian gabbroic rocks of the Sergeevka Complex with a U-Pb age of 527 Ma (John N. Aleinikoff, written commun., 1985). Fineness of gold is 600.

E.D. Petrachenko (this study).

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
K53-10 42°52'N 132°50'E	Progress Sergeevka	Au Granitoid-related Au	Medium. Average grade of 5.89 g/t Au.

Consists of sulfide-poor pyrite-arsenopyrite-gold-quartz veins, small veinlets, poorly mineralized fracture zones, zones of mylonite, and zones altered to metasomatic carbonate-chlorite-sericite rocks. Deposit hosted in a Late Cretaceous granitic pluton that cuts a sequence of granitic-gabbro rocks of Sergeevka Complex with a Cambrian age of 500 to 527 Ma (J.N. Aleinikoff, wrtten commun., 1992). The deposit is prospected to depths of a few tens m. This lode is also the source for nearby placer Au deposits.

A.N. Rodionov, written commun., 1991.

K53-11 42°54'N 133°28'E	Porozhistoe Sergeevka	Au Granitoid-related Au	Small. Average grade of 5.39 g/t Au.

Consists of sulfide-poor gold disseminations and veins in cataclastic and schistose zones that occur in metamorphosed gabbroic rocks of the Cambrian Sergeevka Complex. Main sulfide minerals are pyrite, pyrrhotite, and chalcopyrite. Gangue minerals are quartz, biotite, sericite, chlorite, and carbonate minerals. Gold occurs as disseminations in chlorite-bearing gabbroic rocks and also as thin veins and veinlet networks. Deposit associated with Late Cretaceous granitic plutons in the area.

I.I. Fatianov and others, written commun., 1988.

K55-01 43°53'N 145°36'E	Golovninskoe Kuril	S, FeS Sulfur-sulfide.	Small. Contains an estimated few tens of thousands tonnes averaging 10-25% S.

Consists of sulfur-bearing bodies, approximately 4 m thick and containing 20-25% S that are deposited at the floor of boiling lake in the caldera of Holocene Golovnin volcano, and near fumarolic vents at the foot of extrusive domes. Sulfur ooze overlies sediments rich in melnikovite (FeS_2, amorphous pyrite) and poor in sulfur (up to 10% S). Quaternary age of mineralization.

Vlasov, 1977.

L52-01 44°34'N 131°27'E	Komissarovskoe (Vorob'eva plad) Laoelin-Grodekovsk	Au, Ag Au-Ag epithermal vein	Small. Average grade of 1.92 g/t Au and 49-52 g/t Ag.

Consists of low-grade gold-silver-pyrite and minor galena and sphalerite that occur in metasomatic sericite-biotite-quartz bodies, fracture zones, and short veins. Deposit hosted in dacitevolcanic rocks, presumably part of a Permian volcanic sequence. Very low grade gold also occurs short quartz veins in an associated Permian sedimentary sequence, and are conformable to bedding, and are also folded and cross-cutting. Mineralization occurred in areas of higher carbon contents in thin-bedded siltstone and argillite.

A.N. Rodionov, written commun., 1991.

L52-02 44°12'N 131°06'E	Baikal Laoelin-Grodekovsk	Cu, Mo Au Porphyry Cu-Mo	Small. Because the ore is highly oxidized, a low Cu content of 0.01%. Average grade of about 0.01% Mo.

Consists of veinlets and disseminations along contacts of gabbro-diorite and gabbro-syenite, both within and adjacent to the intrusive rocks. Deposit occurs in an area of 150-200 m2 in hydrothermally altered, biotite-K-feldspar rock that is surrounded by epidote-chlorite propylitic alteration. Ore minerals are chalcopyrite, bornite, pyrite, and molybdenite. The hydrothermally altered areas exhibit anomalous gold. Host rocks are metamorphosed Silurian and Devonian sedimentary and siliceous volcanic rocks, and Permian(?), subalkaline, gabbro-diorite, gabbro-syenite, and granite porphyry that intrude the sedimentary sequence. The gabbro-diorite is highly alkaline, and the gabbro-syenite and granite porphyry that host the deposit are K-enriched.

Petrachenko and Petrachenko, 1985.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L52-03 44°17'N 131°24'E	Zolotoi Stream (Sofie-Alekseevskoe) Laoelin	Au Au quartz vein	Small. Average grade of1.3 g/t Au; 5 g/t Ag.

Consists of zones of thin pyrite-gold-quartz veins, disseminated gold, and coarse-grained pyrite in volcanic rocks with chlorite and carbonate alteration with local course-grained pyrite. Deposit hosted in a Late Permian volcanic-sedimentary sequence.

E.D. Petrachenko, written commun., 1985.

L53-01 47°58'N 136°11'E	Khvoshchovoe Samarka	Cu, Mo Porphyry Cu-Mo	Small. Average grade of 0.02 to 0.4% Cu, 0.01 to 0.20% Mo, 0.01 to 0.09% W.

Consists of zones of veinlets and disseminations associated with intense metasomatic alteration composed of biotite, microcline, argillite, sericite, quartz, and carbonate. Deposit hosted in a Cretaceous amphibole-biotite granodiorite and biotite granite that intrudes Jurassic sandstone and siltstone. Intrusive and sedimentary rocks are crosscut by aplite, granodiorite porphyry, and diorite porphyry dikes presumably related to porphyry Cu deposit. Ore minerals occur in all hydrothermally-altered rock except carbonate. Ore minerals are pyrite, chalcopyrite, molybdenite, scheelite, wolframite, magnetite, hematite, sphalerite, galena, and pyrrhotite. Deposit occurs in a 10 km^2 circular structure around the granitic rocks.

V.B. Shuvalov, written commun., 1986.

L53-02 47°36'N 136°15'E	Kafen Samarka	Cu, Mo Porphyry Cu-Mo	Small.

Consists of linear zones of quartz alteration with disseminated sulfides that occur around numerous granitic apophyses. Ore minerals are pyrite, chalcopyrite, and molybdenite. Ore veins occur at the margin of granitic body and partly in host rocks, within a zone of intense greizenization and silicification. Deposit surrounded by a sulfide aureole and hosted in granite and granodiorite porphyry that form part of Early Cretaceous Khingan series with an earlier magmatic stage of dikes of gabbro-diorite. Country rocks are Late Permian sandstone, siltstone, basalt, and basaltic tuff that are contact metamorphosed to hornfels.

V.P. Bredikhin, written commun., 1979.

L53-03 47°17'N 136°13'E	Katenskoe Ariadny	Ti Zoned mafic-ultramafic Ti	Large

Consists of disseminated ilmenite in pyroxene-hornblende gabbro and olivine gabbro of Early Cretaceous age. Contains local lenticular bodies that several tens of meters thick and at least 1 km long.

Scheka and others, 1991.

L53-04 47°06'N 135°04'E	Malakhitovoe Samarka	Cu, Mo Porphyry Cu-Mo	Small. Average grade of 0.1 to 1.6% Cu in stockwork and up to 0.5% Cu in breccia zone.

Occurs in a circular aureole of hydrothermally altered rocks with dimensions of 200 x 200 m over an intrusive dome. Successive mineral assemblages are: (1) quartz-biotite-actinolite with pyroxene and epidote; (2) quartz-biotite-actinolite; (3) quartz-biotite-sericite (± chlorite); and (4) quartz-hydromica (with carbonate). A stockwork contains the first three facies and consists of a thick network of quartz-epidote-actinolite veinlets and lenses up to 2-3 cm thick with chalcopyrite, bornite, and pyrite. Heavily fractured and brecciated chert and siltstone were prospected by drill holes to the depth of 100 m. Ore minerals in breccia zones are chalcopyrite, bornite, molybdenite, pyrite, rarely pyrrhotite, cubanite, arsenopyrite, galena, and sphalerite. Carbonate veinlets with chalcopyrite also occur. Deposit occurs at northwest margin of a volcanic-tectonic depression that contains a lower structural stage of Early Cretaceous sandstone interlayered with siltstone and shale that grades upwards into conglomerate and sandstone that is overlain by Paleogene andesite and basaltic andesite lava and lava breccia. Local intrusive rocks consist of dike-like bodies of calc-alkaline andesite porphyry, regarded as tongues of a dome-like subvolcanic intrusion.

Petrachenko and Petrachenko, 1985.

Deposit No. / Latitude / Longitude	Deposit Name / Metallogenic Belt	Major Metals / Minor Metals / Deposit Type	Grade and Tonnage
L53-05 46°57'N 134°27'E	Lermontovsky Samarka	W Au W skarn and greisen	Large. Average grade of 0.67-3% W_2O_3.

Consists of lenticular, sheeted, and nest-like skarn bodies that occur at the top of an Early Cretaceous granitic stock along contacts with bedded limestone. Ore bodies range from 40-80 to 500-640 m long and 1 to 78 m thick. Deposit was formed in three stages: (1) skarn (diopside, hedenbergite, hornblende, wollastonite, and garnet) replacement of limestone and of biotite hornfels formed from sandstone; (2) hydrothermal alteration of granitic rocks, hornfels, and skarn to greisen; and (3) sulfide minerals. Two types of greisen occur: (1) quartz-albite-muscovite; and (2) scheelite-muscovite-apatite-mica-quartz. Pyrrhotite dominates among sulfides; arsenopyrite, pyrite, marcasite, and scheelite are subordinate. Sulfide minerals are either superimposed on scheelite-bearing greisen or occur separately in veins. Deposit also contains silver-telluride-bismuth (polymetallic ore) and gold-telluride-bismuth (pyrrhotite ore) zones. Tungsten occurs in all parts of deposit, although the largest accumulations of scheelite occur in muscovite and lesser biotite, and phlogopite greisen, quartz veins, and a metasomatic feldspathic rock. Host Early Cretaceous granitic rocks are highly aluminous, low in alkalies and calcium, and contain elevated levels of fluorine and phosphorus.

Gvozdev, 1984.

L53-06 46°32'N 136°26'E	Verkhnezolotoe Luzhkinsky	Cu, Sn W, As, Zn Porphyry Cu	Small. Average grade of 3 g/t Au, 86 g/t Ag, 0.35-2.27% Cu, 0.69% Pb, and 0.26% Sn.

Occurs at the side of a volcanic-tectonic depression which is filled with trachyandesitic flows overlain by dellenite-rhyolite tuff and other extrusive rocks of Late Cretaceous (Turonian to Santonian) age. Deposit are cut by dikes of andesite and basaltic porphyry, dacite, diorite stocks, and separate granodiorite porphyry dikes; all of which are parts of a Late Cretaceous volcano-plutonic complex. A Cu stockwork is related to a diorite stock; stockwork boundaries coincide with the aureole of biotite alteration, which is overprinted by epidote-actinolite and chlorite-carbonate propylitic alteration that extends to periphery of stock. Distribution of ore is irregular. Disseminated ore locally contains rich ore in zones of heavily fractured rocks. Chalcopyrite and marcasite are the dominant ore minerals, with minor sphalerite, galena, molybdenite, and cassiterite. Richest ore is associated with tin, copper, and locally tungsten minerals. Zone of oxidized ore up to 20-30 m deep caps the deposit.

Orlovsky and others, 1988.

L53-07 46°28'N 135°53'E	Vostok-2 Luzhkinsky	W W skarn	Large. Average grade of 0.65% Cu; 1.64% W_2O_3 . Mined since 1980's.

Consists of steeply-dipping skarn as veins and sheet-like bodies that occur at the contacts of a large olistolith of Carboniferous to Permian limestone which is in a matrix of Jurassic clastic rocks. Some ore bodies fill fractures in the Jurassic clastic rocks. Skarn also occurs in quartz-sericite hydrothermally altered rocks that envelope a plagiogranite-granodiorite stock. Some skarn bodies occur wholly within intrusive rocks. The deposit was formed in several stages. An early stage consists mainly of pyroxene, plagioclase, amphibole, and garnet. An intermediate stage altered both skarn and intrusive rocks and formed quartz-feldspar-muscovite (chlorite, biotite) greisen with scheelite, apatite, and minor arsenopyrite, pyrrhotite, and chalcopyrite. A late stage of scheelite and quartz was succeeded by low temperature scheelite-arsenopyrite. Plagiogranite dated at approximately 110 ma by K-Ar isotopic studies; deposit is interpreted as about the same age.

Stepanov, 1977; Rostovsky and others, 1987.

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L53-08 46°05'N 135°45'E	Tigrinoe Luzhkinsky	Sn, W, Ta, Nb, In Mo, Zn, Bi Sn-W greisen	Medium. Average grade of 0.14% Sn and 0.045% W_2O_3,

Consists of a complex Sn-W deposit defined by: (1) a stockwork of quartz-topaz-micaceous greisen along the contact of a Li-F granite pluton; (2) a linear stockwork consisting of a thick network of veinlets (5-10 to 70 veinlets per meter) of parallel north-south-trending quartz-topaz veins from 3 to 100 cm thick. Veins are hosted in contact metamorphosed sedimentary rocks adjacent to the granite pluton; and (3) a sulfide breccia pipe containing rock fragments of the stockwork and greisen cemented by quartz with lesser carbonate, fluorite, and sulfides. Three stages of mineralization are distinguished: (1) early quartz-molybdenite-bismuthinite; (2) middle REE greisen of wolframite-cassiterite with high contents of Sc, Ni, and Ta; and (3) late hydrothermal quartz-fluorite-carbonate-sulfide veins. In, Cd, Ag, and Se are enriched in sulfides in the two last stages. K-Ar age of the lithium-fluorine granite is 90 Ma ± 5%.

Korostelev and others, 1990; Gonevchuk and Gonevchuk, 1991.

L53-09 46°20'N 136°34'E	Yantarnoe Luzhkinsky	Sn Porphyry Sn	Small. Average grade of 0.1-2.17% Cu, 0.03-1.02% Pb, 7.3% Sn, and 0.7-2.22% Zn.

Consists of veinlets and disseminations of cassiterite and sulfide minerals in a pipe-like body and in a volcanic breccia composed of trachyandesite and rhyolite that intrude Early Cretaceous clastic sedimentary rocks. Early mineralization was associated with rhyolite in the pipe-like body and volcanic breccia and produced mainly pyrite and chalcopyrite. The major part of deposit formed after the intrusion of explosive breccia of the deposit and consists of metasomatic quartz-chlorite, quartz-sericite, and quartz-chlorite-sericite alterations that contain a sulfide-free cassiterite-chlorite-quartz assemblage, and a Sn-polymetallic assemblage rich with galena, sphalerite, and chalcopyrite. Host igneous rocks are spatially related to Paleocene volcanic vents with K-Ar isotopic age of about 65 Ma.

Rodionov, 1988.

L53-10 46°10'N 136°30'E	Zvezdnoe Luzhkinsky	Sn Cu, Pb, Zn Porphyry Sn	Small. Average grade of 2.56% Pb; 0.53% Sn; 2.16% Zn.

Consists of a neck of Late Cretaceous(?) to Paleocene subvolcanic rhyolite with numerous (up to 40%) miarolitic cavities filled with a quartz-cassiterite aggregate. Rhyolite altered to sericite and contains finely disseminated cassiterite. Cassiterite-sulfide veins also occur in Early Cretaceous clastic rocks around the intrusion. Galena and quartz-galena with cassiterite and stannite are dominant in the upper part of the deposit, and sphalerite-chalcopyrite-pyrrhotite with cassiterite ore predominate in deeper part of deposit.

Rodionov, 1988.

L53-11 46°22'N 137°41'E	Salyut Kema	Au, Ag Au-Ag epithermal vein	Small. Average grade of 1.75 g/t Au.

Consists of teeply-dipping veins and veinlets within alteration zones. Veins range from 0.1 to 1.5 m thick; zones range from 0.3 to 40-50 m thick. Deposit formed in several stages including: (1) sulfide-poor gold-pyrite-quartz, argentite-adularia-quartz veins; and (2) sulfide-rich Cu polymetallic veins. Major minerals are argentite, sphalerite, native silver and gold, quartz, adularia, fluorite, and chlorite, with subordinate galena, chalcopyrite, hematite, pyrargyrite, and acanthite. Ore has high Ag and F content. Hydrothermal alteration consists of hydromica-chlorite, chlorite-carbonate, and argillite. Host rocks are Late Cretaceous to Paleogene felsic tuff, tuffite, and minor andesite. Deposit presumably related to the extrusion of late-stage subalkaline rhyolite.

A.N. Rodionov, written commun., 1983.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L53-12 46°11'N 137°55'E	Glinyanoe Kema	Au, Ag Au-Ag epithermal vein	Small. Average grade of 8.3 g/t Au, and 122 g/t Ag.

Consists of adularia-quartz, sericite-chlorite-quartz, and carbonate-chlorite-quartz mineralized veins and zones that contain pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, argentite, acanthite, silver tellurides, and native gold and silver. Veins and zones occur in altered, silicified volcanic rocks that overlie Late Cretaceous (Santonian) felsic volcanic rocks. Deposit interpreted to have occurred in four stages: (1) gold-pyrite-quartz, (2) quartz-hydromica and quartz-carbonate, (3) gold-silver, and (4) quartz-chlorite-adularia with silver sulfosalts. Age of the deposit is interpreted as Late Cretaceous to Paleogene

A.N. Rodionov, written commun., 1986.

L53-13 46°04'N 137°49'E	Nesterovskoe Kema	Cu Mo, Ag Porphyry Cu	Small.

Consists of a 50 x 200 m aureole of hydrothermally altered rocks in a mineralized stock. Dominant alteration is quartz-sericite. Ore minerals are pyrite, chalcopyrite, sphalerite, and molybdenite. Malachite occurs in oxidized zone. Ag content increases with depth. Deposit occurs in a fault zone cutting granodiorite and host rocks. Zone contains vein and disseminated Cu minerals. Ore occurs to depths of several tens of m. Deposit occurs 6 km inland from the Sea of Japan in volcanic rocks cut by Late Cretaceous and Paleogene intrusions. The area contains numerous andesite and dacite extrusions.

Petrachenko and others, 1989.

L53-14 45°39'N 135°25'E	Zabytoe Luzhkinsky	W, Sn, Bi W-Sn greisen	Medium. Average grade of 0.01-0.1% Sn; 0.01-12.61% W_2O_3.

Consists of complex tin-bismuth-tungsten minerals related to a Late Cretaceous granitic stock. The upper part of the stock consists of leucogranite with biotite granite and granite porphyry. The lower part consists of granite and aplite which contain lithium micas with late-stage protolithionite and less abundant zinnwaldite. Deposit consists of quartz veins from 3 to 15 m thick and metasomatic zones in granite greisen and hornfels. Quartz-wolframite, quartz-sulfide, and quartz-carbonate stages are identified. Quartz-wolframite stage consists of quartz, wolframite, molybdenite, beryl, cassiterite, and sulfides. Quartz-sulfide ore consists of quartz-arsenopyrite-pyrrhotite-sphalerite and quartz-pyrite-sphalerite-galena with bismuth sulfosalts, bismuthine, and native bismuth. Deposit contains high levels of Li and Rb. Deposit is zoned with Ni-Rb-W minerals in the central portion of the stock and later-stage sulfide-tungsten ore at the periphery. Mo and Be contents increase with depth.

P.G. Korostelev and others, written commun., 1987; Gvozdev and others, 1990.

L53-15 45°46'N 135°58'E	Zimnee Luzhkinsky	Sn, Pb, Zn Sn polymetallic vein	Small. Average grade of 0.1-3.0% Cu, 3.18% Pb, 0.59% Sn, and 4.09% Zn.

Consists of mineralized breccia, breccia- and fracture-filling veins, zones of closely spaced veinlets, and pockets that occur in fracture zones. Sn polymetallic ore bodies have strike lengths up to 1200 m, extend extensvely down dip, and vary in thickness from several tenths of a meter to several tens of meters. Deposit occurs near a granodiorite body and contains mainly pyrrhotite, pyrite, arsenopyrite, sphalerite, stannite, and cassiterite. Ore far from the granodiorite and in the upper part of veins is mostly galena with fine-grained cassiterite. Near the granodiorite, ore consists of breccia-bearing fragments of tin-sulfide minerals that are cemented by a quartz-micaceous (greisen) aggregate with arsenopyrite and cassiterite. The K-Ar age of altered rocks associated with the Sn-polymetallic ores is 75 Ma. Age of greisen assemblage is approximately 50 Ma as determined by K-Ar isotopic study of the granodiorite. The deposit exhibits regional metamorphism and cataclasis.

P.G. Korostelev and others, written commun., 1980; Nazarova, 1983.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L53-16 45°40'N 136°08'E	Dalnetayozhnoe Luzhkinsky	Sn, Pb, Zn Sn polymetallic vein	Small. Average grade of1.53% Pb; 0.53% Sn; 2.58% Zn.

Consists of mineralized fracture zones that contain irregularly distributed veinlets, pockets, and disseminations in Lower Cretaceous flyschoid sandstone and siltstone. About 30 ore bodies occur in north-south-trending fracture zones, possibly up to 1 km long. Dominant ore minerals are pyrrhotite, pyrite, sphalerite, stannite, and cassiterite, with minor galena, chalcopyrite, and arsenopyrite. Gangue minerals are quartz, carbonates, chlorite, and sericite.

P.G. Korostelev and others, written commun., 1980.

L53-17 45°30'N 136°39'E	Tayozhnoe Kema	Ag Au Ag epithermal vein	Medium. Average grade of 50-2000 g/t Ag and 1 g/t Au. Mined since 1980's.

Consists of steeply-dipping quartz veins that occur along northwest to north-south fractures that cut coarse-grained, Early Cretaceous sandstone. Veins are 100 to 500 m long and 0.5 to 2 m thick, and also occur laterally under the contact between sandstone and overlying 50-m-thick section of Late Cretaceous felsic volcanic rocks. Ore minerals occur within the veins, and in metasomatic zones along the sub-horizontal contact between veins and overlying volcanic rocks. Major Ag-bearing minerals are Ag sulfosalts and sulfides. Pyrite and arsenopyrite are rare and formed before Ag-bearing minerals. In the upper part of veins, Ag occurs in tetrahedrite, freibergite, stephanite, pyrargyrite, and polybasite. At middle depths, Ag occurs in acanthite and stephanite dominate, along with argentopyrite and allargentum also occur. Acanthite dominates at depth. Deposit assumed to be related to a Paleocene rhyolite volcano-plutonic assemblage.

A.N. Rodionov and others, written commun., 1976; Logvenchev and others, in press.

L53-18 45°18'N 133°38'E	Ussuri deposits Kabarga	Fe Ironstone	Small. Average grade of 23.8-38.6% Fe.

Consists of a group of deposits with sheeted magnetite and hematite-magnetite bodies that occur in Early Cambrian clastic-carbonate rocks that overlie Early Cambrian dolomite. Iron ore occurs in chert and interlayered quartz-sericite-chlorite, quartz-sericite schist, and dolomite and along chert contacts. Upper part of ore-bearing zone is oxidized, and manganese ore (dominantly pyrolusite) occurs in oxidized zone in addition to iron ore. Mineralogic and geochemical studies suggest an exhalative-sedimentary origin.

Denisova, 1990.

L53-19 45°13'N 134°28'E	Ariadnoe Ariadny	Ti Pt Zoned mafic-ultramafic Ti	Large. Average grade of 1.0-11.8% TiO_2; 0.086% V_2O_5.

Consists of abundant disseminated ilmenite that occurs in layers in pyroxene-hornblende gabbro and pyroxenite layered intrusions. Ilmenite layers are several tens of m thick and several hundred m long. K-Ar isotopic age of 160 to 170 Ma for ore-bearing intrusions. Ilmenite contains rare platinoid inclusions.

Scheka and Vrzhosek, 1985.

L53-20 45°05'N 134°35'E	Skrytoe Samarka	W W skarn	Small. Average grade of 0.1-0.88% W_2O_3.

Scheelite occurs in: (1) zones of quartz-epidote-feldspar hydrothermally altered rocks; zones range from several cm to several m thick; and (2) feldspar-quartz veins in skarn and hornfels. Skarn types are amphibole-plagioclase, garnet, pyroxene-plagioclase, and wollastonite. Ore zones and veins occur as sheets and consist of quartz, epidote, feldspar, chlorite, sericite, calcite; and rarely apatite, prehnite, fluorite, sphene, pyrrhotite, arsenopyrite, sphalerite, and scheelite skarn. Scheelite is concentrated in quartz-chlorite-sericite zones. Feldspar-quartz veins contain scheelite, arsenopyrite, and apatite; as well as minor amounts of tourmaline, pyrrhotite, bismuthinite, native bismuth, and fluorite. Quartz-pyrite veinlets with calcite and chlorite cut the tungsten zones and veins. Thin veins of quartz-muscovite greisen occur to a depth of approximately 230 m. Age of deposit unknown, probably Early Cretaceous, and similar to Vostok 2, Lermontovsky, and Benevskoe deposits. Host rocks are Jurassic siltstone and sandstone, Paleozoic chert, spilite, and limestone.

V.I. Gvozdev and others, written commun., 1988.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L53-21 45°08'N 135°02'E	Malinovskoe Luzhkinsky	Cu Au Porphyry Cu	Small. Average grade of 0.6-12.9 g/t Au; 0.42-4.5% Cu.

Summary and References

Deposits consists of veinlet and disseminated minerals in syenite. Ore minerals are chalcopyrite, pyrite, pyrrhotite, marcasite, arsenopyrite, gold, bismuthinite, glaucodot, and sphalerite; with minor argentite, freibergite, galena, cinnabar, and enargite. Scheelite and wolframite occur locally. Chalcopyrite content in veins decreases and arsenopyrite increases with depth. Mineralization occurs in several phases. Locally, veinlets and disseminated copper minerals associated with quartz-sericite alteration. Epidote-chlorite-carbonate propylitic alteration is widespread in the area. Host rocks altered to quartz-sericite rock. Au-sulfide mineralization younger than Cu mineralization and is associated with biotite-K-feldspar propylitic and sericitic alteration. Cu veins occur along contacts both within and outside the intrusive complex. Quartz-sulfide veins and lenses have variable thickness. Deposit occurs in syenite and monzodiorite that are part of a small intrusive complex of Late Cretaceous (Cenomanian-Turonian) gabbro-diorite, monzodiorite, and syenite intruded into fractures in Early Cretaceous sedimentary rocks. Country rocks are contact metamorphosed, although intrusive contacts are mostly tectonic. Associated monzodiorite exhibits K-feldspar and biotitie alteration. Intrusive rocks are of calc-alkaline and subalkaline series with high alumina content.

Petrachenko and others, 1991.

L53-22 44°45'N 135°21'E	Yuzhnoe Luzhkinsky	Pb, Zn, Ag Sn, Cd Polymetallic vein	Medium. Average grade of 349 g/t Ag; 6.78% Pb; 0.95% Sb; 0.16-1.2% Sn; 9.8% Zn. Mined for Ag from 1970's to present.

Main vein occurs in a syncline in Early Cretaceous biotite siltstone intercalated with coarse-grained sandstone. Vein ranges from 0.5 to 1.4 m thick, has been traced for 1.6 km, and prospected to the depth of 900 m. Ore contains Zn, Pb, Ag, Cd, and Bi minerals. Sn occurs at deep levels. Three major ore-bearing assemblages occur: (1) axinite-pyroxene-garnet; (2) quartz-sulfide; and (3) carbonate-silicate-sulfide. From top downward, vertically zoned mineral assemblages these: (1) sulfosalt-sulfide (Sb-Pb-Ag), (2) sulfide (galena-sphalerite-pyrrhotite), (3) quartz-arsenopyrite with hexagonal pyrrhotite, and chalcopyrite and cassiterite. At deep levels of the eastern flank of the ore body is a Sn-polymetallic deposit (Sn-Ag-Pb). Deposit related to a subalkaline monzonite-diorite stock with K-Ar isotopic age of 75 to 98 Ma. Veins cut the stock and the sedimentary rocks hosting stock.

Vasilenko and Strizhkova, 1987.

L53-23 44°39'N 134°39'E	Zarechnoe Luzhkinsky	Cu Porphyry Cu	Small. Average grade of 0.05 g/t Au; 0.02-0.9% Cu.

Occurs in a 400 x 800 m elongate stockwork that is spatially related to fractured andesite flows. Deposit exhibits intense propylitic alteration (actinolite, epidote, biotite, and chlorite) with fine veinlets, disseminations, and small pockets of chalcopyrite, chalcocite, bornite, cuprite, pyrite, and arsenopyrite. Deposit occurs in a Late Mesozoic andesite-trachyandesite volcanic sequence in the Central Fault zone that occurs between the Samarka and Zhuravlevsky terranes.

Petrachenko and Petrachenko, 1985.

L53-24 44°38'N 135°20'E	Smirnovskoe Luzhkinsky	Pb, Zn, Sn Ag Polymetallic vein	Medium. Average grade of 69 g/t Ag, 2.69% Pb, 0.41% Sn, 3.52% Zn. Mined for Ag from 1950's to about 1993.

Consists of (1) cassiterite and sulfide minerals in shear zones, and (2) quartz vein and greisen. Cassiterite and sulfide minerals occur in a series of en echelon shear zones along a regional fault. Host rocks are weakly propylitized Early Cretaceous (Valanginian) flysch. Shear zones range from 0.5 to 2.10 m thick, are up to 2 km long, and extend down dip at least 960 m. In addition to Zn, Pb, and Sn, deposit contains lesser Ag, In, and Cd. A zonal succession of mineral assemblages, from top downwards, consists of: (1) carbonate-sulfosalt-sulfide; (2) quartz-sulfide; (3) quartz-arsenopyrite-cassiterite; and (4) pyrrhotite. K-Ar isotopic age of 80 Ma on nearby intrusive monzonite interpreted as age of deposit. Quartz vein and greisen consists of metasomatic quartz-muscovite and quartz-topaz-fluorite zones and veins with Pb and Zn sulfides, and cassiterite. Zones range up to 6 m width in cavities. K-Ar isotopic age of 45 to 60 Ma for greisen. Formation of greisen related to a complex of small high-K monzonite-diorite intrusions at Yushnoe.

Vasilenko and Strizhkova, 1987.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L53-25 44°21'N 135°10'E	Vysokogorskoe Luzhkinsky	Sn Sn silicate-sulfide vein	Medium. Average content of 1.0% Sn. Mined from 1960's to present. Largest mine in Kavalerova area.

Consists of quartz-chlorite-cassiterite, quartz-sulfide-cassiterite, and sulfide-cassiterite veins and mineralized fracture zones in Early Cretaceous olistostrome partially overlain by Late Cretaceous felsic volcanic rocks. Sn mineralization related to the areas of quartz-tourmaline alteration about 5-6 m thick. Average thickness of veins and mineralized zones is 1.2 to 1.4 m, with lengths of 400 to 500 m. Ore traced to a depth of 700 m. In addition to cassiterite, deposit contains chalcopyrite, arsenopyrite, pyrrhotite; and rarely galena and sphalerite. Sulfosalts of bismuth and silver are common.

Litavrina and Kosenko, 1978; Ryabchenko, 1983.

L53-26 44°25'N 135°30'E	Partizanskoe (Soviet 2, Svetliy Otvod) Taukha	Pb, Zn Ag Pb-Zn skarn	Medium. Average grade of 67.6 g/t Ag; 1.5-3% Pb; 0.6-4% Zn. Mined from 1950's to present.

Consists of numerous, small, steeply-dipping skarn bodies at the contact of a Triassic limestone olistolith encased in Early Cretaceous clastic rocks. Skarns merge and form a single deposit about 400 m below the surface, and pinch out at a depth of approximately 600 m. Ore and skarn assemblages are vertically zoned; higher temperature assemblages occur deeper. Massive, densely disseminated silver-lead-zinc ore (Pb/Zn about 1.0) occurs above quartz-calcite aggregate in the upper part of ore body. Massive, densely disseminated lead-zinc ore (Pb/Zn about 0.8) is associated with Mn-hedenbergite skarn and occurs at middle depths. And disseminated zinc ore (Pb/Zn about 0.5) occurs in ilvaite-garnet-hedenbergite skarn in the lower part. Galena and sphalerite are dominant ore minerals; chalcopyrite and arsenopyrite are common; minor magnetite, pyrrhotite, and marcasite also occur. Silver-bearing minerals are sulfosalts of Ag and Sb in the upper part of the deposit and galena in the lower part. Galena contains silver as a solid solution of matildite. The age of mineralization is bracketed between 60 and 70 Ma by basalt dikes, with K/Ar isotopic ages of 60-70 Ma, that cut the ore body at the contact of olistolith, and by the lower part of the overlying volcanic strata, with K/Ar ages of 70-80 Ma, which are cut by ore body. The deposit consists of four or more related ore bodies that occur over about 5 km strike length, including the Soviet 2, Partizansk East, Partizansk West, and Svetliyotvod ore bodies. The underground workings for this group of deposits have a total length of about 11 km.

Ratkin, Simanenko, and Logvenchev, 1991.

L53-27 44°29'N 135°35'E	Dalnegorsk Taukha	B Boron skarn	World class. Mined from 1970's to present. Produces over 90% of all borates in Russia.

Deposit occurs as a thick skarn zone formed in a large, upturned olistolith of bedded Triassic limestone enclosed in Early Cretaceous clastic sedimentary rocks. The skarn extends to a depth of approximately 1 km, where it is cut off by a granitic intrusion. Skarn formed in two stages, with second-stage skarn over-printing earlier skarn. The two stages of skarn formation are separated in time by the intrusion of intermediate-composition magmatic bodies (with approximate K/Ar ages of 70 Ma). The first stage consists of grossular-wollastonite skarn and concentrically zoned, finely banded aggregates with numerous finely crystalline datolite and druse-like accumulations of danburite crystals in paleohydrothermal cavities. The second stage skarn consists predominantly of long, radiated hedenbergite and andradite with coarsely-crystalline datolite, danburite, quartz, axinite, and calcite. An Ar-Ar age for orthoclase indicates the age of the late-stage skarn assemblage is 57 Ma. The silicate mineralogy of the skarns is similar to that in lead-zinc skarn deposits in this same region. B isotopic studies indicate a magmatic source for boron (Ratkin and Watson, 1993). The deposit is very large and had been mined from 1970's to present. The Dalnegorsk open-pit mine is prospected to the depth of 1 km. The silicate mineralogy of the skarns is similar to that in lead-zinc skarn deposits in this same region.

Ratkin, 1991; Ratkin and Watson, 1993; P.Layer, V.Ivanov, and T.Bundtzen, written commun., 1994.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L53-28 44°35'N 135°40'E	Nikolaevskoe Taukha	Pb, Zn Ag Pb-Zn Skarn	Medium. Average grade of 62 g/t Ag; 1.5-8.7% Pb; 1.36-10.5% Zn. Mined from 1970's to present. Main shaft about 500 m deep.

Summary and References

Consists of large, layered ore bodies formed in a giant olistolith of Triassic limestone that is part of an Early Cretaceous accretionary-fold complex. The skarn occurs at the contacts of limestone with hosting siltstone and sandstone, and with overlying felsic volcanic rocks of a Late Cretaceous to Paleogene post accretionary sequence. Small ore bodies also occur in limestone blocks in the volcanic rocks that were torn off the underlying basement. The ore minerals are dominantly galena and sphalerite that replace an earlier hedenbergite skarn near the surface, and, at depth, replace a garnet-hedenbergite skarn. Subordinate ore minerals are chalcopyrite, arsenopyrite, pyrite, pyrrhotite, fluorite, and silver sulfosalts. K/Ar isotopic studies indicate that the age of mineralization bracketed between 60 and 80 Ma. A 60 K/Ar Ma isotopic age is obtained for an unmineralized basalt dike that cuts the mineralized zone, and a K/Ar age of 70-80 Ma is obtained for a mineralized ignimbrite that overlies the olistolith. .

Garbuzov and others, 1987; V.V. Ratkin, this study.

L53-29 44°39'N 136°12'E	Plastun Taukha	Cu Porphyry Cu	Small. Associated skarn contains 30-350 g/t Ag; 0.3-0.8% Cu.

Consists of veinlets and disseminations from 100 to 150 m thick, with sulfide-bearing zones from 15 to 20 m thick. Ore minerals are pyrite and chalcopyrite, with subordinate arsenopyrite, sphalerite, and galena. Deposit hosted in Upper Cretaceous (Cenomanian-Turonian) felsic volcanic rocks. Alteration consists of chlorite, epidote, quartz, and sericite. Deposit occurs at the flank of caldera filled with Upper Cretaceous to Paleocene (Maastrichtian-Danian) volcanic rocks. Underlying sedimentary rocks of the Early Cretaceous accretionary-fold complex include lenticular skarns up to 10 m long and 1.0 to 1.5 m thick with disseminated magnetite, chalcopyrite, pyrite, and pyrrhotite.

Mikhailov, 1989.

L53-30 44°28'N 134°08'E	Koksharovskoe Ariadny	Ti P Zoned mafic-ultramafic Ti	Large. Average grade of 1.0-10% P_2O_5; 3.3-4.5% TiO_2.

Consists of disseminated ilmenite, magnetite, and apatite in a hornblende and biotite pyroxenite with a K-Ar isotopic age of 160 Ma. Minor PGE present. Intrusive rocks are weathered. Weathered pyroxenite may have economic concentrations of vermiculite.

Scheka and others, 1991.

L53-31 44°25'N 134°47'E	Arsenyevsky Luzhkinsky	Sn Pb, Zn, W, Ag Sn silicate-sulfide vein	Medium. Average grade of 2-3% Sn. Locally up to 20-25% Sn, Also contains from 0.1-0.5% WO_3 , 1-2% Pb and Zn , and a few hundred ppm Ag. Mined since 1970's.

Deposit consists of a series of parallel, steeply-dipping Sn quartz veins up to 1000 m along strike and 600-700 m down dip. Veins are commonly 10 to 20 cm thick, with maximum thickness of 1 to 2 m. Ore mineral assemblages are vertically zoned. From the top downwards assemblages are: (1) quartz-cassiterite; (2) quartz-arsenopyrite-pyrrhotite; (3) polymetallic; and (4) arsenopyrite-pyrrhotite. Late-stage alteration consists of quartz-fluorite-carbonate, with sizable amounts of huebnerite. Deposit associated with 60 Ma rhyolite dikes that exhibit quartz-sericite autometasomatism, with local miarolithic cavities filled with cassiterite.

Rub and others, 1974; Radkevich and others, 1980.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L53-32 44°28'N 134°59'E	Khrustalnoe Luzhkinsky	Sn Pb, W, Ag Sn silicate-sulfide vein	Medium. Average grade of 0.8-1.7% Pb; 0.22% Sn; up to 11.8% Zn. Mined during 1950's and 1960's.
Deposit consists of 70 to 80 steeply-dipping ore veins with dominantly north-south and northwest trends. Veins extend for up to 1 to 3 km along strike and up for 500 to 600 m down dip; with an average thickness of 0.15 to 0.20 cm. The major mineral assemblages occur in a zonal pattern. At deep levels are quartz-cassiterite and early quartz-sulfide with arsenopyrite, pyrrhotite, chalcopyrite, sphalerite, and stannite. At shallow levers are late-stage quartz-sulfide containing galena and sphalerite. Tourmaline alteration of wall rock occurs at deep levels, and chlorite alteration occurs at shallow levels. Radkevich and others, 1980.			
L53-33 44°24'N 135°58'E	Krasnogorskoe Taukha	Pb, Zn Ag Polymetallic vein	Medium. Average grade of 62 g/t Ag, 5 % Pb, 0.26 % Sn, and 6.77 % Zn.
Consists of steeply-dipping quartz-sulfide veins, up to several hundred m length along strike and from 0.2 to 1.5 m thick, that cut a sequence of Late Cretaceous (Cenomanian to Turonian) ash flow tuffs. Sphalerite and galena are the dominant ore minerals; the flanks of veins contain pyrite-marcasite-pyrrhotite, with lesser antimony-silver sulfosalts. At the deeper levels of the ore bodies, galena contains up to several percent silver and bismuth as matildite. The volcanic rocks adjacent to the polymetallic veins are altered to quartz and chlorite. In the core of the veins, chlorite, manganous calcite, rhodochrosite, rhodonite, and spessartine occur with quartz gangue. The veins occur near an Upper Cretaceous-Paleocene (Maastrichtian to Danian) volcanic vent. The vent breccia also contains disseminated sphalerite, galena, and cassiterite. The veins formed immediately after mineralization of vent breccia, with an approximate age K/Ar isotopic age of 65 Ma. Ratkin and others, 1990.			
L53-34 44°26'N 135°49'E	Lidovskoe Taukha	Pb, Zn Pb-Zn polymetallic vein	Medium. Average grade of 7.8% Pb; 6.4% Zn. Mined since 1950's.
Consists of gently-dipping (approximately 30°) sulfide veins that cut Early Cretaceous siltstone and sandstone. Most veins contain galena and sphalerite, with subordinate nonmetallic minerals. Deposit formed in two stages: (1) quartz, muscovite, chlorite, arsenopyrite, pyrite, and cassiterite; and (2) pyrrhotite, sphalerite, galena, chalcopyrite, stannite, carbonates, and chlorite. Quartz-calcite veinlets with minor sulfides were emplaced during the later stage, after the intrusion of basaltic dikes. Some ore bodies, whose composition is similar to that of the vein ore, are saddle-shaped; with ore overlying the gently-dipping upper surfaces of granodiorite bodies. Granodiorite was altered by autometasomatism. Age of granodiorite and associated ore is 69 to 72 Ma (K/Ar). Govorov, 1977; Ratkin and others, 1990.			
L53-35 44°18'N 132°08'E	Voznesenka-I Voznesenka	Zn Korean Zn massive sulfide	Medium. Average grade of 4% Zn.
Consists of massive and thick-banded sphalerite and magnetite-sphalerite layers in bedded Early Cambrian limestone. Ore bodies are lenticular, 1-2 m thick, 20 to 100 m long, and occur in dolomitic limestone and marl. Sulfide bodies and host rocks are folded and regionally metamorphosed. Sulfide bodies locally altered to skarn and greisen during emplacement of a Silurian granitic stock that intrudes the carbonate unit. Androsov and Ratkin, 1990.			

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L53-36 44°11'N 132°08'E	Voznesenka-II Yaroslavka	Fluorite Fluorite greisen	Large. 450 million tons fluorite ore averaging 30-35% CaF_2. Mined since 1960's. Currently largest producer of fluorite in Russia.
Fluorite ore occurs above the apex of a 1.5 km wide intrusion of Late Cambrian (512-475 Ma) Li-F alaskite granite. Deposit interpreted as forming during metasomatic replacement of Early Cambrian, black organic limestone resulting in alteration to greisen. Deposit and vein greisen occurs along a north-south-trending fault. Muscovite-fluorite aggregate occurs at the periphery of the ore zone whereas vein greisen occurs in the middle of the zone. Greisen is often brecciated, showing a two-stage origin. Fragments of breccia consist of mica-fluorite, fluoritized limestone, greisen, and granite altered to greisen. Fragments are cemented by quartz-topaz-micaceous-fluorite aggregate during the second stage. Androsov and Ratkin, 1990.			
L53-37 44°16'N 132°13'E	Yaroslavskoe Yaroslavka	Sn Sn greisen	Medium. Average grade of 0.52% Sn. Mined during 1950's to 1970's.
Consists of greisen that mainly replaces skarn, limestone, and schist; and to lesser extent granite and granite porphyry. Sn-bearing quartz and quartz-tourmaline veins are related replacement of skarn by greisen are classified into: (1) mineralized fracture zones,(2) ore veins, (3) veinlets and ore pods, and (4) saddle-shaped and sheeted ore. Sn ores are classified into three types based on mineral associations: (1) tourmaline-quartz; (2) tourmaline-fluorite; and (3) sulfide-tourmaline-quartz with subordinate cassiterite-polymetallic and chlorite-sulfides. The sulfide minerals are dominantly pyrite, arsenopyrite, galena, and sphalerite. Deposit occurs along the contact of a Early Paleozoic biotite granite (approximately 400 Ma), intruding a Lower Cambrian shale, siltstone, sandstone, and limestone. The pre-ore pyroxene-scapolite, vesuvianite-garnet, and epidote-amphibole skarn occurs in limestone and shale along the granite contacts, and in rare limestone inclusions within the granite. Govorov, 1977.			
L53-38 44°24'N 133°17'E	Chernyshevskoe Voznesenka	Zn, Pb Korean Zn massive sulfide	Small. Average grade of 1.5-6.5% Pb and 0.7-2.5% Zn.
Consists of sheeted pyrrhotite-arsenopyrite-pyrite-galena-sphalerite bodies that occur at the contact of a limestone sequence with overlying Early Cambrian siltstone. Rare conformable zones of disseminated sulfide mineralization occur within the limestone away from the contact. Sulfide bodies are 1 to 2 m thick, with a surface exposure 100 to 200 m long. Deposit was drilled to a depth of about 100 m. Bazhanov, 1988.			
L53-39 44°06'N 134°24'E	Lazurnoe Luzhkinsky	Cu, Mo Porphyry Cu-Mo	Small. Contains up to 3 g/t Au; 0.3-0.6% Cu; 0.008-0.2% Mo.
Consists of a stockwork of veinlets and disseminated ore in an asymmetric semi-ring; around the hypabyssal body. Chalcopyrite, bornite, pyrite, sphalerite, and molybdenite occur to a depth of 300 m. Sulfide minerals associated with propylitic alteration (epidote, chlorite, sericite, and carbonate), and weak silicification and K-feldspar alteration of veinlets. Quartz-carbonate veins with sulfides occur at surface. The porphyry stockwork zone is 500 x 60 m, with an average concentration of approximately 0.15% Cu. Deposit related to hypabyssal Late Cretaceous gabbro-monzonite and monzodiorite that intrude Lower Cretaceous sedimentary rocks adjacent to the Central Deep Fault. Mineralized stock intruded by granodiorite which contains a Au-sulfide occurrence. R.I. Petrachenko and V.G. Gonevchuk, written commun., 1984; Petrachenko, Gonevchuk, and Petrachenko, 1987.			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L54-01 47°09'N 138°35'E	Yagodnoe Kema	Au, Ag Pb, Cu, Zn Au-Ag epithermal vein	Small. Average grade of 4.28 g/t Au; 49.3 g/t Ag.

Occurs in thin zones, up to 1 km long, of hydrothermally altered quartz and chlorite rock with superimposed Au-polymetallic deposit that contains galena and sphalerite, with minor chalcopyrite, Ag sulfides, and molybdenite. Zones are associated with Paleocene (Danian) intrusions of diorite-quartz diorite and granodiorite-granite that intrude Late Cretaceous granite.

R.I. Petrachenko, written commun., 1988.

L54-02 47°06'N 138°06'E	Burmatovskoe Kema	Au, Ag Au-Ag epithermal vein	Small. Average grade of 0.8-8.4 g/t Au; 10-61 g/t Ag.

Consists of Au-Ag replacement of Paleocene age that occurs as lenticular metasomatic zones of varying mineralogy: (1) hydromica-quartz; (2) sericite-chlorite-quartz; and (3) carbonate-quartz. Local skarn and propylite composed of magnetite, hematite, and chalcopyrite. Ore zones are several hundred m long. Au/Ag ratio is 1:1 to 1:100 and higher. Ore minerals, which comprise up to 10% of the rock, are gold, silver, argentite, proustite, polybasite, and pyrargyrite. Deposit not explored at depth. Host rocks are Late Cretaceous felsic tuff, tuffite, tuffaceous sandstone, and andesite that are intruded by Paleocene rhyolite and dacite.

Rodionov and Kuznetsov, 1984.

L54-03 46°58'N 138°09'E	Sukhoe Kema	Au, Ag Au-Ag epithermal vein	Small

Consists of carbonate-quartz, adularia-quartz, and chlorite-quartz veins that contain gold, silver, polybasite, pyrargyrite, proustite, galena, sphalerite, chalcopyrite, and pyrite. Hydromica-quartz alteration zones are associated with ore-bearing veins. Au/Ag ratio ranges from 1:15 to 1:40. Veins are 5 cm to 2.5 m thick and several tens to several hundred m long. Veinlet zones have no clear boundaries. Deposit hosted in altered Late Cretaceous tuff and rhyolitic lava. Ore veins and zones are related to the extrusions and dikes of Paleocene (Danian) andesite.

A.N. Rodionov, written commun., 1986.

L54-04 47°04'N 142°56'E	Bereznyakovskoe Aniva-Nabil	Mn Volcanogenic Mn	Small. Ranges from 1 to 24% Mn.

Consists of several small quartz-rhodonite lenses, with surficial pyrolusite and psilomelane in a weathered zone. Deposit occurs conformably to early to middle Paleozoic metamorphic rocks. Ore bodies are small, with dimentsions of 0.6 x 25 to 1 x 120 m.

V.D. Sidorenko, 1974.

L54-05 46°33'N 143°30'E	Burea River Unassigned	W W greisen(?)	Small. Contains up to 1% W .

Consists of veinlets disseminations of scheelite that are associated with quartz-mica alteration in a zone of hydrothermally altered Paleogene granitic rocks that intrude Jurassic and Cretaceous volcanic rocks and chert.

Sidorenko, 1974.

L54-06 46°18'N 143°26'E	Novikovskoe Aniva-Nabil	Cu, Zn, Pb Zn, Pb Cyprus massive sulfide(?)	Small. Average grade of 1% Cu, 0.1% Zn, and 0.1% Pb.

Consists of sulfide disseminations in propylitic-altered mafic volcanic rocks. Dominant metallic minerals are chalcopyrite and pyrite with subordinate galena, bornite, tetrahedrite, chalcocite and covellite. Hydrothermal alteration consists of quartz, sericite, and carbonate. Disseminations occur in zones that range from 0.1 to 0.7 m thick. Deposit hosted in a Tertiary(?) chert- and volcaniclastic rock sequence. Deposit interpreted as forming during sea floor volcanism.

Sidorenko, 1974.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L55-01 45°47'N 149°43'E	Krishtofovich Volcano Kuril	S, FeS_2 Sulfur-sulfide	Medium. Contains up to 35% S.

Sulfur occurs in pods and in disseminations that are associated with quartz-kaolinite and alunite-quartz hydrothermal alteration of flows and tuff of the Krishtofovich volcano on southern part of Urup island. Deposit occurs in the inner walls of the caldera. Massive unleached ore contains up to 35% S and forms a pipe-like body with plan dimensions of 100 x 350 m. Ore contains sulfur (up to 30%), pyrite, melnikovite (2-5%), opal, and quartz. In some places, deposit occurs as massive sulfur. Age of mineralization interpreted as Pleistocene and Quaternary.

Znamensky, 1972.

L55-02 45°41'N 149°35'E	Tet'yaevskoe Kuril	Cu, Zn, Pb Cu-Pb-Zn polymetallic vein	Medium. Ore contains 0.12-7.8% Cu, up to 2.7% Zn, and 0.06-2.8% Pb.

Consists of veinlets, disseminations, and quartz-sulfide veins that occur in hydrothermally altered siliceous rocks, and in silicified and sericite-altered volcanic and sedimentary rocks. Ore minerals are pyrite, chalcopyrite, sphalerite, and galena. Sphalerite is rich in Cd and Ge, pyrite contains Au inclusions. Area of deposit approximately 20 km^2; with uneven depth. Deposit contains fracture zones. Deposit age interpreted as Middle Miocene.

Vlasov, 1977.

L55-03 45°27'N 148°43'E	Sof'ya Kuril	Au Au epithermal vein	Small. Average grade of 0.2% Pb, up to 0.1% Cu, up to 0.12% Zn, and approximately 1 g/t Au.

Consists of linear and spaced stockwork composed of variable-trending quartz-pyrite veinlets containing barite, apatite, and adularia. Stockwork occurs along a northwest trending fracture zone. Host rocks are silicified and contain disseminated pyrite and sphalerite. Metasomatic zoning consists of the successive assemblages: (1) quartz-adularia±montmorillonite; (2) chlorite-montmorillonite; and (3) albite-chlorite-carbonate. Ore bodies up to 0.5 m thick. Occurs over an area of approximately 2 km^2 in intermediate tuff and volcanic rocks. Deposit age is Late Miocene.

R.I. Petrachenko, written commun., 1980.

L55-04 45°12'N 148°12'E	Reidovskoe Kuril	Mo Porphyry Mo	Small. Locally contains up to 1.0% Mo.

Consists of fine disseminations and veinlets of molybdenite in altered tuffaceous rocks of intermediate and mafic composition. Rocks are silicified and contain diaspore, pyrophyllite, sericite, alunite, and dickite. Mineralized and altered rocks extend to depths of over 400 m. Ore mineral, in addition to molybdenite, include pyrite, marcasite, sphalerite, and chalcopyrite. Pliocene diorite stocks and dikes are interpreted as source of mineralizing fluids. Age of deposit interpreted as Pliocene and Quaternary.

Petrachenko and Petrachenko, 1989.

L55-05 45°10'N 148°02'E	Sernaya River Kuril	Au, Zn, Cu Au epithermal vein	Small. Up to 0.2% Zn, 0.01-0.2% Cu, 0.02-0.05% V, 0.005-0.1% Mo, and 0.8-1 g/t Au.

Consists of a series of closely spaced quartz-adularia-sulfide and quartz-adularia veinlets up to 15 to 20 cm thick, composed of barite and zeolite. Veinlets occur along intersections of circular and radial faults. Ore minerals are cleiophane, chalcopyrite, pyrite, ilsemannite, and silver suflosalts. Hydrothermal alteration assemblages are chlorite-sericite, chlorite-montmorillonite, and quartz-adularia-montmorillonite. Temperature of ore-bearing quartz deposition was 250°C. Deposit occurs at the foot of Baransky volcano, in Miocene to Pliocene tuff and tuffaceous conglomerate, at the periphery of a modern hydrothermal system. Age of mineralization interpreted as Pliocene.

R.I. Petrachenko, written commun., 1978.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L55-06 45°01'N 147°54'E	Vysokoe Kuril	S, FeS_2 Sulfur-sulfide	Medium. Ore contains 25-30% S; about 10,000 tonnes of S.

Consists of poorly consolidated fumarole and hot springs deposits that occur in the crater of and on the slopes of Machekha volcano. Fumarole and hot spring deposits cemented and partly replaced by sulfur. Kaolinite and opal occur in addition to sulfur. Age of mineralization interpreted as Holocene.

Vlasov, 1971.

L55-07 44°56'N 147°30'E	Novoe Kuril	S, FeS_2 Mo Sulfur-sulfide	Large. Contains up to 20-80% S and up to 0.5% MoS_2 . Contains about 5 million tonnes sulfur.

Consists of sulfur bodies that occur in hydrothermally altered silicified rock, along with opalite, alunite, and kaolinite. Altered rocks contain sulfur, but highest concentrations sufur are associated with opalite, silicified rock, and alunite. Secondary minerals are barite, gypsum, marcasite, pyrite (up to 15%), and molybdenite. Deposit occurs in a flat-lying sequence, about 500 to 400 m thick, of andesite, andesite-basalt, and related tuff that crops out along scarps of a 2 km-wide erosional depression. Some ore bodies are controlled by faults. Age of mineralization interpreted as Pliocene and Quaternary.

Petrachenko, 1967.

L55-08 44°37'N 147°22'E	Rudnikovskoe Kuril	Sn, Pb, Zn Sn silicate-sulfide vein	Small. Average grade of 0.03-0.4% Sn .

Consists of disseminated pyrite, sphalerite, chalcopyrite, and cassiterite; and quartz-chlorite veinlets with cassiterite in siliceous, chloritized, and epidotized hypabyssal diorite. Sn content varies from 0.03 to 0.4% across mineralized zones that range up to 20 m wide and up to 50 m long. A few galena veins also. Deposit age interpreted as early Miocene.

Petrachenko, 1973.

L55-09 44°19'N 146°05'E	Prasolovskoe Kuril	Au, Ag Au-Ag epithermal vein.	Medium. Mined before 1990's.

Consists of veins that mostly dip steeply and range from 2-3 m thick, with a few up to 10 m thick. Veins consist mainly of banded metacolloidal gold, telluride, and quartz veins that contain up to 1-3% ore minerals. Deposit vertically zoned. From bottom to top, assemblages are: (1) gold-cassiterite-quartz; (2) polysulfide-quartz; (2) gold-telluride-quartz; and (3) gold-adularia (carbonate)-quartz. Dominant ore minerals are pyrite, chalcopyrite, bornite, chalcocite, covellite, and sphalerite. Arsenopyrite, molybdenite, cassiterite, galena, argentite, native silver, gold, hessite, naumannite, and goldfieldite are also abundant. Limonite, covellite, malachite, and azurite occur in an oxidized zone. Deposit explored to a depth of over 200 m. An area 1.5 by 0.5 km is propylitically altered and impregnated with pyrite as well as numerous quartz veinlets with epidote, sericite, adularia, chlorite, calcite, and rare barite. Earlier veinlet and disseminations are related to Miocene intrusions. Later Au-Ag minerals is related to the Pliocene volcano-plutonic complex. Deposit is associated with Pliocene plagiogranite and quartz diorite that intrude early and middle Miocene pyroclastic green tuff deposits.

Danchenko, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
L55-10 44°12'N 145°58'E	Valentinovskoe Kuril	Cu, Pb, Zn Kuroko Cu-Pb-Zn massive sulfide	Small. Average grade of 1% Cu, 1.5-1.7% Pb, and 10-13% Zn in fine-grained ore, and locally up to 4% Cu, 10-16% Zn, and 1-1.7% Pb.

Summary and References

Consists of two steeply-dipping, thin, lens-like deposits, up to 150 m long. Two deposit types exist: (1) most common type composed of massive, fine-grained sphalerite, galena, chalcopyrite, chalcocite, tetrahedrite, melnikovite, barite, gypsum, quartz, chalcedony, chlorite, sericite, and calcite; contains approximately 1% Cu, 1.5-1.7% Pb, and 10-13% Zn; and (2) less common ore type consists of pyrite, sphalerite, and chalcopyrite with galena and other sulfides; contains up to 4% Cu, 10 - 16% Zn, and 1 - 1.7% Pb. Deposit occurs in Early Miocene rhyolite, dacite, andesite, and andesitic tuff with chert layers. Host rocks are propylitized or sericitized, and are part of a submarine tuff complex.

Neverov, 1964.

L55-11 44°01'N 145°45'E	Spiridonovskoe Kuril	Sn, Pb, Zn Sn polymetallic vein	Small. Contains up to 0.13% Sn.

Consists of disseminated pyrite, galena, sphalerite, and stannite that occur in chlorite-sericite-K-feldspar-quartz altered rocks. Disseminations occur in fracture zones in rhyolite-dacite lava flows. Deposit age interpreted as Pliocene.

Petrachenko, 1978.

L56-01 46°58'N 152°04'E	Dushnoe Kuril	Cu, Zn, Pb Cu-Pb-Zn polymetallic vein	Small

Consists of polymetallic veins and steaks in an area about a few tens of m long that consist of disseminated chalcopyrite, sphalerite, galena, and pyrite that occur in light-colored, argillized rocks. Hydrothermal alteration associated with sulfides. Deposit hosted in Late Miocene pyroclastic rocks along Srednyaa Bay and Dushnaya Bay on Simushir Island. Deposit age interpreted as Pliocene(?).

Sidorenko, 1974.

M09-01 50°43'N 127°58'W	Red Dog Island Porphyry	Cu Ag Porphyry Cu	Medium. Reserve of 41.1 million tonnes grading 0.26% Cu, 0.34 g/t Au.

Consists of chalcopyrite and bornite that occur as disseminations and as fracture fillings in hornfels and associated with magnetite in siliceous breccia. Molybdenite occurs in lesser quantities in fractures and quartz-sericite veins that occur along shear zones. Host rocks are Lower Jurassic Bonanza Group tuffs metamorphosed to hornfels at contacts, with silicification and hydrothermal alteration. K-Ar date of 144 ± 5 Ma of the associated Island Plutonic Suite yields an approximate age of mineralization. Deposit age interepreted as Late Jurassic.

B.C. Minfile, 1989; EMR Canada, 1989; Mining Review, 1992.

M09-02 50°37'N 127°31'W	Island Copper (Rupert Inlet) Island Porphyry	Cu, Mo, Au Porphyry Cu-Mo	Large. Production and reserves of 257 million tonnes grading 0.52% Cu, 0.22 g/t Au.

Consists of pyrite, chalcopyrite and molybdenite that occur as fracture fillings and disseminations. Chalcopyrite and galena occur in minor amounts peripheral to the pyrite and chalcopyrite mineralization. Deposit occurs in two parts; the main body on the hanging wall of the dike is tabular shaped, from 60 to 180 meters wide, 1700 meters long and 300 meters deep with a strike of 290°Az and dipping 60°N parallel to the dike. The footwall zone is not as well defined as the hanging wall zone. Hosted in Lower Jurassic Bonanza Group andesitic and basaltic tuffs that are intruded by a quartz feldspar porphyry dike. A K-Ar age of 154 ± 6 Ma from nearby rocks of the Island Plutonic Suite gives an approximate age of mineralization. Deposit age interpereted as Late Jurassic.

Cargill and others, 1976; B.C. Minfile, 1989; EMR Canada, 1989.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M09-03 50°23'N 127°15'W	Benson Area (Empire, Coast Copper) Island Porphyry	Cu, Fe Au Cu-Fe skarn	Medium. Production and reserves of 3.0 million tonnes grading 1.56% Cu, 26.6% Fe, 1.4 g/t Au.

Summary and References

Consists of magnetite and chalcopyrite with minor bornite and pyrrhotite that occur as skarn replacement bodies along the northwest-striking and moderately west-dipping contact between Quatsino Formation limestone and Karmutsen Formation, both part of the Upper Triassic Vancouver Group. Low-grade gold and silver values are associated with chalcopyrite that occurs as veinlets and disseminations in sill-like lenses, in calc-silicate skarn and massive magnetite. Production between 1962 and 1973 from the Empire and Old Sport orebodies was 2,657,593 tonnes yielding 1.5 % Cu, 27.14% Fe, 1.47 g/t Au and 4.41 g/t Ag. Deposit age interpreted as Jurassic.

Sangster, 1969; B.C. Minfile, 1989.

M09-04 50°03'N 126°50'W	Zeballos Iron (Ford) Island Porphyry	Fe Fe skarn	Medium. Reserves of 2.268 Mt grading 7.9% Fe_2O_3.

Consists of magnetite that occurs as a 21-meter thick and 400 meter long, northeast-striking, northwest-dipping tabular replacement body formed along the contact between Upper Triassic Quatsino Limestone of the Vancouver Group and tuff of the Lower Jurassic Bonanza Group. Host rocks form a roof pendant surrounded by granodiorite and hornblende diorite of the Early to Middle Jurassic Island Plutonic Suite. Production, both open pit initially and later underground, between 1962 and 1969, was 1,187 tonnes Fe. Pre-production reserves in 1959 were 2.268 million tonnes grading 47.9% magnetite, with additional possible reserves of 450,000 tonnes at similar grade. Deposit age interpreted as Early to Middle Jurassic.

Sangster, 1969; B.C. Minfile, 1989.

M10-01 51°28'N 123°38'W	Fish Lake Fish Lake-Bralorne	Cu, Au Ag, Mo, Zn Porphyry Cu-Mo	Large. Reserves of 675 million tonnes grading 0.24% Cu, 0.43 g/t Au.

Consists of pyrite and chalcopyrite with minor molybdenite, bornite, sphalerite and tetrahedrite that occur in stockwork veins and as disseminations in a Late Cretaceous quartz-diorite porphyry and adjacent contact metamorphosed Lower Cretaceous sedimentary and volcanic rocks. Principal orebody (Cu >0.25%) is ovoid shaped with dimensions of 450 meters by 250 meters. A whole rock isotopic date of 77.2 ± 2.8 Ma yields a deposit age of Late Cretaceous.

Wolfhard, 1976; B.C. Minfile, 1991; EMR Canada, 1989; McMillan, 1991; Taseko Mines Ltd., news release, May 4, 1993.

M10-02 51°23'N 120°04'W	Chu Chua Kootenay-Shuswap	Cu, Zn, Au, Ag Co Cyprus massive sulfide	Medium. Reserves of 2.5 million tonnes grading 2% Cu, 0.5% Zn, 0.5 g/t Au, 9 g/t Ag.

Consists of pyrite with chalcopyrite and minor sphalerite that occur in two major and several smaller stratiform massive sulfide lenses associated with pyritic, cherty sediments and pillowed basalt of the Upper Paleozoic (Devonian to Permian) Fennel Formation. Chalcopyrite and sphalerite occur interstitially to pyrite. Basalt locally extensively altered to talc and carbonate in structures interpreted as vents. Open-pit geological reserves of 1.043 million tonnes grading 2.97% Cu with a 3:1 stripping ratio and a 1% Cu cut-off were reported in 1989. Deposit age interpreted as Upper Paleozoic.

Schiarizza and Preto, 1987; B.C. Minfile, 1990; EMR Canada, 1989; Hoy, 1991.

M10-03 51°03'N 122°49'W	Tungsten Queen (Silverquick, Manitou) Tyaughton-Yalakom	Hg W, Sb, Au Silica-carbonate Hg	Medium. Reserves of 1.5 million tonnes grading 0.4% Hg.

Consists of cinnabar in disseminated grains, streaks, small lenses and smears on fault surfaces in brecciated Upper Jurassic to Lower Cretaceous conglomerate at Silverquick occurrence, and in shear zones in amygdaloidal volcanics at the Manitou (Empire) occurrence. Deposit age interoreted as Eocene(?).

B.C. Minfile, 1985; EMR Canada, 1989; Schiarrizza and others, 1990.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M10-04 51°08'N 122°37'W	Poison Mountain (Copper Giant) Fish Lake-Bralorne	Cu, Mo Ag, Au Porphyry Cu-Mo	Medium. Reserves of 180 million tonnes grading 0.31% Cu, 0.007% Mo, 0.14g/t Au, 40g/t Ag.

Consists of pyrite, chalcopyrite, molybdenite and bornite that occur in veinlets, fracture fillings and disseminations. Deposit hosted mainly in and near the perimeter of the core of a zoned Eocene intrusive, hosted by greywacke and grit of Upper Jurassic-Lower Cretaceous Relay Mountain Group. Intrusive core is hornblende-quartz monzonite porphyry. Deposit age interpreted as Eocene(?).

Seraphim and Rainboth, 1976; EMR Canada, 1989; McMillan, 1991; George Cross Newsletter no. 65, April 2, 1993.

M10-05 50°47'N 122°49'W	Bralorne, Pioneer (Bridge River Area) Fish Lake-Bralorne	Au W, Sb Au-Sb polymetallic vein	Medium. Production and reserves of 8.34 million tonnes grading 16.2 g/t Au.

Consists of gold in quartz veins (fracture fillings) with pyrite, arsenopyrite and scheelite. Veins range from 1.5 to 2 meters wide and are hosted in Permo-Triassic diorite, gabbro and greenstone in a steeply dipping north-trending shear zone (Cadwallader Break) and associated with Late Cretaceous (86-91 Ma) porphyry dikes. Significant production occurred in two major deposits, the Bralorne and Pioneer mines. Production from the Bralorne mine from 1899 to 1971 was 81.1 tonnes Au from 5.0 million tonnes milled and production from the Pioneer mine between 1908 and 1960 was 40.4 tonnes Au from 2.4 million tonnes milled. Proven ore probable reserves for Bralorne above and below the 1000 m level are 965,000 tonnes grading 9.3 g/t Au. Deposit age interpreted as Late Cretaceous.

B.C. Minfile, 1985; EMR Canada, 1989; Leitch and others, 1989; B.C. Minfile, 1991.

M10-06 50°55'N 121°25'W	Maggie (Bonaparte River) Fish Lake-Bralorne	Cu, Mo Porphyry Cu-Mo	Medium. Reserves of 181 million tonnes grading 0.28% Cu, 0.029% MoS_2.

Consists of chalcopyrite and molybdenite that occur as fine disseminations in quartz veins and in host rock and as narrow veinlets within or bordering quartz and to lesser degree calcite veins. Potassic and phyllic alteration assemblages overlap in the zones of high grade ore; phyllic and argillic assemblages are associated with lower grade ore. Principal host rock is quartz monzonite of the Tertiary (61 Ma) Maggie Stock. Part of deposit occurs within Upper Paleozoic and Lower Mesozoic Cache Creek Group metasedimentary and metavolcanic rocks. Deposit age interpreted as Paleocene.

Miller, 1976; EMR Canada,1989, MR 223; B.C. Minfile, 1990; Mining Review, 1992;

M10-07 50°23'N 122°45'W	Owl Creek district Owl Creek	Cu, Mo Porphyry Cu-Mo	Medium. Estimated 10 to 20 million tonnes grading 0.3% to 0.4% Cu, 0.03% MoS_2.

Consists of several zones of chalcopyrite, molybdenite and pyrite with minor bornite that occur as blebs, disseminations and fracture fillings. Deposit hosted in Jurassic to Tertiary quartz diorite and feldspar porphyry intrusives of the Coast Plutonic Complex and in propylitic and argillic altered and dioritized volcanic rocks of the Upper Triassic Cadwallader Group. Deposit age interpreted as Tertiary.

BCGS, 1970; Mahoney, 1977; EMR Canada, 1989; B.C. Minfile, 1991.

M10-08 50°30'N 120°59'W	Bethlehem-JA Guichon	Cu, Mo Porphyry Cu-Mo	Large. Production and reserves of 430 million tonnes grading 0.45% Cu.

Bethlehem deposits (Jersey, East Jersey, Huestis, Iona and JA) consist of chalcopyrite, bornite, specularite and molybdenite with minor magnetite and chalcocite as fracture fillings and to a lesser degree as disseminations hosted within granodioritic and quartz dioritic phases of the Late Triassic-Early Jurassic Guichon Creek Batholith. Reserves for the JA are 286 million tonnes at 0.43% Cu and 0.017% MoS_2. Reserves and production for the remaining Bethlehem deposits are 144 million tonnes at 0.50% Cu and 0.013 g/t Au. Deposit age interpreted as Early Jurassic (199 Ma).

Briskey and Bellamy, 1976; B.C. Minfile, 1988; McMillan, 1985, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M10-09 50°29'N 121°03'W	Valley Copper Guichon	Cu, Mo Porphyry Cu-Mo	Large. Production and reserves of 716 million tonnes grading approximately 0.47% Cu, 0.006% Mo.

Consists of disseminated chalcopyrite (potassic alteration) and bornite (phyllic alteration) with minor digenite, covellite, pyrite, pyrrhotite, molybdenite, sphalerite and galena. Deposit hosted in granodiorite and quartz monzonite of the Bethsaida phase of the Guichon Creek Batholith (204 Ma). Minor amounts of iron-antimony sulfide (gudmundite) and native gold have also been reported. An oxidized halo of ranging in thickness from 0.3 to 100 meters consists of limonite, malachite, pyrolusite, digenite, native copper and tenorite . The average thickness of the oxidized zone is 33 meters. Deposit age interpreted as Early Jurassic.

Osatenko and Jones, 1976; McMillan, 1985, 1991; B.C. Minfile, 1989; Highland Valley Copper Ltd., annual report, 1991.

M10-10 50°27'N 121°03'W	Lornex Guichon	Cu, Mo Porphyry Cu-Mo	Large. Production and reserves of 530 million tonnes grading approximately 0.37% Cu, 0.014% Mo.

Consists of chalcopyrite, bornite, molybdenite and pyrite as fracture fillings and coatings. Deposit hosted in granodiorite of the Skeena phase of the Guichon Creek Batholith (204 Ma) and pre-mineralization quartz porphyry dike related to the Bethsaida phase. Western edge of the orebody is faulted; extension is probably represented by the Valley Copper deposit 2.5 km north. Deposit age interpreted as Early Jurassic.

Waldner and others, 1976; McMillan, 1985, 1991; B.C. Minfile, 1991; Highland Valley Copper Ltd., 1991.

M10-11 50°26'N 120°60'W	Highmont (Gnawed Mountain) Guichon	Cu, Mo Porphyry Cu-Mo	Medium. Production and reserves of 123 million tonnes grading 0.23% Cu, 0.006 g/t Au, 0.021% Mo.

Consists of four large, low-grade mineralized zones and three smaller zones at the southern end of the Highland Valley porphyry copper district. Ore minerals consist of chalcopyrite, bornite and molybdenite in veins and fractures with minor disseminated chalcopyrite hosted in quartz diorite of the Skeena phase and quartz monzonite of the Bethsaida phase of the Guichon Creek Batholith (204 Ma). Deposit age interpreted as Early Jurassic.

Reed and Jambour, 1976; McMillan, 1985, 1991; B.C. Minfile, 1991.

M10-12 50°40'N 120°31'W	Iron Mask Area (Afton, Ajax) Copper Mountain (South)	Cu Au Porphyry Cu-Au	Medium. Production and reserves of 66 million tonnes grading 0.77% Cu, 0.56 g/t Au.

Major porphyry Cu-Au deposits at Afton and Ajax (West and East) are hosted in Iron Mask Batholith that contains several shallow, open-pit, alkaline intrusive-related, porphyry Cu-Au deposits. Afton Mine is a tabular-shaped deposit hosted hosted in fractured diorite of the Cherry Creek pluton (U-Pb zircon age of 207 Ma) with a deeply penetrating supergene zone characterized by the presence of native copper and lesser chalcocite. The hypogene zone at Afton mine consists of chalcopyrite, bornite and pyrite mineralization in fractures. Ajax deposit, located 10 km southeast of Afton Mine near the southwestern edge of the batholith, occurs at the intersection of two major dioritic phases of the batholith, the Sugarloaf diorite and the hybrid diorite. Ore minerals are pyrite and chalcopyrite with trace amounts of bornite, chalcocite and molybdenite. Deposits ages interpreted as Early Jurassic.

Kwong, 1987; B.C. Minfile, 1990; McMillan, 1991; Ross and others, 1992, 1993.

M10-13 50°03'N 124°39'W	O.K. Gambier	Cu, Mo Zn Porphyry Cu-Mo	Medium. Reserves of150 million tonnes grading 0.39% Cu, 0.024% MoS_2.

Consists of chalcopyrite, molybdenite and pyrite with minor sphalerite and bornite that occur in fractures, as quartz stringers, irregular veinlets, blebs and as disseminations. Deposit hosted primarily in granodiorite of the Coast Plutonic Complex adjacent to an elliptical quartz monzonite body. Intrusives ages range from Jurassic to Tertiary, mineralization is Late Cretaceous. Deposit age interpreted as Late Cretaceous.

Meyer and others, 1976; B.C. Minfile, 1988; EMR Canada, 1989; Mining Review, 1992.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M10-14 50°13'N 120°56'W	Craigmont Guichon	Cu, Fe Au, Ag Cu-Fe skarn	Medium. Production and reserves of 34.9 million tonnes grading 1.21% Cu, 19.6% Fe.
Consists of magnetite, hematite and chalcopyrite that occur as massive pods, lenses and disseminations within a calc-silicate skarn assemblage that replaces carbonates. Host rocks part of the Triassic Nicola Group that occurs near the southern boundary of the Lower Jurassic Guichon Batholith. Production between 1962 and 1982 was 33.4 million tonnes grading 1.21% Cu, 0.002 g/t Au and 0.007 g/t Ag. Reserves are estimated at 1.5 million tonnes grading 1.13% Cu. A 500,000 tonne stockpile of magnetite ore exists, from which approximately 45,000 tonnes per year are shipped to coalfields for use in heavy media separation. Deposit age interpreted as Early Jurassic.			
Morrison, 1980; B.C. Minfile, 1983, 1988; Dawson and others, 1991.			
M10-15 49°34'N 125°36'W	Westmin (Buttle Lake-Myra, Lynx, H-W, Battle) Mount Sicker	Zn, Cu, Ag, Au Pb, Ba Kuroko Zn-Cu massive sulfide	Large. Production and reserves of 30.3 million tonnes grading 2.23g/t Au, 54.5g/t Ag, 2.12% Cu, 7.1% Zn.
Consists of massive sphalerite, chalcopyrite, pyrite and lesser galena and barite with minor tennantite, bornite, pyrrhotite, digenite, covellite and stromeyerite that occur in a number of lenses along an east-west trend. Deposit hosted within Late Devonian Myra Formation felsic volcanics of the Sicker Group. Deposits occur at two stratigraphic levels; the H-W horizon at the base of the Myra Formation, and the Lynx-Myra-Price horizon in the central portion of the Myra Formation. Stratigraphic footwall of >300 m of basaltic andesite is intensely altered to quartz-sericite-pyrite under the H-W deposit. Recent exploration by Westmin Resources Ltd., has extended reserves by finding new orebodies at both stratigraphic horizons and by re-evaluating sulfide clast-bearing breccias. Deposit age interpreted as Upper Devonian.			
B.C. Minfile, 1990; Juras and Pearson, 1991; Hoy, 1991; George Cross Newsletter no. 30, February 12, 1993.			
M10-16 49°45'N 124°33'W	Texada (Vananda, Marble Bay, etc.) Island Porphyry	Cu, Au, Ag Cu-Au skarn	Medium. Produced 393,190 tonnes grading 6.2% Cu, 2.3 g/t Au, 9.9 g/t Ag.
Consists of chalcopyrite and bornite that occur in irregular pipe-like bodies in several copper skarn deposits in the northern portion of Texada Island. Deposit hosted within limestonesof the Upper Triassic Quatsino Formation and occurs along contacts with Middle to Late Jurassic dioritic intrusions of the Island Suite. Main producers of the Vananda area were the Marble Bay, Copper Queen, Cornell and Little Billie mines where, between 1896 and 1952, 393,190 tonnes of production yielded 897 kg of Au, 3.9 tonnes of Ag and 2,438 tonnes of Cu. Drill indicated reserves at the Little Billie deposit are reported as 181,400 tonnes grading 11.1 g/t Au, 34.3 g/t Ag, and 2.0% Cu. Deposit age interpreted as Jurassic.			
B.C. Minfile, 1983, 1990; Vananda Gold Ltd., annual report,1992; Webster and Ray, 1990; Ray and Webster, 1991.			
M10-17 49°43'N 124°33'W	Texada Iron Island Porphyry	Fe Cu, Ag, Au, Zn Fe skarn	Medium. Produced 17.6 million tonnes grading 61% Fe.
Consists of massive magnetite skarn mineralization that occurs as replacement bodies at the Prescott, Yellow Kid, and Paxton mines. Deposits hosted within limestones of the Upper Triassic Quatsino Formation at or near contacts with quartz monzonite of the Middle Jurassic Gillies Stock (U-Pb zircon date of 178 Ma). Massive magnetite is associated with garnet, pyroxene, epidote, amphibole, minor calcite and sporadic pyrite and pyrrhotite. Rare arsenopyrite and sphalerite also occur. Recent sampling of Fe-skarn magnetite from the Texada Iron Mines with values of 3.14% Cu, 46.6 g/t Ag and 2.8 g/t Au. Deposit age interpreted as Middle Jurassic.			
Sangster, 1969; B.C. Minfile, 1990; Webster and Ray, 1990.			

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M10-18 49°31'N 123°22'W	Gambier Island Gambier	Cu, Mo Zn, Pb Porphyry Cu-Mo	Medium. Reserves of 114 million tonnes grading 0.29% Cu, 0.018% MoS_2.
Consists of pyrite, chalcopyrite and molybdenite that occur as disseminations, fracture fillings and veinlets. Deposit hosted in early Tertiary quartz porphyry intrusive of the Coast Plutonic Complex and adjacent volcanics of the Cretaceous Gambier Group. Tertiary intrusive rocks form a 500 meter diameter, northwest trending oval-shaped stock. Deposit occurs in a broad arcuate zone 200 meters wide and 1200 meters long. Deposit age interpreted as early Tertiary. EMR Canada, 1989; B.C. Minfile, 1990; Mining Review, 1990.			
M10-19 49°37'N 123°08'W	Britannia Britannia	Cu, Zn Ag, Au Kuroko Cu-Zn massive sulfide	Medium. Production and reserves of 49.3 million tonnes grading 2.8%Cu, 0.32g/t Au, 3.78 g/t Ag, 0.26% Zn.
Consists of massive pyrite, chalcopyrite, sphalerite with minor galena, tennantite, tetrahedrite, barite and fluorite that occur in numerous discrete, concentrically zoned siliceous ore bodies. Deposits hosted in a deformed roof pendant of Lower Cretaceous metavolcanic rocks of the Gambier Overlap Assemblage enclosed within granodiorite of the Coast Plutonic Complex. Principal host rocks are foliated pyroclastic rocks of dacitic to andesitic composition. During the period from 1905 to 1974 the Britannia Mine produced 47,884,558 tonnes of ore from which 15.3 tonnes Au, 180.8 tonnes Ag, 517 tonnes Cu, 15.6 tonnes Pb and 125.3 tonnes Zn were recovered. Measured and drill-indicated reserves are 1.57 million tonnes grading 1.9% Cu remain. Deposit age interpreted as Early Cretaceous. Payne and others, 1980; B.C. Minfile, 1983, 1990; EMR Canada, 1989; Dawson and others, 1991.			
M10-20 49°43'N 121°43'W	Clear Creek (Gem) Owl Creek	Mo Cu, Zn, W, Bi Porphyry Mo	Medium. Reserves of 15.9 million tonnes grading 0.07% Mo.
Consists of molybdenite with minor pyrite and sphalerite that occur in quartz and calcite veins and as fracture fillings. Deposit occurs in an arcuate zone in and surrounding an Oligocene quartz monzonite stock (Gem Stock, K-Ar age of 35 Ma). Other host rocks are quartz diorite and granodiorite of the mid-Cretaceous Spuzzum pluton and schist and gneiss of the Cretaceous Settler Schist. Deposit age interpreted as Oligocene. EMR Canada, 1989; B.C. Minfile, 1992.			
M10-21 49°39'N 120°32'W	Axe (Summers Creek, Axe) Guichon	Cu Mo Porphyry Cu-Mo	Medium. Estimated 57.5 million tonnes grading: 0.5% Cu.
Consists of disseminated chalcopyrite, pyrite and molybdenite with minor chalcocite that occur as disseminations and fracture fillings in mafic volcanics of the Upper Triassic Nicola Group associated with felsic and mafic Jurassic granodiorite intrusives. Alteration is potassic and argillic with quartz-sericite alteration also reported. Three zones are explored, the South Zone, West Zone and Adit Zone. Reserve estimates uncertain due to poor core recovery. Deposit age interpreted Jurassic. Northern Miner, September, 1973; Ney and Hollister, 1976; B.C. Minfile, 1985; EMR Canada, 1989;			
M10-22 49°45'N 120°28'W	Primer (North Zone) Guichon	Cu, Fe Porphyry Cu	Medium. Reserves of 23 million tonnes grading 0.20% Cu.
Consists of chalcopyrite and pyrite that occur with magnetite and quartz as fracture fillings. Deposit hosted in Jurassic feldspar porphyry which intrudes Triassic Nicola Group volcanics. Deposit age interpreted as Jurassic. Ney and Hollister, 1976; B.C. Minfile, 1985; EMR Canada, 1989.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M10-23 49°53'N 120°00'W	Brenda (Peachland Area) Guichon	Cu, Mo Ag, Au, Zn Porphyry Cu-Mo	Large. Production and reserves of 164.0 million tonnes grading 0.16% Cu, 0.04% Mo, 0.031 g/t Au, 0.63g/t Ag.

Summary and References

Consists of chalcopyrite and molybdenite with minor pyrite and magnetite occur within veins and fractures. Deposit hosted in granodiorite and quartz diorite of the Middle Jurassic Brenda Stock. Mineralization occuring during at least five stages of vein emplacement, each with unique attitudes and overall mineralogy developed in fractures. Grade is a function of fracture density and mineralogy of the veins. Potassic alteration (K-feldspar and biotite) accompanies sulfide mineralization. K-Ar hornblende age of 176 Ma for the Brenda Stock and K-Ar biotite age of 146 Ma (latest Jurassic) interpreted as age of deposit.

Soregaroli and Whitford, 1976; B.C. Minfile, 1985, 1990; McMillan, 1991.

M10-24 49°15'N 125°59'W	Catface Catface	Cu Au, Mo Porphyry Cu-Mo	Medium. Reserves of 181 grading 0.45% Cu, 0.05 g/t Au.

Consists of chalcopyrite, bornite, chalcocite, pyrite, pyrrhotite and molybdenite that occur in fractures and quartz veinlets. Deposit hosted in quartz monzonite and quartz diorite of the Eocene Catface Suite, and by meta-basalt of uncertain origin, either Upper Triassic Karmutsen Formation or Paleozoic Sicker Group. K-Ar biotite age of 48 ± 12 Ma for the Catface Intrusive Suite interpreted as Eocene age of deposit.

McDougall, 1976; B.C. Minfile, 1990; Dawson and others, 1991; Mining Review, 1992.

M10-25 49°03'N 125°26'W	Kennedy Lake (Brynnor) Island Porphyry	Fe Fe skarn	Medium. Produced 4.48 million tonnes grading 68.3% Fe.

Consists of magnetite skarn replacement of Upper Triassic Quatsino limestone along a stratigraphic contact with interbedded tuff. Skarn occurs adjacent to an intrusive contact with quartz diorite of the Early to Middle Jurassic Island Suite. Pyrite and pyrrhotite occur in trace quantities within the magnetite. Two orebodies occur: the main body, which was mined by open pit between 1962 and 1968; and a second body located east-southeast of the open pit. Reserve data not available, but are probably sufficient to allow the classification of the Brynnor deposit as a medium size deposit (>5 million tonnes contained metal). Deposit age interpreted as Early to Middle Jurassic.

Sangster, 1969; B.C. Minfile, 1983, 1988.

M10-26 49°25'N 123°04'W	Lynn Creek Gambier	Zn, Pb Ag, Cu Zn-Pb skarn	Medium. Reserves of 272,000 tonnes grading 9.0% Zn (average), variable Ag.

Consists of sphalerite, galena, pyrrhotite, chalcopyrite and pyrite in quartz veins and calc-silicate skarn. Deposit hosted in shear zones in a roof pendant of Jurassic to Cretaceous metasedimentary and metavolcanic rocks of the Gambier Group enclosed within diorite of the Coast Plutonic Complex. Ag ranges up to 68.6 g/t, Zn up to 20%. Deposit age interpreted as Late Cretaceous-Tertiary.

Western Miner, no. 112, p. 32-34, 1963; Northern Miner, October 31, 1963; B.C. Minfile, 1985, 1989; EMR Canada, 1989.

M10-27 49°19'N 121°57'W	Seneca (Harrison) Unassigned	Zn, Cu, Pb, Ag Au, Ba Kuroko Zn-Cu-Pb massive sulfide	Medium. Reserves of 1.50 million tonnes grading 3.57% Zn, 41.13 g/t Ag, 0.82 g/t Au.

Consists of sphalerite, chalcopyrite, pyrite, galena and barite that occur as massive stratiform bodies. Hosted in felsic tuffs and coarse pyroclastics and overlain by andesite flows of the Jurassic Harrison Lake Formation. Reserves also contain 0.63% Cu and 0.15% Pb. Deposit age interpreted as Jurassic.

B.C. Minfile, 1988; Dawson, and others, 1991; International Curator Resources Ltd., new release, November, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M10-28 49°29'N 121°31'W	Giant Nickel (Pride of Emory) Unassigned	Ni, Cu Au, PGE Gabbroic Ni-Cu	Medium. Produced 4.3 million tonnes grading 0.77% Ni, 0.33% Cu, 0.68 g/t Au.

Consists of seventeen deposits that occur in three types of pipe-like orebodies. Deposits extend 3 km along strike. Deposits consist of: (1) zoned, with disseminated pyrrhotite, pentlandite and chalcopyrite that show evidence of forming by magmatic segregation; (2) Massive pyrrhotite, pentlandite and chalcopyrite confined to fault and contact zones; and (3) narrow vein-like tabular bodies with limited aureole. Chromite occurs in sulfides in at least one orebody. Twenty-eight orebodies are known with production from twenty-two. Deposits hosted in an elongated stock-like ultramafic body interpreted as earliest phase of the mainly dioritic Spuzzum Pluton (95-120 Ma). Maximum grades are 2.6% Ni, 0.9% Cu, 1.0% Cr, 0.1% Co, 0.68 g/t Au, 2 g/t Pt and 7.2 g/t Pd. Proven and probable reserves are 5.07 million tonnes grading 0.4% Ni and 0.14% Cu. Deposit age interpreted as Cretaceous.

Aho, 1956; Clark, 1969; Christopher and Robinson, 1975; B.C. Minfile, 1985, 1989; Dawson and others, 1991.

M10-29 49°10'N 121°01'W	Giant Copper (Canam, A.M.) Fish Lake-Bralorne	Cu, Mo Au, Ag Porphyry Cu-Mo	Medium. Reserves of 22.9 million tonnes grading 0.75% Cu, 0.41 g/t Au, 12 g/t Ag.

Consists of chalcopyrite, pyrrhotite, pyrite and arsenopyrite that occur in a vertical, elongate, pipe-like body that intrudes metasedimentary and metavolcanic rocks of the Jurassic Dewdney Creek Group. Host rocks intruded locally by quartz diorite of the Invermay stock. A copper equivalent (CuE) of 1.21% is estimated for a potential open pit mine (one of three proposed by operators, Bethlehem Resources Ltd.) with a stripping ratio of 4.5:1. Uraninite and monazite are reported. Deposit age interpreted as Cretaceous.

B.C. Minfile, 1985, 1990; EMR Canada, 1989; Bethlehem Resources Ltd., annual report, 1990.

M10-30 49°28'N 120°50'W	Lodestone Mountain Area Copper Mountain (South)	Fe, V PGE Zoned mafic-ultramafic Fe-V	Medium. Reserves of 81.65 million tonnes grading 17.56% Fe.

Consists of titaniferous magnetite and ilmenite that occur in pods and lenses and as disseminated grains in pyroxenite of the Tulameen layered mafic-ultramafic (Alaskan type) complex. Deposit formed primarily by magmatic differentiation. Minor Pt reported. Report Ti content of magnetite of 1%. An additional 249 million tons of possible and inferred ore is estimated. Deposit age interpreted as Early Jurassic.

Findlay, 1969a, b; B.C. Minfile, 1985, 1988; St. Louis and others, 1986; EMR Canada, 1989.

M10-31 49°20'N 120°32'W	Copper Mountain (Ingerbelle, etc.) Copper Mountain (South)	Cu Au, Ag, PGE Porphyry Cu-Au	Large. Production, resource, and reserves of 435 million tonnes grading 0.44%Cu, 0.14 g/t Au.

Consists of chalcopyrite and bornite that occur as disseminations and in stockworks in Late Triassic alkaline intrusive rocks of the Copper Mountain Suite and similar age volcanic and volcaniclastic rocks of the Nicola Group. This and similar deposits in the Copper Mountain area occur along a northwest trend for over 4 km. Main orebodies are the Copper Mountain, Pits 1-3, Ingerbelle East, Ingerbelle, Virginia and Alabama. Production, to 1994, of 108 Mt of ore yielded 770,000 t Cu and 21.8 t Au. Reserves are 127 million tonnes of 0.38% Cu, 0.16 g/t Au and 0.63 g/t Ag. Resources of 200 Mt at 0.4% Cu equivalent, are estimated. Deposit age interpreted as Early Jurassic.

Fahrni and others, 1976; B.C. Minfile, 1990; McMillan, 1991; P. Holbeck, Cordilleran Roundup, written commun., 1995.

M10-32 49°22'N 120°02'W	Hedley Camp (Nickel Plate, Mascot, etc) Guichon	Au, Ag Cu, Co, Zn Au skarn	Medium. Reserves of 5.07 million tonnes grading 3.0 g/t Au, 2.5 g/t Ag, 0.1% Cu.

Consists of pyrrhotite, arsenopyrite, pyrite, chalcopyrite and sphalerite with trace galena, native Bi, native Au, electrum, tetrahedrite, native Cu, molybdenite and cobaltite. Hosted in calc-silicate skarn associated with contact metamorphism of limestone of the eastern sedimentary facies of the Upper Triassic Nicola Group adjacent to the Early Jurassic Hedley diorite and gabbro intrusives. Production (1904-1991) from 8.43 Mt ore was 62.68 t Au and 14.74 t Ag from Nickel Plate, Mascot, French, Goodhope and Canty. Deposit age interpreted as Early Jurassic.

B.C. Minfile, 1990; Ray and Webster, 1991; Ettlinger and others, 1992; Ray and others, 1993; Ray and Dawson, 1994.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M10-33 48°52'N 123°47'W	Mt.Sicker Area (Lenora-Tyee, Twin J, Lara, Mount Sicker	Cu, Zn, Ag Au, Pb, Ba Kuroko Zn-Pb-Cu massive sulfide	Medium. Production and reserves of 33.5 million tonnes grading 0.78% Cu, 20.23 g/t Ag, 1.25 g/t Au.

Consists of massive pyrite, chalcopyrite, sphalerite, galena with barite hosted in felsic volcanic tuffs of the McLaughlin Ridge Formation (Sicker Group). Reserves and production for the Lenora-Tyee-Twin J deposit are 594,852 tonnes grading 2.46% Cu, 3.85% Zn, 0.37% Pb, 117.0 g/t Ag and 2.5 g/t Au. Reserves for the Lara deposit are 529,000 tonnes grading 1.01% Cu, 5.87% Zn, 1.22% Pb, 100.1 g/t Ag and 4.73 g/t Au. Reserves for the Copper Canyon deposit are 32.4 million tonnes grading 0.75% Cu, 8.57 g/t Ag and 1.17 g/t Au. Deposit age interpreted as Late Devonian.

EMR Canada, 1989; B.C. Minfile, 1990; Dawson and others, 1991; Hoy, 1991.

M10-34 48°27'N 124°02'W	Jordan River (Sunro) Unassigned	Cu, Ag, Au Mo Gabbroic Cu	Medium. Production and reserves of 2.8 million tonnes grading 1.24% Cu, 1.7g/t Ag, .67g/t Au.

Consists of chalcopyrite, pyrrhotite, pyrite and minor molybdenite with trace pentlandite, native copper and cubanite. Deposit hosted in shear zones within Eocene Metchosin Volcanics associated with and adjacent to gabbro dikes. Minor ore minerals also occur in the gabbro dikes. Production between 1962 and 1974 was 1,329,034 tonnes with processing of 2,262,651 g of Ag, 899,273 g of Au and 13,754,271 kg of copper. Reserves of 1.47 million tonnes grading 1.43% Cu. Deposit age interpreted as Eocene.

Stevenson, 1950; B.C. Minfile, 1983, 1990.

M10-35 49°57'N 124°21'W	Hi-Mars (Lewis Lake) Gambier	Cu, Mo Porphyry Cu-Mo	Medium. Estimated 82 million tonnes grading 0.3% Cu, minor Mo.

Consists of chalcopyrite and molybdenite that occur as disseminations and fracture fillings in granodiorite of the Coast Plutonic Complex. Companion silicificic and potassic alteration. Deposit age interpreted as Late Cretaceous.

BCDM GEM 1972, p.272; George Cross Newsletter no. 49, March 10, 1978.

M11-01 51°47'N 118°57'W	Ruddock Creek Monashee	Zn, Pb, Ag F, Ba Sedimentary exhalative Zn-Pb	Medium. Reserves of approximately 5.0 million tonnes grading 7.5% Zn, 2.5% Pb.

Consists of three mineralized zones with banded sphalerite, pyrrhotite, galena, pyrite and minor chalcopyrite and local barite and fluorite occur as discontinuous folded lenses and layers over a strike length of several kilometers. Hosted in schist, calc-silicate gneiss, quartzite and marble of Late Proterozoic age. Deposit age interpreted as Late Proterozoic.

Hoy, 1982a; B.C. Minfile, 1986; Dawson and others, 1991.

M11-02 51°34'N 119°54'W	Rexspar (Birch Island) Kootenay-Shuswap	U, F, Sr, REE, Th Felsic plutonic U-REE	Medium. Reserves of 1.1 million tonnes grading 1.55% U_3O_8 , 30% CaF.

Consists of three zones of uranium-thorium-fluorite and one zone of fluorite. Zones occur in an alkalic volcanic succession of probable Late Paleozoic age. Mineralization probably syngenetic with the host rocks and derived from deuteric, volatile-rich fluids associated with the later stages of alkalic plutonic-volcanic igneous activity. Commercial grades of uranium mineralization are associated with fluorphlogopite-pyrite replacement of trachytic alkali-feldspar porphyry. Fluorite reserves of 1.36 million tonnes of 30% CaF. Deposit age interpreted as Mississippian.

Northern Miner, September 6, 1977; Preto, 1978; B.C. Minfile, 1985; R.T. Bell, written commun., 1992; Mining Review, 1992.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-03 51°31'N 119°49'W	Harper Creek Kootenay-Shuswap	Cu, Ag, Au Mo,Pb,Zn Cyprus massive sulfide	Medium. Reserves of 96 million tonnes grading 0.41%Cu, 2.5g/t Ag, 0.04g/t Au, 0.016% Mo.
Consists of disseminated pyrite, pyrrhotite and chalcopyrite with minor molybdenite, galena, sphalerite, and tetrahedrite that occur in tabular zones. Hosted in mafic metavolcanics and quartz-sericite phyllites of the Devonian Eagle Bay Formation. Deposit is stratabound at a regional scale. Locally, mineralization crosses bedding and schistosity. Skarn origin suggested (Schiarizza and Preto, 1987) with a relation to Devonian intrusive rocks, now metamorphosed to orthogneiss. Deposit consists of two parts: (1) the East Zone with reserves of 42.5 million tonnes grading 0.39% Cu, 2.4 g/t Ag, and 0.044 g/t Au; and (2) the West Zone with reserves of 53.5 million tonnes grading 0.42% Cu, 2.6 g/t Ag and 0.047 g/t Au. Deposit age interpreted as Devonian(?).			
B.C. Minfile, 1987, 1989; Preto and Schiarizza, 1985; Schiarizza and Preto, 1987; Mining Review, 1992.			
M11-04 51°27'N 118°49'W	Cottonbelt Monashee	Pb, Zn, Ag Cu, Mo Sedimentary exhalative Pb-Zn	Medium. Reserves of 725,760 tonnes grading 6% Pb, 5% Zn, 60 g/t Ag.
Consists of coarse grained sphalerite, magnetite, galena and minor pyrrhotite and molybdenite in a dark green calc-silicate assemblage of garnet, diopside, calcite, dolomite and quartz that occur parallel to bedding. Hosted in calcareous metasedimentary rocks in layers up to 2 m thick and occurs intermittently over a strike length of 5 km. Deposit age interpreted as Late Proterozoic.			
Hoy, 1982a; B.C. Minfile, 1987; MacIntyre, 1991.			
M11-05 51°38'N 118°26'W	Goldstream (Pat) Kootenay-Shuswap	Cu, Zn, Ag Besshi massive sulfice	Medium. Reserves of 3.2 million tonnes grading 4.5% Cu, 3.1% Zn, 20 g/t Ag.
Consists of massive pyrrhotite, chalcopyrite and sphalerite often exhibiting gneissic texture with sub-rounded quartz, phyllite and carbonate inclusions. Deposit occurs as a thin, conformable sheet (400 x 1500 x 1-3m thick) and as several other horizons in sericite qquartzite and calcareous and chloritic phyllite in the lower Index Formation of the Cambrian Lardeau Group. Host metavolcanic-phyllite unit consists of mafic tholeiitic volcanic rocks, massive greenstone, chloritic phyllite, ultramafic pods and dark calcareous to pelitic schist. 427,886 tonnes of ore were mined in 1983 and 1984 averaging 8.9 g/t Au, 4.43% Cu and 0.12% Zn. Production restarted in 1992. Reserves at the start of 1994 were 1 million tonnes grading 4.3% Cu, 2.9 % Zn, and 12 g/t Ag. Deposit age interpreted as Cambrian.			
Hoy, 1979, 1991; B.C. Minfile, 1987.			
M11-06 51°09'N 119°49'W	Rea Gold (Hilton) Kootenay-Shuswap	Ag, Pb, Zn, Au, Cu Kuroko Zn-Pb-Cu massive sulfide	Medium. Reserves of 376,385 tonnes grading 76 g/t Ag, 2.2% Pb, 2.3% Zn, 6.1g/t Au, 0.5% Cu.
Consists of two massive sulfide (pyrite, arsenopyrite, sphalerite, galena, chalcopyrite, and tetrahedrite) and barite lenses. Hosted in a succession of Upper Devonian to Lower Carboniferous mafic to intermediate volcanic and volcaniclastic rocks with minor associated chert and phyllite (Eagle Bay Formation). Gold occurs in the massive sulfides and in barite and in informally-named "footwall" stockwork zone. Deposit age interpreted as Devonian and Carboniferous.			
Hoy and Goutier, 1986; B.C. Minfile, 1987; Hoy, 1991.			
M11-07 51°07'N 119°50'W	Homestake (Squaam Bay) Kootenay-Shuswap	Ag, Pb, Zn, Au, Cu, Ba Kuroko Zn-Pb-Cu massive sulfide	Medium. Reserves of 919,420 tonnes grading 248 g/t Ag, 2.5% Pb, 4% Zn, 0.55% Cu.
Consists of two tabular sulfide-barite horizons that occur in intensely quartz-sericite-pyrite altered sericite schist derived from felsic (tuffaceous units of andesite, dacite and rhyolite) of the Devonian Eagle Bay Formation. Sulfides include tetrahedrite, galena, sphalerite, pyrite and chalcopyrite. Deposit overlain by intermediate to felsic volcanics of Eagle Bay Formation. Rea Gold volcanogenic deposit occurs in same unit about 4 km to northwest. Reserves include 275,500 tonnes grading 36.7% Ba. Deposit age interpreted as Late Devonian.			
Hoy and Goutier, 1986; B.C. Minfile, 1989; Dawson and others, 1991; Hoy, 1991.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-08 51°08'N 118°28'W	Mount Copeland Monashee	Mo Pb, Zn, Cu Porphyry Mo	Medium. Reserves of 180,000 tonnes grading 1.82% MoS_2 and production of 171,145 tonnes grading 0.75% MoS_2.

Consists of molybdenite, pyrite, pyrrhotite, bornite, chalcopyrite and galena that occur along the northern boundary of a large mass of nepheline syenite gneiss flanking the southern boundary of the Frenchman's Cap Dome, one of several gneissic domes flanking the eastern margin of the Shuswap Metamorphic Complex. Deposit hosted in irregular lenses of aplite and pegmatitic syenite. U-Pb zircon isotopic age of 773 Ma. Deposit age interpreted as Late Proterozoic.

McMillan, 1973; Okulitch and others, 1981; B.C. Minfile, 1986.

M11-09 51°08'N 118°25'W	River Jordan (King Fissure) Monashee	Pb, Zn, Ag Sedimentary exhalative Zn-Pb	Medium. Reserves of 2.6 million tonnes grading 5.1% Pb, 5.6% Zn, 35 g/t Ag.

Consists of stratabound layers and lenses (1 to 6-m thick) of fine grained sphalerite and pyrrhotite with eye-shaped lenses of watery grey quartz and scattered grains of pyrite and galena. Deposit hosted in Late Proterozoic, amphibolite-grade calc-silicate gneiss, quartzite and marble of the Monashee metamorphic complex. Deposit age interpreted as Late Proterozoic.

Hoy, 1982a; B.C. Minfile, 1985; MacIntyre, 1991.

M11-10 51°15'N 118°07'W	Mastadon (J&L) Kootenay	Zn, Pb, Au, Ag Sedimentary exhalative Pb-Zn (?)	Medium. Production and reserves of 12.27 million tonnes grading 4.9% Zn, 2.3% Pb, 62 g/t Ag, 7.83 g/t Au.

Consists of pyrite, arsenopyrite, sphalerite, galena and sulfosalts that occur in bands, lenses and stringers from 0.1 to 12 meters wide. Hanging wall part of deposit consists of disseminated sphalerite, galena and pyrite; footwall part of deposit consists of massive arsenopyrite, sphalerite and pyrite. Ore minerals are concentrated along the contact between phyllite and limestone. Gold is refractory and associated with arsenopyrite. Deposit hosted in Lower Cambrian Hamill Formation quartzite and Badshot Formation limestones with limestone forming the footwall for deposit. Deposit origin is poorly understood. Deposit age interpreted as Early Cambrian.

Cordilleran Geology and Exploration Roundup, 1990; Mining Review, 1992.

M11-11 51°25'N 116°26'W	Monarch (Kicking Horse) Cathedral	Zn, Pb, Ag Southeast Missouri Pb-Zn	Medium. Production and reserves of 820,000 tonnes grading 5.63% Pb, 8.85% Zn, 31 g/t Ag.

Consists of argentiferous galena, sphalerite and pyrite that occur in vertical,north-south-striking fissures along the east limb of an anticline. Hosted in partially brecciated and dolomitized limestone of Middle Cambrian Cathedral Formation. Mineralization extends along a strike length of over 1370 meters. Deposit age interpreted as Middle Cambrian.

Hedley, 1950; Hoy, 1982a; B.C. Minfile, 1985.

M11-12 51°01'N 116°39'W	Parson Southern Rocky Mountain	Ba Ba vein	Medium. Production of 75,000 tonnes (1957 to 1988). Grade not available.

Consists of barite that occurs in two parallel fissure veins approximately 100 meters apart. Deposit occurs in quartzite underlain by shale and dolomite of the Lower Cambrian St. Piran and Lake Louise Formations. Veins are exposed over a strike length of over 60 meters and have a maximum thickness of 10 meters. Deposit was initially mined in an open pit, but has been developed underground since 1957. Deposit age interpreted as Early Cambrian.

B.C. Minfile, 1985, 1991; Leitch, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-13 50°38'N 117°36'W	Trout Lake Bayonne	Mo W, Cu, Pb, Zn Porphyry Mo	Medium. Reserves of 50 million tonnes grading 0.23% MoS_2.

Consists of molybdenite and pyrite in quartz veins; in addition, pyrrhotite, scheelite, chalcopyrite and quartz and lesser galena, sphalerite and tetrahedrite occur in peripheral skarns. Deposit hosted mainly in limestone, schist and quartzite of the Lower Paleozoic Lardeau Group. Minor part of deposit occurs as disseminations in altered granodiorite that is interpreted as equivalent to Jurassic to Cretaceous Kuskanax Batholith located nearby to the west and southwest. Deposit interpreted as Jurassic to Cretaceous.

Boyle and Leitch, 1982; B.C. Minfile, 1985.

M11-14 50°50'N 116°20'W	Brisco Area Southern Rocky Mountain	Ba, Mg Ba vein and breccia	Medium. Production of 140,323 (1947-73) grading 98.25% BaSO4.

Consists of barite that occurs as a north-striking breccia zone in dolomite of the Lower Paleozoic Beaverfoot-Brisco Formation. Deposit occurs on the east limb of a northwest-trending syncline cut by numerous faults of varying size. Barite also occurs locally in the Proterozoic Mount Nelson Formation as narrow veins. Deposit age interpreted as Ordovician.

British Columbia Ministry of Mines, Annual Report, 1964; Reesor, 1973; B.C. Minfile, 1985.

M11-15 50°29'N 118°03'W	Big Ledge (Pingston Creek) Monashee	Zn, Pb Sedimentary exhalative Zn-Pb	Medium. Reserves of 6.5 million tonnes grading 4% Zn.

Consists of sphalerite, pyrrhotite galena and pyrite in lenses. Hosted in a dark, pyrrhotite and pyrite-rich, graphitic, calcareous schist that occurs along strike for approximately 10 km. Schist part of paragneiss that is interpreted to be the amphibolite-grade metamorphic equivalent of the Late Proterozoic Windermere Group. Deposit age interpreted as Late Proterozoic.

Hoy, 1982a; B.C. Minfile, 1985.

M11-16 50°47'N 115°41'W	Mount Brussilof (Baymag) Southern Rocky Mountain	Magnesite Stratabound Mg	Large. Reserves of 40.7 million tonnes grading 92.4% to 95% MgO.

Consists of magnesite replacements of Middle Cambrian carbonate rocks of the Cathedral Formation. Replacements form an irregular lens approximately 790 x 500 x 120 m. Deposit age interpreted as Middle Cambrian.

Grant, 1987; B.C. Minfile, 1991; Simandl and Hancock, 1991.

M11-17 50°22'N 116°57'W	Duncan Lake Area Kootenay	Pb, Zn Sedimentary exhalative Zn-Pb	Medium. Reserves of 2.76 million tonnes grading 3.3% Pb, 3.1% Zn.

Consists of galena, sphalerite and pyrite with minor pyrrhotite that occur in at least eight zones as bands, lenses and veins located preferentially in hinges of folds. Hosted in dolomites of the Lower Cambrian Badshot Formation. Reserves are for the Duncan #6 ore zone. Deposit age interpreted as Early Cambrian.

Hoy, 1982a; B.C. Minfile, 1985.

M11-18 50°29'N 115°52'W	Windermere Creek (Western Gypsum) Southern Rocky Mountain	Gypsum Strataform gypsum	Medium. Production and reserves of 10.8 million tonnes grading 83-93% $CaSO_4$.

Consists of gypsum and anhydrite that occur along the basal contact of the Devonian Burnais Formation composed of carbonate rocks. Production of 6.8 million tonnes are for four open-pit operations, the Windermere 1 to 4 pits, between 1947 and 1991. Reserves of 4 million tonnes grading 80% CaSO4 are quoted for the Elkhorn zone that occurs about 400 meters south of the Windermere zone. Deposit age interpreted as Devonian.

B.C. Minfile, 1986, 1991; BCGS, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-19 50°34'N 115°16'W	Kootenay River Gypsum Southern Rocky Mountain	Gypsum Strataform gypsum	Medium. Size not available. Grades of more than 80% $BaSO_4$.

Consists of gypsum that occurs along the basal contact of the Devonian Bernais Formation composed of carbonate rocks. Deposit age interpreted as Devonian.

B.C. Minfile, 1991.

M11-20 50°03'N 117°43'W	Millie Mack Nelson	Au, Ag Pb, Zn Au-Ag polymetallic vein	Medium. Reserves of 18.1 million tonnes grading 2.06 g/t Au, 68.6 g/t Ag.

Consists of galena, tetrahedrite and sphalerite with minor arsenopyrite and native gold that occur in broken quartz veins hosted in graphitic slate and andesite of the Lower Jurassic Slocan Group of the Quesnellia terrane. Porphyritic intrusive rocks occur nearby. Deposit age interpreted as Eocene.

Western Miner, no. 11, p. 38, 1964; B.C. Minfile, 1985; Mining Review, 1990.

M11-21 49°56'N 117°18'W	Silverton District (Sandon, Silver Ridge) Nelson	Ag, Pb, Zn Cd Ag polymetallic vein	Medium. Produced approximately 3.5 million tonnes grading 500 g/t Ag, 6% Pb (approximately).

Consists mainly of sphalerite and galena disseminations and rare masses that occur in quartz veins within quartzites and argillites north of the contact of the Jurassic Nelson Batholith, and also within granitic rocks of the batholith south of the contact. Recent isotopic studies suggests an Eocene age for mineralized quartz veins in the district (Beaudoin and others, 1992). District includes numerous small operations, including those in and around Sandon and Silverton. District produced more than 1,800 tonnes of Ag between the 1890's and present. Deposit age interpreted as Eocene(?).

Goldsmith and Sinclair, 1983; B.C. Minfile, 1985; Beaudoin and others, 1992.

M11-22 49°43'N 116°55'W	Ainsworth District Nelson	Zn, Pb, Ag Ag polymetallic vein	Medium. Produced 698,751 tonnes grading 7.9% Pb, 253.2 g/t Ag.

Consists of sphalerite and galena with lesser tetrahedrite that occur in quartz veins hosted by metasedimentary rocks of the Milford (Carboniferous), Kaslo (Triassic) and Slocan (Jurassic) Groups. Recent isotopic studies suggest an Eocene age for quartz vein mineralization in the Ainsworth and Slocan areas (Kootenay Range). Coordinates are based on one of 75 occurrences listed for the Ainsworth camp. Deposit age interpreted as Eocene(?).

Goldsmith and Sinclair, 1983; B.C. Minfile, 1985; Beaudoin and others, 1992.

M11-23 49°46'N 116°52'W	Riondel (Blue Bell) Nelson	Zn, Pb, Ag Cu, Cd, Au Zn-Pb-Ag skarn and manto	Medium. Produced 4.82 million tonnes and reserves of 0.35 million tonnes grading 6.3% Zn, 5.2% Pb, 45 g/t Ag.

Consists of sphalerite, galena, pyrrhotite, pyrite, arsenopyrite, chalcopyrite and knebelite that occur in replacement bodies and in veins controlled by bedding, fractures and open anticlinal culminations. Hosted in limestone of the Paleozoic Lardeau Series near Mesozoic intrusive rocks of the Fry Creek Batholith. Recently published isotopic studies suggests an Eocene age for mineralization in the district which includes the Riondel deposit. Deposit age interpreted as Eocene(?).

B.C. Minfile, 1985, 1988; Hoy, 1980, 1982a; Nelson, 1991; Beaudoin and others, 1992.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-24 50°20'N 116°25'W	Mineral King Bayonne	Zn, Pb, Ag Cu, Cd, Ba Zn-Pb skarn and manto	Medium. Produced 2.1 million tonnes grading 4.12% Zn, 1.70% Pb, 24.8 g/t Ag.

Consists of sphalerite, galena and pyrite with bournonite (PbCuSbS3) and rare meneghinite that occur in steeply dipping pipes or along steeply dipping shears associated with a synclinal wedge between two faults. Hosted in Middle Proterozoic Mount Nelson Formation composed of dolomite and dolomitic quartzite. Deposit mined between 1928 and 1974. Current reserves of 72,576 tonnes grading 34.3 g/t Ag, 2.5% Pb and 4.5% Zn. Deposit age interpreted as mid-Cretaceous.

Fyles, 1960; Hoy, 1982a; B.C. Minfile, 1985, 1991; Dawson and others, 1991.

M11-25 50°03'N 115°31'W	Lussier River (United Gypsum) Southern Rocky Mountain	Gypsum Strataform gypsum	Medium. Estimated 7 milion tonnes grading 100% gypsum.

Consists of gypsum that occurs as evaporite beds underlying carbonate rocks of the Devonian Burnais Formation. Minor sulphur occurs locally. Selenite occurs in fractures and faults. Deposit age interpreted as Devonian.

B.C. Minfile, 1991.

M11-26 49°38'N 118°55'W	Lassie Lake Area (Blizzard) Nelson	U Paleoplacer U	Medium. Reserves of 2.1 million tonnes (containing 4000 tonnes U) grading 0.227% U_3O_8.

Consists of autunite and saleeite that occur in paleostream channels in Paleogene continental sedimentary rocks or basins that overly quartz monzonite of Cretaceous Valhalla Pluton. Uranium minerals occur in oxidized facies of coarse-grained fluvial sedimentary rocks and in disseminated organic material in reduced, fine-grained sedimentary rocks. Deposit age interpreted as Eocene.

Sawyer and others, 1981; B.C. Minfile, 1985.

M11-27 49°31'N 119°10'W	Carmi Moly Nelson	Mo, Cu U, F Porphyry Mo	Medium. Reserves of 44.5 million tonnes grading 0.13% Mo.

Consists of molybdenite and chalcopyrite that are disseminated in brecciated Lower Jurassic granodiorite that has been intruded by Eocene quartz monzonite porphyry (with a 50 Ma isotopic age) that also contains part of deposit. Deposit occurs within a 2-km diameter annular-shaped pyritic zone. Deposit age interpreted as Eocene.

B.C. Minfile, 1985; Dawson and others, 1991.

M11-28 49°26'N 119°03'W	Highland Bell (Beaverdell) Nelson	Ag, Pb, Zn Au, Cu, Cd Ag polymetallic vein	Medium. Produced 941,644 tonnes (1901-1992), grading 1060 g/t Ag, 1.14% Pb, 1.37% Zn.

Consists of sphalerite, pyrite, galena, arsenopyrite, chalcopyrite and minor pyrargarite in quartz-calcite veins that occur along a northeast-trending, 3 km by 800 meter belt on the west slope of Mt. Wallace. Majority of production (1,166 tonnes of Ag) from a Upper and Lower Lass vein system that occurs in granodiorite of the Jurassic West Kettle Batholith and adjacent turbidite rocks and pyroclastics of the Permian Wallace Formation. Heat source for the mineralized veins interpreted as quartz monzonite of the Eocene Beaverdell Stock with a 50 Ma isotopic age. Deposit age interpreted as Eocene.

Watson and others, 1982; B.C. Minfile, 1985, 1989.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-29 49°43'N 116°00'W	Sullivan (Kimberley) Purcell	Pb, Zn, Ag Cd, Sn Southeast Missouri Pb-Zn	Large (world class). Production and reserves of 162 million tonnes grading 6.6% Pb, 5.7% Zn, 68 g/t Ag.

Consists of a laminated sulfide assemblage of galena, sphalerite and pyrite that has undergone metamorphic recrystallization and tectonically induced mechanical and chemical remobilization. Deposit located near a north-trending rift axis at an intersection with the east-west-trending, proto-Kimberley fault. Sulfide deposition initially predated the Mine Sill, and was accompanied by extensive boron (tourmaline) alteration of marine sedimentary origin. Ongoing hydrothermal activity from marine brines generated successive chlorite-pyrrhotite-muscovite and albite-chlorite-pyrite-sericite-calcite assemblages in ore zone and hanging wall and footwall, all coincident with gabbro dikes and sills. Deposit hosted conformably within folded Middle Proterozoic turbidites of the Lower Aldridge formation of the Purcell Supergroup. Turbidites fill an intracontinental extensional rift marine basin and are intercalated with tholeiitic Moyie Sills 1467+3 Ma (zircon U/Pb) old. Deposit age interpreted as Middle Proterozoic.

Leitch and Turner, 1991, 1992; J. Lydon and Sullivan Team, Cordilleran Geology and Exploration Roundup, Vancouver, p. 6-7, 1995.

M11-30 49°36'N 115°58'W	Marysville Southern Rocky Mountain	Magnesite Strataform magnesite	Large (estimated). Tonnage not available. Grade of 40 to 45% MgO.

Consists of conformable, interbedded magnesite that is hosted within quartzites of the upper 100 m of the Lower Cambrian Cranbrook Formation Thickest bed ranges up to approximately 15 meters thick, exposed over strike length of 5.5 km. Deposit age interpreted as Early Cambrian.

B.C. Minfile, 1986, 1991; Grant, 1987.

M11-31 49°05'N 118°36'W	Phoenix-Greenwood District Bayonne	Cu, Au, Ag, Fe Cu-Au skarn	Medium. Production and reserves of 34.0 Mt grading 0.8% Cu, 1.1 g/t Au, 15 g/t Ag.

Consists of chalcopyrite, pyrite, pyrrhotite, magnetite plus minor sphalerite and galena that occur in a garnet-rich calc-silicate skarn assemblage of andradite, clinozoisite, diopside and quartz. Skarn hosted by Triassic carbonate, clastic, and volcanic rocks of Quesnellia terrane in proximity to contacts with Middle Jurassic and mid-Cretaceous granitoid intrusive rocks. Production figures are for 1893 to 1985, and include 270,000 tonnes Cu, 36 tonnes Au, and 117 tonnes Ag. Deposit age interpreted as Middle Jurassic to Early Cretaceous.

B.C. Minfile, 1985; Church, 1986; Schroeter and Lane, 1991.

M11-32 49°01'N 118°10'W	Castle Mountain (Mastadon, Mabel) Unassigned	Ni, Cr Podiform Cr-Ni	Large. Inferred resource of 354.7 million tonnes grading 0.24% Ni.

Consists of lenses and disseminations of chromite in an intensely serpentinized Cretaceous dunite dike that intrudes andesite and latite of the Early Jurassic Rossland Group. Deposit occurs about 400 meters from the intrusive contact with gneissic biotite granite of the Nelson Batholith. A large body of low-grade nickel mineralization occurs at some depth below the surface within serpentinized rock. Ni minerals include nickeliferous magnetite, fine grained millerite and pentlandite. Deposit age interpreted as Cretaceous.

BCGS, 1979; B.C. Minfile, 1983.

M11-33 49°05'N 117°50'W	Red Mountain Moly (Coxey, Novelty, Nevada) Bayonne	Mo Au, Cu, W, Bi, Ag Mo skarn	Medium. Production and reserves of 1.31 million tonnes grading 0.20% MoS_2.

Consists of molybdenite, pyrrhotite, chalcopyrite, arsenopyrite, scheelite, pyrite, magnetite, bismuthinite, galena and sphalerite that occur in veins, disseminations and shears within skarn and contact-metamorphosed siltstone and breccia of the Pennsylvanian to Permian Mount Roberts Formation adjacent to contacts with Jurassic Trail Pluton. Pyroxene-epidote-biotite skarn with minor garnet hosts a coarse-grained assemblage of molybdenite, lesser pyrite and sporadic scheelite adjacent to porphyritic quartz diorite sills and dikes related to the Trail Pluton. Reserves in 1985 were 245,000 tonnes grading 0.22% Mo. Deposit age interpreted as Jurassic.

B.C. Minfile, 1991; Ray and Webster, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-34 49°05'N 117°49'W	Rossland (Le Roi, War Eagle) Rossland	Au, Ag Cu Au-Ag polymetallic vein	Medium. Produced 7.62 million tonnes grading 15.2 g/t Au, 19 g/t Ag.

Summary and References

Gold deposits are divided into three types, North belt, Main veins and South belt. Most production (>80%) from the Rossland Camp was from the Le Roi, Center Star, Nickel Plate, War Eagle and Josie ore bodies that occur in the central portion of the Rossland Camp in the Main vein system (98% of Rossland Camp production). Main vein consists of pyrrhotite and chalcopyrite in a gangue of quartz and calcite, 1% Cu (avg) in ore. Main vein system consists of a series of en echelon veins that dip steeply north and strike of 070° between two large north-trending lamprophyre dikes. Structural control of veins is inferred by growth faults that were active during deposition of Rossland Group. Total production from Rossland Camp between 1894 and 1941 was 84 tonnes of gold and 105 tonnes of silver. Deposits of the Rossland Camp are hosted preferentially in mafic volcanics of the Elise Formation of the Early Jurassic Rossland Group. Deposit age interpreted as Jurassic.

Dawson and others, 1991; B.C. Minfile, 1991; Schroeter and Lane, 1991; Hoy and Dunne, 1992.

M11-35 49°18'N 117°11'W	Ymir-Erie Creek (Yankee Girl) Rossland	Au, Ag Pb, Zn Au-Ag polymetallic vein	Medium. Produced 713,461 tonnes grading 12.4 g/t Au, 62.12 g/t Ag.

Consists of pyrite, galena, sphalerite and native gold, in a gangue of quartz, calcite and siderite. Deposits occur along northeast-trending, northwest-dipping shear zones in folded metasedimentary rocks of the Triassic Ymir and lower Jurassic Rossland Groups. Deposits occur near contacts with Jurassic Nelson intrusive rocks. Deposit age interpreted as Jurassic.

Hoy and Andrew, 1988; Little, 1960; B.C. Minfile, 1991; Schroeter and Lane, 1991.

M11-36 49°09'N 117°12'W	H.B. (Zincton) Kootenay	Zn, Pb, Ag Cd, Au Sedimentary exhalative Pb-Zn	Medium. Produced 6.7 milion tonnes grading 3.91% Zn, 0.74% Pb, 4.42 g/t Ag.

Consists of pyrite and sphalerite that occur in narrow bands, irregular lenses or disseminations in dolomite of the Lower Cambrian Reeves Formation. Local cross-zones contain fine-grained massive sulfides that commonly occur as matrix in a coarse breccia. Breccia zones are related to thrust faults and are interpreted as secondary structures. Much of the dolomite in the West orebody is altered to talc. Deposit age interpreted as Early Cambrian.

Fyles, 1970; Sangster, 1986; B.C. Minfile, 1991; MacIntyre, 1991; Hoy, 1982b.

M11-37 49°08'N 117°08'W	Sheep Creek Area (Kootenay Belle, etc.) Rossland	Au, Ag, Pb, Zn Cu, W Au-Ag polymetallic vein	Medium. Production and reserves of 1.8 million tonnes grading 15 g/t Au, 6 g/t Ag (approximately).

Consists of pyrite, sphalerite, galena, chalcopyrite and galena that occur in quartz veins within quartzite, argillite, and argillaceous quartzite of the Nevada and Nugget members of the Quartzite Range Formation. Veins controlled by northeast-trending faults that are particularly productive where they cross the axes of two north-trending anticlines. Deposit age interpreted as Jurassic(?).

B.C. Minfile, 1991; Panteleyev, 1991; Schroeter and Lane, 1991.

M11-38 49°06'N 117°14'W	Emerald-Invincible Bayonne	W. Mo W skarn	Medium. Produced 1.4 million tonnes grading 1.3% WO_3.

Consists of scheelite, wolframite, molybdenite, pyrrhotite, pyrite and chalcopyrite that generally occur as disseminations, but locally occur as massive with pyrite and pyrrhotite. Deposit hosted in Lower Cambrian Laib Formation along the contact of the Reeves Member Limestone with the Emerald Member argillite, as well as along the contact of the limestone with Cretaceous Emerald and Dodger Stocks. Garnet, diopside, tourmaline, powellite, calcite, biotite, K-feldspar, and sericite alteration is predominant; kaolinite, tremolite and silica alteration also reported. Production figures are approximate, but 7,416 tonnes of concentrate from the Emerald Tungsten, Feeney and Dodger workings have been reported and grade 0.5% to 1.5%. Deposit age is mid-Cretaceous.

Mulligan, 1984; B.C. Minfile, 1991; Ray and Webster, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M11-39 49°06'N 117°13'W	Jersey Kootenay	Zn, Pb, Ag Cd Sedimentary exhalative Pb-Zn	Medium. Produced 7.7 million tonnes grading 3.49% Zn, 1.65% Pb, 3.08 g/t Ag.

Summary and References

Consists of fine grained sphalerite and galena with pyrite, pyrrhotite and minor arsenopyrite in five ore bands ranging from 0.30 to 9 meters thick. Sulfides occur more abundantly in fold troughs relative to fold crests. Cadmium is associated with sphalerite, silver with galena. Classified as carbonate-hosted sedimentary exhalative deposits of Kootenay Arc type that are hosted within the folded Reeves Member dolomites of the Lower Cambrian Laib Formation. Alternate skarn genesis of some deposits is proposed. Deposit age interpreted as Early Cambrian.

Fyles, 1970; Hoy, 1982a; Sangster, 1986; MacIntyre, 1991; Dawson, 1995.

M11-40 49°02'N 117°21'W	Reeves-MacDonald (Reemac) Kootenay	Zn, Pb, Ag Cd, Cu, Ga, Ge Southeast Missouri Pb-Zn	Medium. Produced 5.9 million tonnes grading 3.48% Zn, 1.38% Pb, 3.39 g/t Ag.

Consists of banded honey-colored sphalerite, pyrite and galena, and locally contorted and brecciated, that occur as stratabound massive sulfides on limb of an anticlinal fold in dolomitized limestone of the Lower Cambrian Laib Formation. Past producer from 1912 to 1978. Reserves in 1978 of 36,287 tonnes grading 0.1% Pb. Deposit age interpreted as Early Cambrian.

Fyles and Hewlett, 1959; Hoy, 1982b; Sangster, 1986; B.C. Minfile, 1991;

M11-41 49°17'N 115°50'W	Moyie (St. Eugene) Purcell	Pb, Ag Zn, Au Ag polymetallic vein	Medium. Produced 1.5 million tonnes grading 7.74% Pb. Reserves grading 125.1 g/t Ag, 0.05 g/t Au, 1% Zn.

Consists of galena, sphalerite, pyrite, pyrrhotite and magnetite in quartz veins that are hosted by turbidites of the Middle Proterozoic Middle Aldridge Formation. Sulfides occur along an east-west striking fracture zone that dips 70 degrees south. Fracture zone crosses axial plane of a large, regional-scale, northeast-plunging anticline. Production occurred between 1899 and 1929. Deposit age interpereted as Middle Proterozoic.

Mathews, 1944; B.C. Minfile, 1983, 1986; Schroeter and Lane, 1991.

M11-42 49°24'N 115°49'W	Vine Purcell	Pb, Zn, Ag, Au Ag-Au polymetallic vein	Medium. Reserves of 1.37 million tonnes grading 4.65% Pb, 2.39% Zn, 50 g/t Ag, 1.8 g/t Au.

Consists of a steeply dipping, pyrrhotite-rich polymetallic Ag-Au vein that occurs along a fault in siltstone and wacke of the lower and middle Aldridge formation. Vein is mineralized over at least 1 km of strike and to a depth of 800 m. A Moyie gabbro dike closely follows the fault-vein structure. Deposit minerals are pyrrhotite, sphalerite and galena that are intergrown in a quartz-calcite gangue. Alteration minerals that occur in and adjacent to the vein are sericite, calcite, chlorite, quartz and minor albite. Vein and gabbro dike occupy the same stratigraphic interval as the nearby Sullivan deposit. Deposit age itnerpreted as Middle Proterozoic.

Hoy and Pighin, 1995.

M52-01 48°59'N 131°15'E	Khingan Khingan	Sn Sn greisen	Medium. Average content of 0.6-0.7% Sn. Mined since 1960's.

Deposit consists of over 15 ore zones that range from 10 to 50 m across and 100 to 400 to 500 m depth that occur in an symmetrical breccia zone about 250-300 m across. Breccia zone is traced to depths of over 1200 m. At the upper levels of the deposit, the breccia is replaced by chlorite, and at depths of 700 to 800 m, the breccia is replaced by quartz-muscovite (sericite)-topaz greisen. Ore assemblage is quartz-fluorite-cassiterite. Arsenopyrite, marcasite, loellingite, chalcopyrite, and bismuth minerals are subordinate. Deposit is of hypabyssal origin and occurs in a pipe-shaped ore bodies of hydrothermal explosion breccia that cut a sequence of felsic volcanic rocks. The deposit is interpreted as related to subalkaline potassium granite with K-Ar isotopic age of 80-90 Ma.

Ognyanov, 1986.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M52-02 49°09'N 131°25'E	Dzhalinda Khingan	Sn In Rhyolite-hosted Sn	Small. Contains up to 30% Sn and up to 0.5% In.

Consists of irregular ore pods that are emplaced in rhyolite that is intensely altered to beresite (quartz, sericite, and pyrite). Deposit is located over a vertical interval of 10 to 20 m, in a volcanic vent and in the immediately adjacent rhyolite cover. Volume of deposit less than 100-150 m^3. Sn occurs in cassiterite (wood tin) and associated with quartz, along with minor pyrite and arsenopyrite. Local dzhalindite that forms intergrowths in wood tin. Deposit is genetically related to the volcanic rocks with K-Ar isotopic ages of 90-95 Ma.

Ognyanov, 1986.

M52-03 48°37'N 131°30'E	Verkhnebidzhanskoe Khingan	Sn Sn quartz vein	Small. Average grade of 0.3-2.0% Sn.

Consists of metasomatic quartz-sulfide lenses that range from 50 to 80 m length along strike, and extend up to 70 m downdip with a maximum thickness of 10 to 12 m. The deposit extends for about 1,300 m. Predominante late-stage ore minerals are mainly sulfosalts (boulangerite, jamesonite). Subordinate, earlier-stage ore-minerals are quartz, cassiterite, and arsenopyrite. Alteration minerals include talc, calcite, siderite, and dolomite. Both the sedimentary and volcanic rocks are extremely rich in Sn (up to 10 clarkes). A Late Cretaceous rhyolite porphyry stock, that contains geochemically anomalous Sn (about 0.005%), is interpreted as the source for the vein Sn that formed during hydrothermal alteration. Deposit hosted in Late Proterozoic dolomite adjacent to a rhyolite porphyry stock, and occurs at a tectonic contact of the dolomite with Late Proterozoic schist.

Ognyanov, 1986.

M52-04 48°39'N 131°53'E	Yuzhno-Khingan South Khingan	Fe Ironstone	Medium

Consists of several stratiform iron deposits that occur in the lower portion of the Early Cambrian Khingan series composed of interbedded cherty, carbonaceous, and micaceous shale, siltstone, dolomite sandstone, limestone, ferruginous quartzite, manganese ore, sedimentary breccia, and conglomerate. Braunite-haussmanite-rhodochrosite ore occurs in beds 2 to 9 m thick in the lower part of the series. Fe- and Mn-bearing beds occur in the middle part of the Khingan series and consists of magnetite, hematite, and magnetite-hematite quartzites that are interlayered with chlorite-dolomite breccia, Quartzites occur in beds from 18 to 26 m thick that are overlain by dolomite that is overlain in turn by shale, limestone, and dolomite. Deposit is of exhalative-sedimentary origin.

V.A. Yarmolyuk and A.P. Glushkov, written commun., 1966.

M53-01 51°30'N 133°55'E	Ippatinskoe Badzhal-Ezop	Sn Sn quartz vein	Small. Average grade of 0.31% Sn and 0.19% WO_3 in 6 largest veins.

Consists of veins and selvages in the northern part of a large granitic body. 65 known veins range in thickness from 2 cm to 2 m, with strike lengths up to 290 m, and are prospected to a depth of 100 m. Veins occur in a north-south-trending zone that is 3,000 m long and up to 300 m wide. Deposit contains minor Cu, Ph, Sb, Pb, and Au. Ore minerals are cassiterite, wolframite, arsenopyrite, along with rare chalcopyrite, pyrite, scheelite, sphalerite, and molybdenite; and very rare bismuthinite and beryl. Gangue minerals are quartz, muscovite, feldspar, fluorite, and rare tourmaline. Deposit is related to fine-grained leucogranite, with K-Ar isotopic age of 75 to 90 Ma.

Ognyanov, 1986.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M53-02 50°26'N 134°15'E	Pravourmiiskoe Badzhal-Ezop	Sn W, Cu Sn greisen	Medium. Average grade of 0.1-5 % Sn, 0.05% WO_3 , and 0.5% Cu.

Consists of disseminations and in veins that occur in a linear area over 1500 m long, 5 to 25 m thick, and extends several hundred m down dip. In addition to Sn, W, and Cu; Bi, Pb, and Sb are present. Earler ore assemblage, of quartz-topaz-cassiterite with fluorite, followed by quartz-arsenopyrite-chalcopyrite, and quartz-tourmaline with cassiterite and stibnite. Gangue composed of quartz-siderophyllite (zwitters) with quartz-topaz greisen. Deposit hosted in Late Cretaceous felsic volcanic rocks that overlie the large, shallow, granite and leucogranite of Verkhneurmiisky batholith. Deposit occurs along an east-west-trending thrust fault with small offset. Deposit is genetically related to Verkhneurmiisky granite and leucogranite complex with K-Ar isotooic ages of 75 to 85 Ma.

Ognyanov, 1986.

M53-03 50°33'N 135°14'E	Loshadinayagriva (Main) Badzhal-Ezop	Sn W Sn quartz vein	Small. Average grade of 0.3 to 1.5% Sn, and up to 0.1% WO_3 .

Consists of quartz-albite-muscovite hydrothermally altered rocks, with ore minerals in both quartz-tourmaline lenses and quartz. Ore assemblages are: (1) cassiterite-quartz with wolframite and arsenopyrite; and (2) quartz-sulfide (galena-sphalerite-chalcopyrite, stannite, and stibnite). Sulfides are very minor. Deposit occurs in steeply-dipping north-south zone along a left-lateral strike-slip fault and associated tensional fractures. Ore zones are 920 m long, vary from 1 to 2 to 10 to 12 m thick along the main fault, and extend from 480 and 600 m along tensional fractures. Deposit contains Sn, Cu, Pb, Zn, and Sb (a few tenths of a percent), and W. Deposit related to a 75 to 85 Ma (K/Ar) diorite-granodiorite-monzonitic complex.

Ognyanov, 1986.

M53-04 50°48'N 136°16'E	Solnechnoe Badzhal-Ezop	Sn W, Cu Sn quartz vein	Medium. Average grade of 0.56% Sn, 0.05% W, and 0.1% Cu. Mined since 1960's(?). Mostly exhausted.

Consists of highly altered quartz-tourmaline veins with numerous apophyses is related to a long north-south, left-lateral, strike-slip fault. Deposit varies from 0.5 to 15 m thick, 800 m long, and extends to the depth more than 500 m below the surface. Five vertically-zoned mineral assemblages are distinguished, from bottom to top: (1) quartz-tourmaline; (2) quartz-arsenopyrite-cassiterite with wolframite, bismuthinite, and scheelite; (3) quartz-sulfide (pyrrhotite, chalcopyrite, and marcasite); (4) quartz-galena-sphalerite; and (5) quartz-carbonate. Deposit is closely related to a K-rich granite phase of a gabbro-diorite-granodiorite complex with K-Ar isotopic ages of 75 to 80 Ma.

Ognyanov, 1986.

M53-05 50°41'N 136°08'E	Kapral Badzhal-Ezop	Mo Cu, Sn Porphyry Mo	Small. Contains up to 0.2% Cu, and up to 0.2% W.

Consists of quartz-sulfide veinlets and veins, and disseminations of pyrite, pyrrhotite, molybdenite, chalcopyrite, sphalerite, galena, wolframite, and Bi minerals across an area of approximately 0.3 km^2. Cu and W contents increase with depth. Deposit hosted in brecciated and altered host rocks and explored over an area 3 by 12 km. Deposit occurs along a fault zone at the margin of an intrusive dome and associated with Late Cretaceous sodic-pyroxene bearing granitic rock. Deposit occurs along contacts between granite and surrounding Late Jurassic volcanic and sedimentary rocks. Country rock is altered to quartz-sericite-chlorite, and locally to greisen.

Gonevchuk and Gonevchuk, 1980, 1983.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M53-06 50°41'N 136°21'E	Festivalnoe Badzhal-Ezop	Sn W, Cu, Bi, In, Ag Sn quartz vein	Medium. Average grade of 0.4 to 1.0% Sn, 0.15%, WO_3, 0.9% Cu, 0.04% Bi, and up to several tens g/t Au. Mined since 1960's.

Deposit contains twenty-six veins associated with zones of quartz-tourmaline alteration. Ore bodies are up to 1 km long, and generally 3 to 7 m thick; with some up to 20 to 30 m thick. Ore is complex, containing Sn, W , Cu, Bi, Ag, and economic levels of In. Quartz-tourmaline forms earlier mineral assemblage that grades upward into: (1) quartz-cassiterite with arsenopyrite; (2) quartz-pyrrhotite-chalcopyrite with stannite, fluorite, and magnetite; and (3) quartz-galena-sphalerite; and quartz-fluorite-calcite. Host rocks are generally altered to quartz-sericite with quartz-chlorite alteration in the upper parts of the deposit. Largest ore bodies are controlled by a north-south-trending, left-lateral, strike-slip fault. Mineralization is spatially related to the potassium-rich granite phase of a gabbro-diorite-granodiorite complex with K-Ar isotopic age of 70 to 90 Ma. However, age of mineralization interpreted as 70 to 75 Ma.

Ognyanov, 1986.

M54-01 50°38'N 142°27'E	Yasnoe Sakhalin Island	Hg Silica-carbonate Hg	Small

Consists of veinlets and pods of cinnabar associated with quartz and pyrite alteration. Hosted in fractured and mylonitic zones in Late Paleozoic to Mesozoic jasper, basalt, and shale.

Sidorenko, 1974.

M54-02 50°33'N 142°32'E	In' River Sakhalin Island	W, Hg, Cu Ag, Au Volcanic-hosted Hg	Small. Average grade of 0.01 to 0.03% W.

Consists of disseminations and veinlets that occur in quartz, quartz-sericite, and kaolinite-sericite-carbonate altered rocks. Ore minerals are pyrite, marcasite, scheelite, chalcopyrite, galena, sphalerite, cinnabar, realgar, and electrum. Mid- and low-temperature propylitic alterations form outer facies of the hydrothermal alteration aureole. Deposit is controlled by fracture zones in strongly silicified Neogene volcanic and subvolcanic mafic- and intermediate-composition rocks.

Sidorenko, 1974.

M54-03 50°11'N 143°04'E	Langeriiskoe Central Sakhalin	Au Au quartz vein	Small

Consists of lenticular bodies of fractured rock, and of quartz-sulfide veins that are controlled by zones of folding. Deposit hosted in Permian and Triassic spilite and graywacke, Jurassic-Early Cretaceous slate, and Cenozoic volcanic rocks and chert.

V.Ya Danchenko, written commun., 1987.

M54-04 50°09'N 143°23'E	Svetlovskoe Sakhalin Island	Hg Silica-carbonate Hg	Small. Low Hg content.

Occurs in fracture zones at contacts of gabbro with serpentinite. Gabbro altered to listwanite. Mercury either replaces quartz and carbonate in listwanite or forms pods of rich ore. Average Hg content in the listwanite is low, generally a few hundredths of a percent.

Sidorenko, 1974.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M54-05 49°58'N 143°35'E	Lyukamskoe Aniva-Nabil	Mn Volcanogenic Mn	Small. Average grade of 3 to 20% Mn, locally up to 50%.

Occurs in jasper and limestone lenses hosted in a Jurassic and Cretaceous volcanic sequence. Sheet-like ore bodies consist of hematite-rhodonite-quartz and rhodochrosite-quartz that are accompanied by surficial pyrolusite and psilomelane veinlets.

Sidorenko, 1974.

M54-06 49°44'N 143°12'E	Ostrinskoe Sakhalin Island	Hg Silica-carbonate Hg	Small. Up to several percent Hg.

Hosted in jasper, basalt, and shale of Late Proterozoic or possibly Mesozoic age. Occurs as veinlets in fracture zones and jasper beds, disseminations, and cinnabar gouge. Mineralized zones are up to 600 m long and 10 to 15 m thick.

Sidorenko, 1974.

M54-07 48°52'N 142°38'E	Inskoe Sakhalin Island	Hg Au, W Volcanic-hosted Hg	Small. From a few tenths of a percent to a few percent Hg.

Consists of a mercury-bearing opalitic complex defined by zones of hydrothermally altered rock with disseminated cinnabar, realgar, pyrite, marcasite, chalcopyrite, galena, sphalerite, scheelite, and gold. Hosted in altered Neogene quartzite and volcanic rocks. Hg-bearing zones range from 1 to 10 m thick, with few to 30 to 35 m, and are up to 300 m long.

Sidorenko, 1974.

M54-08 49°20'N 138°47'E	Mopau Kema	Sn Porphyry Sn	Small. Average grade of 0.3% Sn.

Consists of lenticular zones in quartz-sericite rocks. Zones contain abundant veinlets of quartz-cassiterite, cassiterite-quartz-feldspar, quartz- cassiterite-chlorite, and quartz-cassiterite-arsenopyrite-chlorite. Veinlets range from paper-thin to 0.5 cm thick, locally up to 10 cm thick. Where closely-spaced, veinlets form an intricate stockwork up to 100 m across with high Sn content. Zones are over 400 m long, several tens of m thick. Some zones occur at contacts with diabase porphyry dikes. Deposit extends to depths of more than 200 m. Ore is sulfide poor and is easily concentrated. Deposit hosted in a series of closely-spaced volcanic vents of rhyodacite breccia that is cut by intrusions of felsite porphyry and dikes of quartz porphyry. Ore associated with a deep-seated felsic pluton. Age of mineralization interpreted as Late Cretaceous to Paleogene.

Finashin, 1959; Usenko and Chebotarev, 1973.

M54-09 48°34'N 138°35'E	Nochnoe Kema	Cu Pb, Zn Porphyry Cu	Small

Consists of a stockwork defined by a thick network of sulfide or quartz-sulfide veinlets containing pyrite, chalcopyrite, bornite, and covellite as disseminations and in small, massive pods. Galena, sphalerite, arsenopyrite, sulfosalts, and molybdenite occur sporadically. Outer parts of the metasomatic aureole are mostly pyrite-bearing. Azurite and malachite were observed in the oxidation zone with limonite alteration. Deposit has not been explored at depth. Deposit related to a Late Cretaceous and Paleogene granite porphyry stock that grades into rhyolite at the periphery. Deposit confined to stock. Concentrically zoned structure of the intrusion contains a hydrothermal alteration pattern that grades from the center to the periphery from quartz-sericite-biotite-feldspars to quartz-sericite rocks. Host clastic rocks exhibit argillic alteratin at the contact with rhyolite. The alteration aureole is 400 by 600 m thick.

Gavrilov and Mamaev, 1988.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M54-10 48°12'N 138°12'E	Sukhoi Creek Kema	Cu, Mo W, Au Porphyry Cu-Mo	Small. Up to 0.2% Cu and 0.01% Mo.

Occurs in stockworks that are several hundred m in diameter and in altered zones. Polymetallic ore dominates in some stocksworks. Ore minerals are chalcopyrite, molybdenite, sphalerite, galena, cassiterite, scheelite, and pyrite. Significant Au and Ag values occur. Deposit hosted in Early Cretaceous sedimentary rocks that are overlain by Late Cretaceous volcanic rocks and are crosscut by ore-bearing granitic intrusions with a K-Ar isotopic age of 73 Ma. Mineralization is related to several granodiorite and granite stocks that are intensely hydrothermally altered. Quartz-sericite alteration and medium-temperature epidote-prehnite-chlorite propylitic alteration occur at the core and grade into micaceous-chlorite-carbonate propylite at the periphery. Granite is locally altered to quartz-muscovite greisen with tourmaline and sphene, and in a few places into a peculiar garnet-phlogopite rock with apatite. Host siltstone and sandstone are altered to orthoclase-actinolite-chlorite hornfels and the felsic extrusive rocks are altered to quartz and phyllite. Deposit not explored at depth.

Petrachenko and others, 1988.

M54-11 48°06'N 138°38'E	Moinskoe Kema	Mo Cu, Zn Porphyry Mo	Small. Up to 0.3% Cu and 0.3% Mo.

Consists of chalcopyrite, sphalerite, galena, molybdenite, and rare ferberite that occur in zones of veinlets, disseminations, and veins. Zones contain galena, sphalerite, and molybdenite that are up to 3 m thick. Deposit occurs along a north-west trending fault zone about 3 km long that cuts a granite porphyry stock. Granite prophylitically altered to quartz, sericite, chlorite, and sulfide along feather joints. Quartz-sulfide and sulfide veinlets and thin veins occur in hydrothermally altered rocks. Disseminated pyrite occurs in altered rocks and in surrounding veins. Polymetallic ores occur mostly at the periphery of the stock. Deposit hosted in hypabyssal Late Cretaceous granite porphyry stock with numerous xenoliths of intrusive and metamorphic rocks and garnet nodules. A leucocratic medium-grained granite body forms the central part of the pluton. Granitic rocks are oversaturated with alumina and contain moderate alkalies. Deposit not explored at depth.

Pertachenko and others, 1988.

M55-01 49°43'N 144°03'E	Russkoe Schmidt and Terpeniya Peninsulas	Cr Podiform Cr	Small. Up to 1 g/t Pt, up to 0.12 g/t Pd, and up to 3.8 g/t Ag.

Consists of chromite in small lenses and veinlets up to 3 m long in serpentinized periodtite. In addition to chrome spinel, deposit contains platinum, palladium, and silver. Hosted in Late Cretaceous volcanic and sedimentary rocks that are cut by small bodies of serpentinized peridotite. Occurs in the East Sakhalin Mountains.

Sidorenko, 1974.

M55-02 49°31'N 144°01'E	Rys'e Aniva-Nabil	Cu, Pb, Zn Cyprus massive sulfide	Small. Average grade of 0.5-1% Cu, 0.1-0.2% Pb, and 0.1-0.2% Zn.

Consists of a series of zones from 0.1 to 0.5 m thick that contain pyrite, chalcopyrite, sphalerite, galena, quartz, sericite, and chlorite. Hosted in Early Cretaceous clastic volcanic rocks and chert in the East Sakhalin Mountains.

Sidorenko, 1974.

M56-01 50°10'N 155°28'E	Carpinsky Caldera Kuril	Mo Porphyry Mo	Small. Less then 0.01% Mo.

Consists of molybdenite that occurs as disseminations and in fine streaks in andesitic lava flows and tuff that display argillic and alunitie alteration. Deposit has dimensions of 100 by 150 m and occurs adjacent to dacite lava. Cinnabar occurs in addition to molybdenite. Mineralization age interpreted as Pliocene to Quaternary.

Petrachenko, 1978; Petrachenko and Petrachenko, 1978.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
M57-01 50°44'N 156°16'E	Koshkina Kuril	Cu, Zn, Pb Polymetallic vein	Small

Deposit consists of bodies up to 200 m long that occur in hydrothermally altered rock adjacent to a granodiiorite and diorite intrusion. Bodies consist of closely-spaced sericite and hydromica veins and veinlets of variable composition. Veins and veinlets composed of quartz-tourmaline, quartz-chlorite-sericite, chlorite-carbonate with zeolite, and quartz-chlorite-epidote. Ore minerals are chalcopyrite, cleiophane, galena, stibnite, realgar, orpiment, arsenopyrite, pyrite, marcasite, hematite, and magnetite. Polymetallic and Sb-As ores are spatially separated and display different types of alteration. Mineralogy and metal content vary widely. Host rocks are propylitized up to epidote-chlorite facies, and are silicified. Propylitized granodiorite and diorite crops out in the middle part of the mineralized area. Alteration formed by sulfate and halogene-acid hydrothermal solutions. Deposit occurs at the northern part of Shumshu Island in an area of approximately 5 km^2 in heavily altered Early-Middle Miocene volcanic rocks that are cut by numerous extrusive and intrusive rocks, all part of a volcano-plutonic complex. Age of mineralization interpreted as late Miocene(?).

Petrachenko, 1978.

M57-02 50°38'N 156°03'E	Ebeko Kuril	S, FeS_2 Sulfur-sulfide	Medium. Contains up to 20 to 45% S.

Consists of three deposit types: (1) native sulfur in fumarole deposits on the slopes of Ebeko Volcano; (2) sulfur ooze in lacustrine deposits in craters; and (3) disseminated metasomatic deposits of sulfur-sulfide ore in altered andesite and tuff, containing 20 to 45% S. In addition to S, ore minerals are pyrite, marcasite, quartz, kaolinite, alunite, pyrophyllite, barite, illite, and opal. Deposit occurs over an area of approximately 20 km^2 on the slopes of Ebeko volcano. Largest deposit areas are 100 to 150 m long and 10 to 15 m thick. Mineralization is related to fumerole and hydrothermal activity of Ebeko andesitic stratovolcano.

Vlasov, 1971.

M57-03 50°30'N 156°02'E	Zaozernoe Kuril	S, FeS_2 Sulfur-sulfide	Medium. Average content of 20-70% S.

Deposit consists of three types: (1) sublimated; (2) sulfur flows; and (3) disseminated-metasomatic. First and second types form irregular bodies that are a few tens of m long, from 5 to 6 m thick, and contain 50-70% S. Ten of ore bodies are explored. Two occurrences of the third ore type range up to 15 m thick and 100 m length along strike, and are related to bodies of siliceous and opalized agglomerate and psephitic tuff. Some pipe-like bodies of sulfur-bearing quartz rock occur that are 1.5 to 2 m across and contain 20 to 35% sulfur. Ore minerals are opal (45-50%), kaolinite (10-15%), alunite (15-20%), and pyrite. In the other parts of caldera are sheet-like bodies consisting of quartz-opal, quartz-alunite, quartz, and opal-kaolinite sulfur-sulfide that occur in hydromica-pyrite rock. Vertical extent of deposit is up to 150 m. Deposit occurs in solfataric fields of the Zaozernaya caldera and the Bilibin andesitic volcano. Age of mineralization interpreted as Pliocene to Quaternary.

Vlasov and Petrachenko, 1965.

M57-04 50°24'N 156°02'E	Rifovoe Kuril	Au, Zn, Pb Au-Pb-Zn epithermal vein	Small. Average grade of 35% Zn and 17% Pb, and up to 1.5 g/t Au.

Consists of several zones, each a few m thick, that occur in tectonic breccia. Zones consist of a series of parallel, steeply-dipping veinlets and veins up to 15 m thick. Ore minerals are sphalerite, galena, chalcopyrite, pyrite, and marcasite. Gangue minerals are quartz, barite, sericite, adularia, and rarely opal. Veinlets and veins are bordered by an aureole of disseminated sulfides. Alteration of host rocks is zoned, and consist, from the core outward of quartz, quartz-adularia-montmorillonite, and albite-chlorite with carbonate. Temperature of ore deposition of 220 to 240°C. Host rocks are heavily altered by fumerole and hydrothermal activity. Deposit occurs in cliffs along the Pacific coast, over an area of approximately 0.8 km^2, in Pliocene volcanic rocks that are intruded by diorite porphyry and trachyandesite dikes. Age of mineralization interpreted as Pliocene.

Petrachenko, 1976.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N03-01 53°45'N 166°10'W	Sedanka (Biorka) Alaska Peninsula and Aleutian Islands	Zn, Pb, Cu Au, Ag Polymetallic vein	Average grade of 6.8% Zn, 0.45% Cu, 0.29% Pb, 1.37g/t Au, 48 g/t Ag

Consists of disseminated sphalerite and pyrite, with minor galena and chalcopyrite along a fault zone striking east-northeast and dipping moderately south. Quartz and ankerite gangue. Fault zone with sulfides at least 1,000 m long, and up to 80 m thick. Hanging wall is Tertiary diorite, footwall is greenstone.

Webber and others, 1946.

N04-01 55°57'N 159°24'W	Kawisgag (Ivanof) Alaska Peninsula and Aleutian Islands	Cu, Mo, Au Porphyry Cu and (or) polymetallic vein	Grab samples with 0.2 to 1.0% Cu, up to 0.024% Mo, and 0.23 to 0.4 g/t Au. Small tonnage

Area of intense sericitic and weaker potassic alteration over an area of about 200 by 700 m in nonmarine fluvial volcanic sandstone and conglomerate of the lower Tertiary Tolstoi Formation and black siltstone of the Upper Cretaceous Hoodoo(?) Formation. Minor propylitic alteration on periphery. Sedimentary rocks intruded small stocks and dikes. Alteration overprinted on contact-metamorphic aureoles around stocks. Iron-stained area of about 2.5 km^2.

R.F. Robinson, written commun., 1975; Frederic H. Wilson and Robert L. Detterman, written commun., 1985

N04-02 55°35'N 161°16'W	Canoe Bay Alaska Peninsula and Aleutian Islands	Au, Ag Hg, As, Pb, Zn Au-Ag epithermal vein	No data

Quartz-cemented breccia with gold in altered late Tertiary or Quaternary felsic intrusive and extrusive rocks consisting of rhyolite to rhyodacite porphyry, and vent, explosion, and lithic breccia. Associated crystal tuff, and andesite to dacite dikes. Core of deposit is marked by sericite, pyrite, argillic, and silica alteration grading outward into weak propylitic alteration. Anomalous soil and rock values of Au, Ag, Hg, As, Pb, and Zn. Intrusive rocks intrude shale, sandstone, and conglomerate of the Cretaceous Hoodoo(?) Formation.

Gary L. Andersen, written commun., 1984; Frederic H. Wilson, written commun., 1985

N04-03 55°37'N 160°41'W	Pyramid Alaska Peninsula and Aleutian Islands	Cu, Au Mo Porphyry Cu	Estimated 110 million tonnes grading 0.4% Cu, 0.03% Mo; trace of Au

Disseminated molybdenite and chalcopyrite(?) in iron-stained dacite porphyry stocks and dikes of late Tertiary age. Zonal alteration pattern with core of secondary biotite and about 3 to 10% magnetite, grading outward to envelope of quartz-sericite alteration. Peripheral sericite filled fractures adjacent to stock. Local oxidation and supergene enrichment blanket up to 100 m thick, mainly of chalcocite and covellite. Deposit centered on 3 sq km area within stock. Several smaller stocks nearby. Stocks intrudes fine-grained clastic rocks of the Upper Cretaceous Hoodoo Formation, and Paleocene or Eocene to Oligocene Stepovak(?) or Tolstoi(?) Formation. Sedimentary rocks contact metamorphosed adjacent to stock.

Armstong and others, 1976; Hollister, 1978; Wilson and Cox, 1983; Gary L. Anderson, written commun., 1984; Robert L. Detterman, oral commun., 1986

N04-04 55°34'N 160°27'W	San Diego Bay Alaska Peninsula and Aleutian Islands	Ag, Au, Cu, Pb, Zn Au-Ag epithermal vein(?)	No data

Area of propylitic, and local argillic or silicic alteration in middle Tertiary dacite flows, associated with Fe-stained area of 61 km^2. Rock samples from altered area contain 0.5% to 5.0% pyrite. Numerous small quartz veins with anomalous Ag and Au, and minor Cu-, Pb-, and Zn-sulfides. Quartz veins in altered middle Tertiary dacite. Veins and altered area may be upper part of porphyry Cu deposit.

Gary L. Andersen, written commun., 1984

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N04-05 55°11'N 160°40'W	Aquila Alaska Peninsula and Aleutian Islands	Au, Ag Au-Ag epithermal vein	Grab samples with up to 7.8 g/t Au, 27 g/t Ag

Summary and References

Quartz fissure vein system with gold in Tertiary andesite flows and tuffs. Veins extend up to 2,700 m and occur along northeast-striking regional fractures, a few kilometers apart, and parallel to similar fractures that host the Apollo-Sitka deposit. Deposit restricted to small ore shoots occurring at intersections of veins or where veins abruptly change strike. Argillic and silicic alteration generally restricted to narrow envelopes around individual quartz veins.

Gary L. Andersen, written commun., 1984

N04-06 55°12'N 160°37'W	Apollo-Sitka Alaska Peninsula and Aleutian Islands	Au, Ag, Pb, Zn, Cu Au-Ag epithermal vein	Produced about 3.3 million g Au from 435,000 tonnes ore grading 7.7 g/t Au. Estimated 163,000 tonnes remaining. Portions of drill core with up to 7.3 g/t Au, 240 g/t Ag

Quartz-calcite-orthoclase veins and silicified zones with gold, galena, sphalerite, chalcopyrite, and native copper. Veins and zones occur in intensely developed, northeast-striking fracture systems that extend to at least 420 m below surface. At least eight major vein-fracture systems. Veins range from a few centimeters to 7 m wide. Higher grade parts of deposit occur in tensional flexures in the vein-fracture system. Abundant quartz comb structures and euhedral crystal druses indicate vein formation at shallow depths. Hosted in extensively propylitically altered Tertiary tuff and intermediate volcanic rocks. Main production from 1894 to 1906. About 5,100 m of underground workings. Considerable exploration activity from late 1980's to the present.

Martin, 1905, Brown, 1947

N04-07 55°12'N 160°35'W	Shumagin Alaska Peninsula and Aleutian Islands	Au, Ag Au-Ag epithermal vein	Estimated 540,000 tonnes grading 10.3 g/t Au, 34.3 g/t Ag; includes 256,000 tonnes grading 14.6 g/t Au and 54.9 g/t Ag

Quartz fissure system with gold hosted in middle Tertiary (Miocene?) andesitic volcanic rocks. Estimated tonnage in area 2,700 m long, 610 m wide, and 120 m deep. Fissure system occurs on same northeast-southwest-trending structure as Aquila deposit. Extensive drilling in 1982 and 1983 and some activity since.

Gary L. Anderson, written commun., 1985

N08-01 55°48'N 132°12'W	Union Bay (Cleveland Peninsula) Klukwan-Duke	Fe, V, Ti, Cr, PGE Zoned mafic-ultramafic Cr-PGE	Large. Estimated 1,000 million tonnes grading 18 to 20% Fe; also numerous chromite andpossible V occurrences. Grab grade 0.093 g/t Pt, 0.20 g/t Pd.

Consists of magnetite and chromite that are disseminated in dunite, and chromite, and also occur as discontinuous stringers in dunite. Deposit hosted in a mid-Cretaceous, concentrically zoned mafic-ultramafic complex with a dunite core, named the Union Bay ultramafic pluton. Magnetite and chromite are primary segregations. PGE occur with chromite and magnetite in dunite. Hand-picked specimens of chromite average 0.093 g/t Pt, 0.200 g/t Pd, 0.062 g/t Rh and 0.215 g/t Ir. Dunite occurs in pipe and lopolith in center of the ultramafic pluton that intrudes Upper Jurassic and Lower Cretaceous flysch of Gravina-Nutzotin overlap assemblage. Peridotite also occurs with dunite; pyroxenite and hornblende pyroxenite occur on periphery of pluton.

Ruckmick and Noble, 1959; Berg, 1984; Brew and others, 1991.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N08-02 55°31'N 132°18'W	Kasaan Peninsula (Mount Andrew) Prince of Wales Island	Cu, Fe Au, Ag Cu-Fe skarn	Produced about 245,000 tonnes ore containing 5.81 million kg Cu, 215,800 g Au, 1.74 million g Ag. Contains an estimated 2.7 million tonnes grading 2.37% Cu, 0.88 g/t Au, 7.1 g/t Ag.

Summary and References

Consists of irregular to tabular masses of magnetite, chalcopyrite, and pyrite in gangue of calcite and calc-silicate skarn that occur in about 30 bodies along a 20-km-long belt. Skarns occur mainly along contacts between lower Paleozoic calcareous metasedimentary rocks and mafic metavolcanic rocks of the Descon Formation adjacent to irregular dikes, sills, and plugs of Ordovician or Silurian diorite, quartz monzodiorite, and mafic dikes. Skarns to north are generally dominated by epidote-quartz endoskarn and pyroxene-garnet-epidote exoskarn with chalcopyrite, magnetite, and calcite. Skarns to south generally consists of hornblende, magnetite, chalcopyrite, and pyrite with low Ag and Au. Considerable mining at various skarns. Several episodes of exploration. Extensive underground workings.

Warner and others, 1961; Berg, 1984; Myers, 1985; Brew and others, 1991.

N08-03 54°55'N 132°08'W	Bokan Mountain (Ross-Adams) Western-Southeastern Alaska	U, Th, Be, Nb, Pb, REE Felsic plutonic U-REE	Medium. Produced about 109,000 tonnes grading about 1% U_3O_8; Th not recovered

Consists of disseminated U, Th, REE, and niobate minerals, including uranothorite, uranoan thorianite, uraninite, xenotime, allanite, monazite, pyrite, galena, zircon, and fluorite in irregular, steeply dipping pipe of Jurassic peralkaline granite. Most of ore produced from crudely cigar-shaped upper part of pluton. Central zone grades outward into normal granite. Associated pegmatite and vein REE, Nb, Th, and U deposits in outer parts of granite or adjacent country rock that consists of early Paleozoic metamorphosed granitic and sedimentary rocks of Alexander terrane. Intermittent mining from 1955 to about 1971.

MacKevett, 1963; Statz, 1977; Thompson and others, 1982; Lancelot and de Saint-Andre, 1982; Armstrong, 1985; Edward M. MacKevett, Jr., written commun., 1986; J. Dean Warner, written commun., 1987; Thompson, 1988; Warner and Barker, 1989; Brew and others, 1991; Berg, 1984.

N08-04 53°32'N 132°13'W	Cinola (Specogna, Babe) Unassigned	Au Hg Au epithermal vein	Medium. Reserves of 24.8 million tonnes grading 2.47 g/t Au.

Consists of gold with pyrite, marcasite, chalcopyrite and cinnabar that occur in silicified zones associated with Miocene rhyolite porphyry dike intruded along a faulted contact between Cretaceous shale and Late Tertiary coarse-grained clastic sedimentary rocks. Silicification and mineralization are partly contemporaneous with clastic sedimentation, with 55% of deposit hosted in clastics, 2% in Cretaceous sediments 13% in rhyolite and 30% in polymictic hydrothermal breccias. Deposit age interpreted as Miocene.

B.C. Minfile, 1989; EMR Canada, 1989; Christie, 1989; Mining Review, 1992.

N08-05 52°46'N 132°03'W	Tasu Sound (Wesfrob, Tasu, Garnet) Island Porphyry	Fe, Cu Fe skarn	Medium. Produced 22.6 million tonnes and reserves of 5.5 million tonnes grading 53.4% Fe, 0.26% Cu, 6.1 g/t Au.

Consists of massive magnetite-chalcopyrite skarn that is hosted in amygdaloidal greenstone of the Upper Triassic Karmutsen Group or near contacts with the Jurassic San Cristobal hornblende diorite pluton of the Island Suite. Deposit age interpreted as Middle Jurassic.

Sutherland Brown, 1968; EMR Canada, 1989; Dawson and others, 1991.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N08-06 55°38'N 132°34'W	Salt Chuck Prince of Wales Island	Cu, Pd, Pt, Au Zoned mafic-ultramaficCu-Au-PGE	Produced about 300,000 tonnes of 0.95% Cu, 1.2 g/t Au, 5.8 g/t Ag, 2.2 g/t PGE; mainly Pd and Pt. Produced 610,400 g PGE. Grab samples with up to to 0.57 g/t Pt, 1 g/t Pd

Consists of iregularly and randomly distributed veinlets of bornite, with minor chalcopyrite, chalcocite, covellite, native copper, and magmatic magnetite. Sulfides and oxides occur as disseminations and along cracks and fractures in pipe-like late Paleozoic or Mesozoic gabbro-clinopyroxenite stock intruding Silurian metagraywacke of Alexander terrane. Clinopyroxenite and gabbro grade irregularly into one another. Bornite forms principal sulfide; occurs mainly as interstitial grains in clinopyroxenite in amounts up to 15 percent. Extensive development of late magmatic or hydrothermal epidote veins in gabbro and clinopyroxenite. K-Ar age of 429 Ma for low-K, altered biotite from clinopyroxenite. Deposit probably magmatic, but there is some to considerable hydrothermal deposition or remobilization of sulfides. Mined from 1907 to 1941 from considerable underground workings and glory hole.

Howard, 1935; Gault, 1945; Donald Grybeck and David A. Brew, written commun., 1985; Loney and others, 1987

N08-07 55°28'N 132°42'W	Dawson Prince of Wales Island	Au Cu, Pb, Zn Polymetallic vein	Probably produced several ten thousand g Au and Ag each, and minor Pb. Estimated 40,000 tonnes grading 34.3 g/t Au remain

Consists of several parallel quartz veins in zone up to about 7 m wide. Most gold concentrated along contacts of veins and lower(?) Paleozoic black graphitic slate of Alexander terrane. Scattered pyrite, sphalerite, chalcopyrite, and galena in veins. Mined from 1900 to 1948 from several sites to a depth of at least 181 m. Some surface activity and drilling in the 1980's.

Wright and Wright, 1908; Harris, 1985

N08-08 55°18'N 132°23'W	Khayyam Alexander	Cu, Au Ag, Zn Kuroko massive sulfide	Produced about 6.4 million kg Cu, 40,120 g Au, and 53,200 g Ag, from 205,000 tonnes ore. Channel samples with up to 5.25% Cu, 6.9 g/t Au, 106 g/t Ag

Irregular, elongate, nearly vertical lenses of massive pyrite, with minor chalcopyrite, sphalerite, pyrrhotite, hematite, gahnite, and magnetite. Gangue of quartz, calcite, epidote, garnet, and chlorite. Seven stacked sulfide lenses up to 70 m long and 6 m thick. Lenses conformable to enclosing felsic to mafic metavolcanic host rocks of the pre-Middle Ordovician Wales Group in the Alexander terrane. Coarse fragmental textures in metavolcanic host rocks. Intense chlorite alteration in footwall below sulfide lenses. Lateral gradation between sulfide lenses and enclosing schist. Several hundred meters of underground workings. Principal mining from 1901 to 1907.

Fosse, 1946; Barrie, 1984a, b, 1988

N08-09 55°15'N 132°37'W	Jumbo district Western-Southeastern Alaska	Fe, Ag, Au, Cu, Mo Cu-Au skarn	Jumbo: Estimated 280,000 tonnes of 45% Fe, 0.73% Cu. Produced 4.6 million kg Cu, 220,000 g Au, and 2.73 million g Ag from 111,503 tonnes ore

District includes major deposit at Jumbo, and several small deposits including Magnetite Cliff, Copper Mountain, and Corbin, and lesser deposits at Upper Magnetite, Gonnason, Houghton, Green Monster, Hetta, and Corbin. Deposits all within a few kilometers of Jumbo deposit. Deposits occur in or adjacent to lower Paleozoic marble and pelitic metasedimentary rocks of the Wales Group, intruded by mid-Cretaceous hornblende-biotite granodiorite (concordant hornblende and biotite K-Ar ages of 103 m.y.). Jumbo deposit: chalcopyrite, magnetite, sphalerite, and molybdenite in skarn at contact between marble and Early Cretaceous granodiorite stock. Gangue is mainly diopside and garnet. More than 3.2 km of underground workings. By far the largest deposit in the district, with major production. Magnetite Cliff: 25-m-thick shell of magnetite that mantles Early Cretaceous granodiorite in contact with garnet-diopside skarn. Skarn contains 2% to 3% chalcopyrite, resources are estimated at 335,600 tonnes of 46% Fe and 0.77% Cu. Production from 1902 to 1922. Copper Mountain: Scattered chalcopyrite and copper carbonate occurrences in diopside endoskarn with veins and masses of epidote, garnet, magnetite, and scapolite near granodiorite. Produced 101,800 kg Cu, 321,300 g Ag, and 4,510 g Au between 1902 and 1907. About 410 m of tunnels and shafts.

Kennedy, 1953; Herreid and others, 1978

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N08-10 55°11'N 132°23'W	Moonshine Alexander	Ag, Pb Zn, Cu Carbonate-hosted massive sulfide	Produced up to 46,500 g Ag. Grab samples with 20 to 83% Pb, 411 to 1,030 g/t Ag

Massive galena with sphalerite, and minor chalcopyrite, and accessory pyrite in well-defined fissure veins and lenses up to a few meters wide in a dolomitized breccia that obliquely cuts across marble and metasedimentary rocks. Wall rocks part of the pre-Middle Ordovician Wales Group in Alexander terrane. Gangue of quartz, siderite, and calcite. Diabase dikes locally cut veins and wall rocks. Several tunnels and shafts. Minor production between 1900 and 1909.

Wright, 1909; Herreid and others, 1978

N08-11 55°03'N 132°38'W	Lime Point Alexander	Ba Bedded barite	Estimated 4,500 tonnes grading 91% barite

Lenses of barite up to 2 m thick are interlayered with the pre-Middle Ordovician dolomitic marble of the Wales Group. Rocks faulted and folded; and andesite dikes intruded along faults. One short adit. Test shipments; no production.

Twenhofel and others, 1949; Herreid and others, 1978

N08-12 55°04'N 132°09'W	Niblack Alexander	Cu, Au, Ag Kuroko massive sulfide	Produced about 636,000 kg Cu, 34,200 g Au, 466,500 g Ag. Contains 6 m thick ore zones with 4.9% Cu, 8.0% Zn, and 9.2 g/t Au

Lenticular masses and disseminations of chalcopyrite, pyrite, and lesser sphalerite, galena, hematite, and magnetite in mainly quartz-sericite schist derived from pre-Ordovician(?) felsic volcanic or volcaniclastic rocks. Felsic metavolcanic rocks interlayered with intermediate to mafic metavolcanic rocks and lesser slate. Host rocks part of the pre-Middle Ordovician Paleozoic Wales Group in Alexander terrane. Workings consist of a 100-m shaft and about 1.6 km of underground workings. Main mining from 1902 to 1909. Recent development.

Herreid, 1964; W.C. Block, written commun., 1989

N08-13 53°49'N 132°01'W	McLean Arm district Prince of Wales Island	Co, Mo Porphyry Co-Mo	Higher grade veins and strockwork range from 0.4-5.6% Cu, 0.01-0.08% Mo, and 2.1-11.0 g/t Au. Anomalous Ag, Pt, Bi, Te, and base metals also occur. Possible 40 million tonnes ore at Apex.

Consists of a group of stockworks and veins at Polson, Ickis, Veta, Apex, and Stone Rcck vein. Stockworks and veins occur mainly along joints and faults that strike north-northeast or west-northwest and dip steeply. Stockworks, veins, joints, and faults interpreted as related to a concentric alteration zone of about 5 km^2 area that contains a carbonate-albite center and an albite-sericite rim. Stockworks and veins hosted in northwest-trending belt of middle Paleozoic, multi-phase plutonic complex of pyroxenite, syenite, and quartz monzonite. Central part of complex containing the deposits is mainly syenite. Altered, mineralized synenite at Stone Rock Bay has a U-Pb zircon isotopic age of 436 Ma. Plutons intrude clastic rocks of the Descon Formation, part of the Alexander terrane, on the southern tip of Prince of Wales Island.

MacKevett, 1963; F.D. Forgeron and L.W. Leroy written commun., 1971; Nokleberg and others, 1995.

N08-14 55°39'N 132°00'W	Gold Standard (Helm Bay) Juneau	Au Au quartz vein	Probably produced a few ten thousand g Au

Two sets of quartz veins with less than 1% gold, pyrite, galena, and tetradymite. Principal vein about 300 m long and up to 2 m thick cuts metamorphosed upper Mesozoic phyllitic flysch and andesite tuff of Gravina-Nutzotin belt. Most ore came from older set of veins that are parallel to foliation of host rocks. Younger veins that parallel strike, but dip in opposite, direction contain little gold.

Wright and Wright, 1908

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-01 55°55'N 129°56'W	Prosperity-Porter Idaho Skeena	Ag, Pb, Zn Ag-Pb-Zn polymetallic vein	Medium. Reserves of 826,277 tonnes grading 669 g/t Ag, 5% Pb+Zn.
Consists of galena, sphalerite, tetrahedrite and native silver that occur in narrow, irregular quartz veins in volcanics of the Jurassic Hazelton Assemblage, adjacent to the Eocene Hyder biotite granodiorite pluton Production in 1922-50 totaled 2.36 million oz Ag. Deposit age interpreted as Eocene. Alldrick, 1985; Alldrick and others, 1987; Prime Equities Inc., 1991; Schroeter and Lane, 1991.			
N09-02 55°57'N 129°42'W	Red Mountain Texas Creek	Au, Ag Zn, Pb, Cu, Te, Bi Au-Ag polymetallic vein	Medium. Reserves of 2.5 million tonnes grading 12.8 g/t Au, 28.6 g/t Ag.
Consists of densely disseminated pyrite veinlets that are enveloped by variable amounts of pyrrhotite and sphalerite plus minor amounts of chalcopyrite, arsenopyrite, galena and tetrahedrite. Alteration assemblages include sericite, K-feldspar, tourmaline and propylitic assemblages. High gold values are associated with semi-massive, coarse grained pyrite. Gold occurs as native metal, electrum and tellurides. Deposit contains twelve surface showings and three underground zones that are associated with the brecciated, sericitized and pyritized contact zone between the Lower Jurassic Goldslide quartz monzonite-granodiorite-diorite pluton and Lower Jurassic bimodal volcanic and volcaniclastic rocks of the Hazelton Group. Deposit age interpreted as Early Jurassic. Northern Miner, February 22, 1993; Greig and others, 1994; Bray, 1994.			
N09-03 55°44'N 129°33'W	Alice Arm Silver (Dolly Varden, North Star, Wolf, Coast	Ag, Pb, Zn Kuroko Zn-Pb-Cu massive sulfide	Medium. Production and reserves of 2.91 million tonnes grading 390 g/t Ag, 0.53% Pb, 0.82% Zn.
Consists of pyrite, sphalerite, galena, tetrahedrite, pyrargyrite and some native silver that occur in four deposits (Dolly Varden, North Star, Wolf and Toric). Deposits interpreted as structurally displaced portions of a once continuous siliceous baritic volcanogenic massive sulfide zone in Lower Jurassic volcanics (Hazelton?) within a roof pendant of the Coast Plutonic Complex. Production from the Torbit (Toric) mine between 1928 and 1959 was 1.27 million tonnes grading 456 g/t Ag and 0.39% Pb. Current reserves for the Dolly Varden, North Star, Torbit, and Wolf are 1.55 million tonnes grading 0.53% Pb, 0.82% Zn and 326 g/t Ag. Deposit age interpreted as Early Jurassic. Devlin and Godwin, 1986; EMR Canada, 1989; Mining Review, 1992.			
N09-04 55°24'N 130°29'W	Quartz Hill Central-Southeastern Alaska	Mo Porphyry Mo	Large. Estimated 1,700 million tonnes of 0.136% MoS_2. Estimate 444 million tonnes with 0.219% MoS_2 near surface.
Consists of a stockwork of molybdenite-bearing, randomly oriented quartz veins, and fractures, and disseminated molybdenite that are distributed throughout a multiply altered hypabyssal stock with an outcrop area of several square kilometers. Stock consists of a shallow-level, multi-phase complex of granite porphyry, quartz porphyry, microgranite, and aplite of late Oligocene or early Miocene age. Stock intrudes the central granitic belt of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Traces of uranium in accessory minerals in the porphyry. K-Ar age of hypabyssal granitic rocks about 27 m.y. Hudson and others, 1979; Berg, 1984; P.R. Smith and J.E. Stephens, written commun., 1985; Brew and others, 1991.			
N09-05 55°27'N 129°50'W	Anyox Area (Hidden Creek, Bonanza) Coast	Cu, Ag, Au Fe Cyprus massive sulfide	Medium. Production and reserves of 26.7 million tonnes grading 1.48% Cu, 9.6 g/t Ag, 0.17 g/t Au.
Consists of chalcopyrite, pyrrhotite and pyrite that occur as pipe-like and sheet-like lenses within metamorphosed roof pendants of Early to Middle Jurassic pillowed tholeiitic volcanic and sedimentary rocks. Roof pendant is underlain by granitoids of the Coast Plutonic Complex. Production from the Hidden Creek and Bonanza orebodies of 22.4 million tonnes with recoveries of 1.50% Cu, 9.61 g/t Ag and 0.17 g/t Au. Similar copper and precious metal grades are reported for reserves. Deposit age interpreted as Early and Middle Jurassic. Sharp, 1980; Grove, 1986; EMR Canada, 1989; Hoy, 1991; Smith, 1993.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-06 55°35'N 129°24'W	Ajax Skeena	Mo Zn, Pb, Cu, Ag Porphyry Mo	Large. Reserves of 178.5 million tonnes grading 0.121% MoS_2.

Consists of molybdenum in quartz-vein stockwork that is hosted in Eocene quartz monzonite porphyry of Alice Arm Intrusions and adjacent hornfels zone in Jurassic argillaceous rocks. Deposit occurs in four small, closely spaced plutons. Total reserves of 417.3 million tonnes grading 0.09% MoS_2 with a very high stripping ratio. A biotite K-Ar age of 54.0 Ma ± 3 Ma age is reported. Deposit age interpreted as Eocene.

Christopher and Carter, 1976; Soregaroli and Sutherland Brown, 1976; B.C. Minfile, 1989; EMR Canada, 1989.

N09-07 55°28'N 129°20'W	Bell Moly (Alice Arm) Skeena	Mo, W Porphyry Mo	Medium. Reserves of 106 million tonnes grading 0.09% MoS_2.

Consists of molybdenite and minor scheelite that occur in quartz vein stockwork in Eocene quartz monzonite porphyry of the Alice Arm Intrusions and biotite hornfels in Jurassic metasedimentary and metavolcanic rocks. Deposit occurs in a crescent-shaped zone around the eastern portion of the Eocene stock. Deposit age interpreted as Eocene.

Carter, 1982; EMR Canada, 1989.

N09-08 55°25'N 129°26'W	Roundy Creek Skeena	Mo Porphyry Mo	Medium. Reserves of 8.4 million tonnes grading 0.15% MoS_2.

Deposit occurs in three zones: the Roundy Creek Zone that lies east of a major fault within quartz stockwork and as fracture fillings; and the Sunshine Creek and High Grade Zones that lie west of the fault and occur as lens-like zones mainly in alaskite dikes. Host rocks are quartz monzonite porphyry of the Eocene Alice Arm Intrusions and argillites and siltstones of the Late Jurassic Bowser Assemblage. K-Ar age for the Alice Arm Intrusion of 52.5 Ma and 53.5 Ma. Deposit age interpreted as Eocene.

Christopher and Carter, 1976; Soregaroli and Sutherland Brown, 1976; Carter, 1982; B.C. Minfile, 1989; EMR Canada, 1989.

N09-09 55°25'N 129°25'W	Kitsault (BC Moly) Skeena	Mo Ag, Pb, Zn, Cu Porphyry Mo	Medium. Production and reserves of 113.3 million tonnes grading 0.184% MoS_2.

Consists of molybdenite in quartz vein stockworks that are related to an Eocene quartz monzonite and quartz diorite stock that intrudes Late-Jurassic-Early Cretaceous siltstones and greywackes of the Bowser Assemblage. At least five phases of the stock are recognized. Three stages of mineralization are associated with intramineral dikes. Molybdenum-bearing rocks form a ring structure around the stock in quartz veinlets. Veinlets are cut by quartz veins, up to 3 meters wide and contain pyrite, galena, sphalerite, scheelite, chalcopyrite, tetrahedrite and pyrrhotite. K-Ar age of 53.7 ± 1.7 Ma for the porphyry. Between 1967 and 1972 production was 9.3 million tonnes grading 0.112% molybdenum. Reserves in 1989 were 104 million tonnes grading 0.19% MoS_2. Deposit age interpreted as Eocene.

Woodcock and Carter, 1976; Carter, 1982; Steininger, 1985; B.C. Minfile, 1989; EMR Canada, 1989.

N09-10 55°35'N 127°29'W	Mount Thomlinson Skeena	Mo Porphyry Mo	Medium. Reserves of 40.8 million tonnes grading 0.12% MoS_2.

Consists of molybdenite, chalcopyrite and pyrite occur with minor magnetite and scheelite that occur in a stockwork of veinlets near the northwest contact of a circular, Eocene quartz monzonite porphyry stock that intrudes argillaceous Jurassic sedimentary rocks. Deposit occurs predominantly within intrusive rocks along the northwest contact. Host sedimentary rocks are deformed and metamorphosed into biotite, muscovite, cordierite and andalusite-bearing schists. K-Ar isotopic age of 53.8 ± 2.2 Ma. Deposit age interpreted as Eocene.

Kirkham, 1964; Carter, 1982; EMR Canada, 1989.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-11 55°08'N 127°36'W	Red Rose Bulkley	W, Au, Cu, Ag W polymetallic vein	Medium. Reserves of 20,000 tonnes grading 5% WO_3.
Consists of scheelite, ferberite, chalcopyrite, molybdenite and uraninite that occur in a shear quartz vein. Shear cuts one of three northeast-trending diorite dikes that intrude contact metamorphosed argillite and siltstone of the Red Rose Formation, near the contact with porphyritic granodiorite of the Cretaceous Rocher Deboule stock. Deposit age interpreted as Cretaceous. EMR Canada, 1989; Dawson and others, 1991.			
N09-12 55°15'N 126°10'W	Dorothy Skeena	Cu, Mo Porphyry Cu-Mo	Medium. Resource of 40.8 to 160 million tonnes grading 0.25% Cu, 0.01% MoS_2.
Consists of chalcopyrite, bornite and minor molybdenite that occur in narrow quartz-filled fractures, rimmed with potassium feldspar. Deposit hosted in a 7.6 meter-wide biotite-feldspar porphyry dike of quartz diorite to granodiorite composition that occurs along the contact with Jurassic Hazelton Group volcanics and sediments. Deposit age interpreted as Late Cretaceous(?). B.C. Minfile, 1985; EMR Canada, 1989.			
N09-13 55°11'N 126°19'W	Morrison Skeena	Cu, Ag, Au Porphyry Cu-Au (Mo)	Medium. Resource of 86 million tonnes grading 0.42% Cu, 0.34 g/t Au, 3.4 g/t Ag, 0.017 Mo.
Consists of chalcopyrite and pyrite that occur in a stockwork of veinlets and fractures, and as disseminations in biotite-hornblende-plagioclase porphyry of the Eocene Babine Suite and in peripheral Jurassic sedimentary rocks. Porphyry and intruded sedimentary rocks are displaced by a fault. Deposit age interpreted as Eocene. Carson and Jambor, 1974; Carter, 1982; EMR Canada, 1989.			
N09-14 55°00'N 126°14'W	Bell Copper (Newman) Skeena	Cu, Au, Ag Porphyry Cu-Au (Mo)	Medium. Production and reserves of 71.75 million tonnes grading 0.46% Cu, 0.23 g/t Au, 0.48 g/t Ag, 0.006 Mo.
Consists of chalcopyrite and lesser bornite that occur as disseminations and in quartz lenses and stockwork veinlets. Deposit hosted in biotite-feldspar porphyry of the Eocene Babine Intrusions and the adjacent Jurassic metasedimentary rocks and metavolcanic rocks of the Hazelton Group. Two rock types are juxtaposed along the northwest-trending Newman fault. K-Ar biotite isotopic age of 51.0 Ma for porphyry interpreted as age of deposit. Ore zone exhibits pervasive potassic (mainly biotite) alteration with a surrounding concentric halo of chlorite and sericite-carbonate alteration. Alteration coincides with a two-km-wide pyrite halo that surrounds the deposit. Better copper grades occur in a 60 x 90 m-thick, flat-lying deposit which is connected to a central pipe-like zone, centered on the western contact of the intrusion. Past production was 28.7 million tonnes grading 0.46% Cu. Reserves include the Extension zone. A supergene chalcocite zone caps the deposit and extends to depths of 50 to 70 meters. Deposit age interpreted as Eocene. Carson and Jambor, 1974; Carson and others, 1976; Noranda Inc., annual report, 1990; B.C. Minfile, 1991; Butrenchuk, 1991.			
N09-15 54°57'N 126°09'W	Granisle Skeena	Cu, Au, Ag Porphyry Cu-Au (Mo)	Large. Production and reserves of 66.2 million tonnes grading 0.42% Cu, 0.12 g/t Au, 1.12 g/t Ag, 0.009 Mo.
Consists of chalcopyrite, bornite and pyrite with low grade Au and Ag and local minor molybdenite that occur in quartz-filled fractures associated with Eocene Babine porphyry intrusions (avg. isotopic age 51.2 Ma) that intrude Lower Jurassic Hazelton Group volcanic and sedimentary rocks. Deposit centered on the contact between biotite-feldspar porphyry and an earlier quartz diorite phase. A central potassic alteration zone is enveloped successively by a quartz-sericite-carbonate-pyrite zone and by a chlorite-carbonate-epidote zone. Deposit age interpreted as Eocene. Kirkham, 1971; Carson and Jambor, 1974; Fahrni and others, 1976; EMR Canada, 1989; Dawson and others, 1991.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-16 54°49'N 127°18'W	Glacier Gulch (Hudson Bay Mountain) Bulkley	Mo W, Cu Porphyry Mo	Large. Resource of 100 million tonnes grading 0.297% MoS_2, 0.06% WO_3.

Consists of molybdenite and minor scheelite that occur in stockwork and quartz vein swarms that are associated with a sheet-like granodiorite body and a later rhyolite porphyry plug. Igneous rocks intrude Jurassic Hazelton Group. The strongest mineralization occurs in to a crudely layered granodiorite sheet in the volcanic pile. Hydrothermal alteration patterns are irregularly developed. Deposit age interpreted as Late Cretaceous.

Kirkham, 1967; Bright and Jonson, 1976; EMR Canada, 1989; BC Minfile, 1995.

N09-17 54°49'N 126°54'W	Big Onion Skeena	Cu, Mo Porphyry Cu-Mo	Medium. Reserves of 18 million tonnes grading 0.36% Cu.

Consists of chalcopyrite, molybdenite and minor bornite that occur in a quartz stockwork and as disseminations in an Eocene pluton of the Nanika Suite and in the surrounding andesite of the Jurassic Hazelton Group. The pluton is an elongate, complex intrusion, formed of two phases, an early quartz feldspar porphyry and a core of younger quartz diorite porphyry. Highest copper grades are in the quartz diorite porphyry; highest molybdenum grades are in quartz feldspar porphyry, and the pyrite occurs in volcanic rocks. K-Ar age isotopic age of 48.7 ± 1.9 Ma obtained from a post-mineral dike. Deposit age interpreted as Eocene.

Mustard, 1976; Carter, 1982; EMR Canada, 1989.

N09-18 54°39'N 127°45'W	Serb Creek Skeena	Mo Porphyry Mo	Medium. Resource of 41.2 million tonnes grading 0.08% MoS_2.

Conists of molybdenite that is widely distributed in fractures and quartz vein stockwork in the quartz monzonite core of an Eocene granodiorite stock that intrudes Hazelton Group volcanic rocks. Deposit age interpreted as Eocene.

Soregaroli and Sutherland Brown, 1976; EMR Canada, 1989; Dawson and others, 1991.

N09-19 54°02'N 126°59'W	Lucky Ship Skeena	Mo Porphyry Mo	Medium. Reserves of 18.1 million tonnes grading 0.16% MoS_2.

Consists of molybdenite that occurs in a stockwork and fractures that are concentrated along the contact between two phases of an Eocene rhyolite porphyry plug that intrudes Jurassic sedimentary and volcanic rocks of the Hazelton Group. Rhyolite porphyry consists of two porphyritic and two breccia phases. Surrounding sedimentary and volcanic rocks are contact metamorphosed. Silicification and molybdenum mineralization are most intense around the younger porphyritic phase where the stockwork is developed. A pyrite halo surrounds silicification in an earlier porphyritic phase, and in breccia and the hornfels. K-Ar isotopic age of 49.9+2.3 Ma obtained from biotite in hornfels. Deposit has potential for open-pit mining. Deposit age interpreted as Eocene.

Soregaroli and Sutherland Brown, 1976; Carter, 1982; EMR Canada, 1989.

N09-20 54°01'N 126°59'W	Poplar Bulkley	Cu, Mo, Ag Porphyry Cu-Mo	Medium. Reserved of 144.1 million tonnes grading 0.368% Cu, 0.10% MoS_2, 2.8 g/t Ag.

Consists of disseminated chalcopyrite and pyrite that occur in a Late Cretaceous biotite-monzonite porphyry stock. Molybdenite occurs in veins with quartz and gypsum. Porphyry stock intrudes Hazelton Group volcaniclastic and epiclastic rocks. Deposit age interpreted as Late Cretaceous.

Mesard and others, 1979; EMR Canada, 1989.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-21 54°05'N 126°44'W	Nadina (Silver Queen) Skeena	Zn, Pb, Ag, Au, Cu Ag polymetallic vein	Medium. Reserves of 1.72 million tonnes grading 6.19% Zn, 328 g/t Ag, 2.7 g/t Au.
Consists of sphalerite, galena and chalcopyrite that occur in a gangue of quartz, rhodochrosite, chalcedony and barite in Late Cretaceous andesite and altered fragmental volcanic rocks. Deposit age bracketed by porphyritic diorite and later felsite dikes and sills, similar to the Eocene Goosly Lake Intrusions. Deposit age interpreted as Eocene. EMR Canada, 1989; Leitch and others, 1990; Dawson and others, 1991.			
N09-22 54°11'N 126°16'W	Equity Silver (Sam Goosly) Skeena	Ag, Cu Au, Sb, As Ag polymetallic vein	Medium. Production and reserves of 32.1 milion tonnes grading 71.3 g/t Ag, 3.90 g/t Au.
Consists of pyrite, chalcopyrite, pyrrhotite and tetrahedrite, with minor sphalerite and galena and silver sulfosalts that are accompanied by argillic alteration. Sulfides occur in veins, disseminations, and massive sulfide replacement bodies, up to 120 m thick, that are situated in tabular fracture zones roughly parallel to stratigraphy. Reserves of 5,915,454 tonnes grading 72.01 g/t Ag, 0.82 g/t Au and 0.22% Cu. Total gold content (production + reserves) estimated as 16,936,034 g (16.9 tonnes). Deposit occurs between the two intrusives, the Cretaceous Skeena Assemblage sedimentary and pyroclastic rocks are intruded by a granitic stock (58 Ma) and a gabbro-monzonite stock (48 Ma) of the Goosly Lake Intrusions. Deposit age interpreted as Eocene. Church, 1971; Carter, 1982; B.C. Minfile, 1988; Northern Miner, March 28,1988; Schroeter and Lane, 1991.			
N09-23 53°52'N 129°31'W	Ecstall Tracy	Zn, Cu, Au, Pb, Ag, Fe Kuroko Zn-Pb-Cu massive sulfide	Medium. Reserves of 6.9 million tonnes grading 0.63% Cu, 2.6% Zn.
Consists of pyrite, chalcopyrite, sphalerite, pyrrhotite, marcasite and galena that occur as two tabular massive stratabound lenses in Paleozoic schist, quartzite and granitoid gneiss remnants of the Nisling terrane within Coast Plutonic Complex. Deposit occurs in a volcanic sequence close to a volcanic center. Intense hydrothermal alteration consists of chlorite, sericite and silica. Deposit age interpreted as Paleozoic. Bacon, 1953; B.C. Minfile, 1989; EMR Canada, 1989; Hoy, 1991.			
N09-24 53°45'N 127°41'W	Nanika (DW, New Nanik) Skeena	Cu Mo Porphyry Cu-Mo	Medium. Reserves of 18.14 million tonnes grading 0.437% Cu.
Consists of chalcopyrite, pyrite, pyrrhotite, molybdenite and bornite that occur in dacite porphyry of the Jurassic Hazelton Group. Porphyry intrudes along a faulted contact with quartz monzonite of the Eocene Nanika Suite. Sulfides occur as disseminations, fracture-fillings and veinlets. Alteration minerals in the dacite are biotite, silica and chlorite. Deposit age interpreted as Eocene. George Cross Newsletter, no. 213, October 30, 1973; Carter, 1982; EMR Canada, 1989; B.C. Minfile, 1991.			
N09-25 53°48'N 127°26'W	Berg Skeena	Cu, Mo Pb, Zn, Ag, Au Porphyry Cu-Mo	Medium. Reserves of 238 million tonnes grading 0.39% Cu, 0.05% MoS_2, 2.84 g/t Ag.
Consists of chalcopyrite, molybdenite and pyrite with minor sphalerite, galena and arsenopyrite. Deposit occurs within a fine-grained stockwork of quartz-filled veinlets that are distributed in a broad asymmetrical zone around a semicircular quartz-monzonite porphyry stock of the Eocene Nanika Suite and within the peripheral ,contact-metamorphosed Hazelton Group volcanic rocks. Most intense molybdenum concentrations occur in the stock, most intense copper concentrations occur 60 meter beyond the contact. A pyrite halo occurs 300 - 600 meters from the contact. Extensive oxidation, leaching and secondary enrichment is present. Deposit age interpreted as Eocene. Panteleyev and others, 1976; Panteleyev, 1981; EMR Canada, 1989; Dawson and others 1991.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-26 53°46'N 127°12'W	Whit (Whiting Creek) Skeena	Mo, Cu Porphyry Mo-Cu	Medium. Resource of 123.5 million tonnes grading 0.043% MoS_2, 0.062% Cu.

Summary and References

Consists of pyrite, chalcopyrite and molybdenite that occur in Jurassic Hazelton Group fragmental rocks that are intruded by Late Cretaceous stocks. The largest stock is a hornblende-biotite granodiorite. Deposit occurs in veinlets and quartz stockworks in contact metamorphosed fragmental rocks and in sericite-altered porphyry. Highest Mo concentrations accompanied by quartz flooding. Deposit age interpreted as Eocene.

B.C. Minfile, 1986; EMR Canada, 1989.

N09-27 53°41'N 127°10'W	Huckleberry Bulkley	Cu, Mo Ag, Au Porphyry Cu-Mo	Medium. Reserves of 91.2 million tonnes grading 0.52% Cu , 0.014% Mo, 0.064 g/t Au, 3.1g/t Ag.

Consists of chalcopyrite and minor molybdenite that occur in fractures dominantly within contact metamorphosed and altered Jurassic Hazelton Group tuffs at contact with an Upper Cretaceous granodiorite porphyry stock of the Burkley Suite. Magnetite occasionally accompanies chalcopyrite. Potassic, pyrite and chlorite alteration haloes surround the stock. Deposit age interpreted as Late Cretaceous.

Southerland Brown, 1969; Carter, 1970; James, 1976; B.C. Minfile, 1988; EMR Canada, 1989; Mining Review, 1992; Society of Exploration Geologists Newsletter, no. 20, January, 1995, p. 26.

N09-28 53°41'N 127°03'W	Ox Lake Bulkley	Cu, Mo Au, Ag Porphyry Cu-Mo	Medium. Reserves of 17.2 million tonnes grading 0.33% Cu, 0.06% MoS_2.

Consists of pyrite, chalcopyrite, hematite, magnetite, pyrrhotite and molybdenite that occur as disseminations and as stockworks in Jurassic felsic tuff, andesite tuff, sandstone and siltstone intruded by an Upper Cretaceous granodiorite stock of the Bulkley Suite. Copper minerals are dominate in the hornfels, and molybdenum minerals are dominant in the porphyry. Pyrite forms a halo extending beyond deposit. Porphyry stock has a K-Ar age isotopic date of 83.4 ± 3.2 Ma. Deposit age interpreted as Upper Cretaceous.

Sutherland Brown, 1969; Carter, 1970, 1982; Richards, 1976; EMR Canada, 1989; Dawson and others, 1991.

N09-29 53°18'N 127°00'W	Redbird Skeena	Mo Cu Porphyry Mo	Medium. Reserves of 63.5 million tonnes grading 0.17% MoS_2.

Consists of molybdenite and pyrite that occur in a stockwork of quartz veinlets within peripheral concentric alteration zones of a quartz-monzonite porphyry stock of the Eocene Nanika Suite that intrudes Middle Jurassic pyroclastic rocks. Stock is dominantly one phase, and hosts a peripheral ring of molybdenum. Potassic (K-feldspar), silica-sericite, and kaolinite alteration are present. Stock has a K-Ar isotopic age 49.0 ± 2 Ma. Deposit age interpreted as Eocene.

Carter, 1982; EMR Canada, 1989; Dawson and others, 1991.

N09-30 52°25'N 131°18'W	Burnaby Iron (Jib) Island Porphyry	Fe Cu Fe skarn	Medium. Reserves of 7.26 million tonnes grading 60% Fe.

Consists of aconcordant body of magnetite that replaces the contact of Upper Triassic Kunga Group limestone and Upper Triassic Karmutsen, Vancouver Group greenstone. Both are intruded by Middle to Late Jurassic monzonitic stocks of the Burnaby Island Plutonic Suite. Stratified rocks strike northeast, dip moderately northwest, and are offset by steeply dipping northwest faults. Massive magnetite bodies grade into skarns. Sulfides are erratic and consist mainly of pyrite, with rare chalcopyrite, pyrrhotite and sphalerite. Deposit age interpreted as Middle Jurassic.

B.C. Minfile, 1992; Sutherland Brown, 1968, Anderson and Reichenbach, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-31 52°18'N 131°12'W	Jedway (Magnet, Jessie) Island Porphyry	Fe Fe skarn	Medium. Pre-production reserves of 4.30 million tonnes grading 62% Fe.

Consists of replacement bands of magnetite, separated by skarn, that occur mainly basalt, conformable to bedding and also along faults. Hosted in basalt of the Upper Triassic Karmutsen Formation that is overlain by Upper Triassic Kunga Group limestone and argillite. Volcanic and sedimentary rocks intruded by greenstone, and diorite porphyry to quartz diorite of the Middle to Late Jurassic Jedway stock of the Burnaby Island Plutonic Suite, and by younger rhyolite and basaltic dikes. Skarns related to the stock. Operated from 1962-1968. Produced 3,938,682 tonnes of ore. Deposit age interpreted as Middle Jurassic.

Sutherland Brown, 1968; Anderson and Reichbach, 1991; B.C. Minfile, 1992.

N09-32 55°45'N 130°45'W	Alamo Tracy	Ag, Au, Cu, Zn Kuroko massive sulfide(?)	Grab samples and drill core with up to 0.2 to 0.7% Cu, 0.2 g/t Au, 50 g/t Ag, and minor Zn

Disseminated and vein-like(?) masses of chalcopyrite, pyrite, pyrrhotite, and sphalerite in zone up to 25 m wide in Paleozoic(?) paragneiss of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984) near foliated granodiorite.

Berg and others, 1977

N09-33 55°22'N 131°12'W	Sea Level Juneau	Au, Ag Au quartz vein	Unknown amount of gold produced in early 1900's

Quartz fissure veins with pyrite, galena, sphalerite and sparse gold in upper Paleozoic or Mesozoic schistose metatuff of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Local disseminated sulfides in wallrocks. Sulfide and gold concentrations higher where quartz vein crosscuts altered feldspar porphyry dikes. Minimum strike length of 600 m. One 36-m-deep shaft, and 363 m of horizontal workings.

Wright and Wright, 1908

N09-34 55°18'N 131°39'W	Goldstream Juneau	Au, Cu, Pb, Zn Au quartz vein	Produced several thousand tonnes ore

Quartz veins contain gold, pyrite, chalcopyrite, galena, sphalerite, and arsenopyrite. Veins cut greenschist, quartz-sericite schist, and pelitic schist of in Upper Jurassic and Lower Cretaceous Gravina-Nutzotin belt. Principal vein about 1 to 2.5 m wide. Several hundred meters of workings.

Wright and Wright, 1908

N09-35 55°18'N 131°21'W	Moth Bay Ketchikan	Cu, Zn Kuroko massive sulfide	Estimated 91,000 tonnes of 7.5% Zn grading 1% Cu. Additional 181,000 tonnes of 4.5% Zn, 0.75% Cu

Discontinuous lenses and layers of massive pyrite and pyrrhotite, with minor chalcopyrite and galena. Associated with disseminated pyrite locally. Host rocks are light brown-gray, upper Paleozoic or Mesozoic muscovite-quartz-calcite schist, subordinate pelitic schist and quartz-feldspar schist, and possibly metachert. Layers and lenses of massive sulfides up to 1 m thick parallel compositional layering of schist. Host rocks part of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Several open cuts and about 230 m of underground workings.

Robinson and Twenhofel, 1953; Berg and others, 1978; Henry C. Berg, written commun., 1984

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N09-36 55°04'N 130°31'W	Red River Tracy	Cu, Mo Kuroko massive sulfide	No data

Disseminated grains and small masses of pyrite, pyrrhotite, magnetite, and molybdenite occurring along layering in Paleozoic(?) paragneiss intruded by pegmatite and gneissic granodiorite, of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Sulfide-bearing layers range from a few centimeters to 30 m thick.

Berg and others, 1978

N09-37 54°55'N 131°21'W	Duke Island Klukwan-Duke	Cr, PGE Zoned mafic-ultramafic Cr-PGE	Grab samples contain 0.037 g/t Pt and 0.033 g/t Pd

Disseminated to locally massive titaniferous magnetite and sparse chromite in hornblende-clinopyroxene phase of Cretaceous zoned ultramafic pluton. Ultramafic pluton intrudes early Paleozoic felsic metavolcanic rocks, early Paleozoic diorite, and Triassic gabbro of Alexander terrane.

Clark and Greenwood, 1972; Irvine, 1974; Berg and others, 1981

N10-01 55°56'N 125°26'W	Lorraine (Duckling Creek) Copper Mountain (North)	Cu Au, Mo Porphyry Cu-Mo	Medium. Resource of 9.1 million tonnes grading 0.70% Cu, 0.27 g/t Au.

Consists of two fault-bounded zones of chalcopyrite, bornite and magnetite that occur as disseminations in a syenite migmatite of the Copper Mountain Suite that intrudes monzonite and diorite of the Hogem batholith. K-Ar isotopic age of 175 ± 5 Ma for syenite intrusion and associated deposit. Sulfides are dominantly disseminated, but also occur in veins. In a Lower Zone, sulfides occur in mafic-rich lenses and are zoned from chalcopyrite + pyrite at the rim, through chalcopyrite with minor bornite to bornite with minor chalcopyrite at the core. Magnetite is common in veinlets and as an accessory mineral. An Upper Zone is similar but is highly oxidized. Copper deposition associated with high biotite and chlorite content, potassium feldspar and sericite alteration. Deposit age interpreted as Middle Jurassic.

Wilkinson and others, 1976; Garnett, 1978; B.C. Minfile, 1985; Dawson and others, 1991; EMR Canada, 1989.

N10-02 55°08'N 124°02'W	Mount Milligan Copper Mountain (North)	Cu, Au Porphyry Cu-Au	Medium. Reserves of 298.4 million tonnes grading 0.22% Cu, 0.45 g/t Au.

Consists of pyrite, chalcopyrite, bornite and magnetite that occur as disseminations and in quartz veinlets. Hosted in augite porphyritic andesite of the Witch Lake Formation of the Upper Triassic to Lower Jurassic Nicola Assemblage that is intruded by several small brecciated diorite and monzonite porphyry dikes and stocks. Deposit related to the intrusion of the MBX and Southern Star stocks. A U-Pb zircon age of 183 ± 1 Ma is obtained for the Southern Star monzonite. Cu and Au minerals associated with moderate to intense potassic alteration around intrusive contacts. Propylitic alteration is widespread and peripheral to potassic alteration. Deposit age interpreted as Middle Jurassic.

EMR Canada, 1989; Delong and others, 1991; McMillan, 1991; Gosh, 1992; Nelson and others, 1991; Barrie, 1993, E & M J , April 1992.

N10-03 54°38'N 124°26'W	Pinchi Lake Pinchi Lake	Hg Silica-carbonate Hg	Medium. Reserves of 1.1 million tonnes grading 0.32% Hg.

Consists of cinnabar that occurs in a stockwork of thin quartz veins, replacement, lodes and breccia fillings. Hosted in marine limestone and carbonatized ultramafic rocks that occur in shears along the Pinchi Fault. Fault separates the Mississippian to Triassic Cache Creek Terrane from the Upper Triassic rocks of Quesnellia and is interpreted as providing a zone of permeability for mercury-bearing hydrothermal solutions. Ultramafic rocks, chert, argillite and greenstone are part of Cache Creek ophiolite and are intensely altered along the fault zones to an assemblage of Fe-Mg carbonates, quartz, mariposite and talc. Mineralization postdated both the Upper Triassic blueschists and Upper Cretaceous-Early Tertiary conglomerates. Production of 6000 tonnes of Hg between 1942 to 1975. Deposit age interpreted as Eocene-Oligocene(?).

Armstrong, 1949; Paterson, 1977; B.C. Minfile, 1989; EMR Canada, 1989; Dawson and others, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N10-04 54°02'N 125°07'W	Endako Francois Lake	Mo Porphyry Mo	Large. Reserves of 280.0 million tonnes grading 0.08% Mo.

Consists of molybdenite, pyrite and magnetite that occur in an elongate stockwork of quartz-sulfide veins that occur along a northwest-trending axis. Deposit hosted in quartz monzonite of the Late Jurassic Francois Lake Suite and occurs mainly along a series of en echelon east-striking veins, at or near the intersection of regional northwest and east structures. Alteration includes pervasive kaolinite and vein envelopes of potassium feldspar and sericite. Intrusive has a K-Ar isotopic age of 141 Ma. Deposit age interpreted as Late Jurassic-Early Cretaceous.

B.C. Minfile, 1989; Dawson and others, 1991; Kimura and others, 1976; Dawson and Kimura, 1972; White and others, 1970.

N10-05 53°17'N 125°10'W	Capoose Lake Skeena	Ag Pb, Zn, Cu, Au Ag-Au polymetallic vein	Large. Reserves of 28.3 million tonnes grading 36 g/t Ag, 0.91 g/t Au.

Consists of high Au and Ag concentrations associated with galena, pyrite, pyrrhotite, chalcopyrite, arsenopyrite and sphalerite that occur as disseminations, replacement of garnet, and fracture filling in Jurassic volcanic rocks of the Hazelton Group in structurally controlled zones. Volcanic rocks associated with subvolcanic porphyritic pluton of the Eocene Quanchus Suite. Deposit age interpreted as Eocene.

Church and Diakow, 1982; EMR Canada, 1989; Mining Review, 1992.

N10-06 53°05'N 121°34'W	Cariboo-Barkerville District (Aurum, Mosquito Creek, Cariboo	Au Ag Au quartz vein	Medium. Production (1933-1987) of 38-05 t Au, 5.1 t Ag, Reserves of 401,768 tonnes grading 5.08 g/t Au. Average grade of 5.08 g/t Au.

District contains three principal mines (Cariboo Gold Quartz, Mosquito Creek, and Island Mountain Mines) that consists of quartz-sulfide veins and pyritic replacement lenses. Quartz-sulfide veins occur in phyllite and quartzite of the "Rainbow Member" usually within 100 meters of the local contact with mafic volcanic rocks and minor limestones of the "Baker Member" of the Lower Cambrian Downey Creek Formation of the Cariboo terrane. Pyrite lenses occur discontinuously in marble bands within the "Baker Member". Two sets of quartz-sulfide-Au veins are associated with major north-trending faults. Veins intrude the pyrite-Au lenses that appear to predate deformation and are interpreted to be syn-metamorphic. Producted 2.7 million tonnes ore (1933-1987), with average grade of 13.94 g/t Au, 1.87 g/t Ag. Deposit age interpreted as Middle Jurassic and Early Cretaceous.

Andrew and others, 1983; B.C. Minfile, 1989; Robert and Taylor, 1989; Schroeter and Lane, 1991.

N10-07 52°31'N 122°16'W	Gibraltar (Pollyanna, Granite Mt) Guichon	Cu, Mo Ag, Au Porphyry Cu-Mo	Large. Production and reserves of 413 million tonnes grading 0.35% Cu, 0.016% MoS_2, 0.006 g/t Au.

Consists of chalcopyrite, chalcocite, molybdenite, cuprite and bornite with minor magnetite and pyrite that occur as stockworks and fracture-filling veins. Deposit hosted in the metamorphosed and deformed Granite Mountain quartz diorite pluton of the Guichon Suite. Pluton intrudes volcanic and sedimentary rocks of the Cache Creek terrane. K-Ar age of 204 Ma ± 6 Ma (Early Jurassic) for pluton age. Multiple intrusions, deformation, greenschist facies metamorphism and mineralization are interpreted to have occurred contemporaneously with amalgamation of Cache Creek terrane with Quesnellia and Stikinia to the east and west respectively. Current reserves of 54 million tonnes grading 0.38% Cu. Deposit age interpreted as Early Jurassic.

Drummond, and others, 1976; B.C. Minfile, 1990; McMillan, 1991; Dawson and others, 1991, Gibraltar Mines Ltd., news release, March 21, 1994.

N10-08 52°34'N 121°38'W	Mt. Polley (Cariboo-Bell) Copper Mountain (South)	Cu, Au Porphyry Cu-Au	Medium. Reserves of 48 million tonnes grading 0.38% Cu, 0.55 g/t Au.

Consists of magnetite, chalcopyrite and minor pyrite that occur in several intrusive phases and three distinct breccias in an Early Jurassic pseudoleucite-bearing alkaline complex that intrudes Upper Triassic Nicola alkaline volcanic and volcaniclastic rocks of the Quesnel Trough. Some skarn and vein occurs in Nicola Group tuffite and flows. Supergene mineralization includes malachite, native copper, cuprite, chalcocite and covellite. U-Pb zircon age of (200 ± 1.5 Ma) for diorite and of monzonite porphyry. Deposit age interpreted as Early Jurassic.

EMR Canada, 1989; B.C. Minfile, 1991; McMillan, 1991; Mining Review, 1991; Gosh, 1992; Fraser and others, 1993.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N10-09 52°34'N 120°59'W	Eaglet (Quesnel Lake) Unassigned	F Ag, Zn, Pb, Mo, W F vein	Medium. Reserves of 21.8 million tonnes grading 11.5% CaF_2 (w/ up to 514 g/t Ag).

Summary and References

Consists of fluorite in feldspar-mica gneiss of Kootenay terrane that is intruded by masses of pegmatite, aplite and granitic rock. Fluorite occurs as disseminated grains, as thin films on fractures, as veinlets and scattered veins up to 15 cm thick, and as pods and irregular masses 15 to 20 cm wide. North to northwest-trending mineralized zones dip steeply. Other ore minerals are galena, sphalerite, molybdenite, celestite, pyrite and silver. Deposit contains chlorite, sericite, and potassic alteration. Deposit age interpreted as Early Cretaceous.

Ball and Boggaram, 1985; B.C. Minfile, 1989; EMR Canada, 1989; Dawson and others, 1991.

N10-10 52°18'N 120°35'W	Frasergold (Eureka Peak, Kay, Mac) Cariboo	Au Ag, Cu, Zn, Pb Au quartz vein	Medium. Resource of 12.7 million tonnes grading 1.85 g/t Au.

Consists of disseminated pyrrhotite and pyrite (5% to 10%) with trace sphalerite, chalcopyrite, galena and coarse-grained gold that occur in deformed quartz-carbonate veins and stockwork. Occurs as stratabound bodies in porphyroblastic phyllite (locally referred to as "knotted phyllite") of the Upper Triassic Quesnel River Group. Veins are interpreted as forming early in the structural history of the area and generated by metamorphic segregation during the accretion of Quesnellia terrane to ancestral North America. The Frasergold Main Zone has been traced by drilling over a strike length of 8 km with gold deposits occurring in at least three stratigraphic horizons within the phyllite. Reserves of 12.7 million tonnes are based on a mining depth of 100 meters. Mineable reserves estimated as 3.17 million tonnes grading 1.71 g/t. Deposit age interpreted as Middle Jurassic.

Bloodgood, 1987; B.C. Minfile, 1989; Eureka Resources Inc., annual report,1990; Mining Review, 1992.

N10-11 52°06'N 120°54'W	Boss Mountain Bayonne	Mo Porphyry Mo	Medium. Reserves of 3.84 million tonnes grading 0.135% Mo.

Consists of molybdenite that occurs in quartz veins, fracture zones and in collapse breccias hosted by the granodiorite phases of the composite Early Jurassic Takomkane batholith that is associated with the mid-Cretaceous Boss Mountain stock. Emplacement of the stock was accompanied by rhyolite dikes, brecciation and multiple stages of veining and Mo deposition. Pyrite forms a 1.5 km-wide halo. Alteration assemblages consists of garnet, hornblende, biotite, sericite, potassium feldspar, chlorite and talc. Produced 2.2 million tonnes grading 0.7% MoS_2 between 1965 and 1982. Deposit age interpreted as mid-Cretaceous.

EMR Canada, 1989; Soregaroli and Nelson, 1976.

N11-01 53°45'N 119°53'W	Forgetmenot Pass Southern Rocky Mountain	Gypsum magnesite Stratbound gypsum	Medium. Reserves of 2.3 million tonnes grading 75% to 90% gypsum.

Consists of four concordant beds of gypsum that are hosted in Upper Triassic dolomite of the lowermost Whitehorse Formation. Beds range from 2 to 26 meters thick, occur over a 100-meter stratigraphic interval, strike northwestward, and dip from 25° to 30° southwest. Solution breccia is locally present. Potential resource of 25 to 30 million tonnes at grades similar to reserves. Deposit age interpreted as Upper Triassic.

EMR Canada, 1989; B.C. Minfile, 1991; Butrenchuk, 1991.

N51-01 55°59'N 123°54'E	Bamskoe (Chul'bango) Stanovoy	Au, Ag Au-Ag epithermal vein	Medium. Average grade of 8.4 g/t Au and 25 g/t Ag

Consists of thirty-five zones of listwanite-beresite hydrothermal alteration that occur in granite and gneiss. Altered zones contain eight Au-bearing prospects with abundant veins, pods, and small quartz and quartz-carbonate veinlets. Prospects range from 140 to 960 m long and have an average thickness of about 3 m. Deposit associated with Early Cretaceous(?) subvolcanic rhyolite and rhyodacite stock, and occurs around the periphery of stock that intrudes Late Proterozoic granite and biotite-amphibolite gneiss of the Stanovoi terrane.

A.V. Lozhnikov and others, written commun., 1989; Kurnik, 1992.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N51-02 54°19'N 122°35'E	Berezitovoe Unassigned	Zn, Pb, Au, Ag Polymetallic sufide and Au vein	Medium. Average grade of 3.3 g/t Au, 14.3 g/t Ag, 0.93% Zn , 0.57% Pb. Contains an estimated 42.3 tonnes Au, 201.0 tonnes Ag, 131.0 thousand tonnes Zn, 80 thousand tonnes Pb.

Massive Pb-Zn sulfides occur in a lenticular, northwest-striking, steeply-dipping (75-85°) zone that ranges up to 1000 m long and from 100 to 160 m thick. Polymetallic sulfide deposit hosted in Early Proterozoic gneissic granite. Sulfides metamorphosed; galena-sphalerite aggregates contains later andradite garnet and gahnite (zinc spinel). Host muscovite-quartz-potassium feldspar rock also contains metamorphic garnet. Adjacent Mesozoic igneous rocks not metamorphosed, indicating pre-Mesozoic mineralization. Au deposit occurs in narrow northeast-trending fracture zones. Au mineralization is later than polymetallic sulfide mineralization. Thin Au-bearing zones, associated with quartz-sericite altered rock, occur beyond the polymetallic sulfide deposit in gneissic granite.

A.K. Ivashchenko and A.A. Kuzin, written commun., 1982; Vakh, 1989.

N51-03 54°27'N 124°14'E	Kirovskoe Stanovoy	Au Granitoid-related Au	Small. Mined until 1961. About 10 tonnes gold produced.

Consists of northwest-striking gold-quartz-sulfide veins hosted in an Early Cretaceous granodiorite stock. Veins commonly occur along contacts of diabase porphyry dikes that cut the granodiorite. Contacts of veins are generally sharp, although host rock is hydrothermally altered. Veins range from 0.5 to 1.0 m thick, and the surrounding altered rock ranges from 5.0 to 9.0 m thick. Altered rocks consist mainly of quartz, albite, sericite, and hydromica; the veins consists predominantly of 40 to 95% quartz. Main sulfides are pyrrhotite, arsenopyrite, and chalcopyrite, with less abundant galena, sphalerite, bismuthite, and tennantite-tetrahedrite. Gold ranges up to 0.28 mm diameter. Fineness of 844 to 977. Deposit source for the placer deposits of the Dzhalinda, Yannan, and Ingagli Rivers, the largest in the Russian Far East.

Gurov, 1969; G.P. Kovtonyuk, written commun., 1990.

N51-04 53°41'N 124°54'E	Burindinskoe Stanovoy	Au, Ag Au-Ag epithermal vein	Small. Average grade of 9.5 g/t Au, 42.6 g/t Ag. Reserves of about 827,400 tonnes. Inferred reserves of 6,230 kg gold and 38,200 kg silver.

Occurs in steeply-dipping quartz and quartz-carbonate gold-bearing veins. Veins range up to 200 m length, with an average thickness of about 10 m. Hosted in an Early Cretaceous volcanic sequence overlying the Gonzhinsky terrane of the Burea-Khanka superterrane.

V.A. Taranenko, written commun., 1991; G.P. Kovtonyuk, written commun., 1993.

N52-01 54°19'N 126°44'E	Zolotaya Gora Stanovoy	Au Au quartz vein	Small. Average grade of grade 52 g/t Au. Intermittently mined from 1917 to 1948. 2.5 tonnes gold produced.

Consists of quartz veins and zones of hydrothermally altered metamorphic rocks that occur conformably to host rock layering. Alteration is predominantly sericite-quartz and chlorite-amphibole-quartz. Main mineral assemblage is sulfides-biotite-quartz, sulfide-sericite-quartz and biotite-quartz-amphibole-chlorite. Less common are amphibole-quartz-feldspar mineral assemblages. Four successive stages of mineralization are identified: (1) magnetite-chalcopyrite-pyrrhotite-quartz; (2) gold-carbonate-sulfide; (3) zeolite; and (4) supergene. Gold occurs both in early and late quartz, and in hydrothermally-altered rocks. Gold generally forms films and fine plates in fractures. Gold concentrated in selvages of quartz and quartz-pyrite veins. Gold fineness high ((985). Deposit hosted in gneissic granite, granulite, calcareous shale, and quartzite of Stanovoi block of North Asian Craton.

Mel'nikov, 1984

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N52-02 53°27'N 126°27'E	Pioneer North Bureya	Au Granitoid-related Au	Small. Average grade of 2.7 g/t Au, and 5.2 g/t Ag. Reserves of 17.1 tonnes Au, 20.1 tonnes Ag.

Consists of quartz, quartz-feldspar, quartz-tourmaline, and quartz-carbonate veins, and zones of altered quartz-potassium feldspar-sericite-albite rocks. Zones are 1 to 50 m thick, and in plan commonly branch and change trends. Ore zones are large, have low Au content and no visible boundries. Extent of deposit determined by geochemical sampling. Gold and gold-sulfide ore assemblages are distinguished. Gold assemblage consists of quartz-adularia-carbonate veins; gold-sulfide assemblage consists of quartz veins with pyrite, galena, stibnite, and silver sulfosalts. Deposit hosted along margin of an Early Cretaceous granodiorite intrusion; both within the intrusion, and in adjacent contact metamorphosed Jurassic sandstone and siltstone.

N.E. Malyamin and V.E. Bochkareva, written commun., 1990; V.N. Akatkin, written commun., 1991.

N52-03 53°08'N 126°17'E	Pokrovskoe North Bureya	Au, Ag Au-Ag epithermal vein	Medium. Average grade 4.4 g/t Au and 15 g/t Ag. Reserves of 15 million tonnes.

Consists of gently-dipping quartz veins and zones of hydrothermal alteration. Main alteration types are propilitic (albite, sericite, calcite, chlorite, and pyrite), berezite (quartz, sericite, and hydromica), and argillic (kaolinite, montmorillonite, hydromica, carbonates, quartz, and pyrite). Largest ore bodies consist of gently-dipping zones of altered rock located near the lower contact of andesitic sequence with a granodiorite porphyry sill. Hydrothermally altered rocks composed of quartz (25-85%), carbonate (2-5%), hydromica (5-12%), adularia (up to 5%), kaolinite (5-7%), and sulfides (less than 1%, mostly pyrite). Gold is fine-grained (0.0005 to 0.032 mm) and associated mainly with quartz rather than with sulfides. Silver grains (0.002 to 0.016 mm) occur in Fe hydroxide. Deposit hosted in Late Cretaceous andesite, dacitic, and tuff. that overlies a Jurassic coal-bearing sequence of sandstone, siltstone, and argillite. Deposit interpreted as forming in Late Cretaceous.

Khomich and others, 1978; Mel'nikov, 1984; V.D. Mel'nikov, written commun., 1993; Khomich, 1990.

N52-04 53°06'N 131°50'E	Malomyr Selemdzha-Kerbi	Au Au quartz vein	Medium. Average grade of 5.0 to 12.4 g/t Au. Estimated reserves of 30-50 tonnes gold.

Consists of quartz veins and local stockworks, with an area of 12 km^2. Most (94%) of gold reserves occur in the gently-dipping Diagonalnaya zone that is about 3 km along strike and ranges from 30 to 150 m thick. Diagonalnaya zone has average grade of 1-2 g/t Au and consists of ten gently-dipping (20° to 30°) ore bodies ranging from1.0 to 28 m thick and 50 to 400 m long with an average grade of 5 to 12.4 g/t Au. Assemblages in deposit formed during five successive stages: (1) quartz breccia with abundant disseminated pyrite; (2) quartz-sulfide veinlets; (3) veinlets of chalcedony-like quartz; (4) monomineral pyrite veinlets; and (5) quartz-carbonate veinlets with pyrite. The second and third stages separated by the intrusion of dikes of Early Cretaceous granodiorite porphyry and diorite porphyry. Only pre-dike mineral assemblages contain gold. Dikes occur within ore zones and are controlled by the same fractures as ore bodies. Gold is fine-grained and ranges up to 0.02 mm. Shape of gold grains is predominatly lumpy, less commonly platy. Gold fineness ranges of 700 to 820. Typical admixtures are Fe, Ti, Cu, and Hg. Deposit hosted in Early Paleozoic quartz-micaceous rocks, shale, slate, and metasandstone of the Tukuringra-Dzhagdi terrane.

K.F. Klyzhko and V.P. Levshuk, written commun., 1982; S.G. Parada, written commun., 1984; B.D. Melnikov, written commun., 1993.

N52-05 52°43'N 129°07'E	Kamenushinskoe Gar	Cu, FeS Cu massive sulfide	Small

Consists of lenses, from 100 to 800 m long and 2 to 12 m thick, that occur conformable to bedding. Eleven ore bodies prospected to depths of 300 m. Pyrite is the most common ore mineral; however, some ore bodies consist of hematite-magnetite-pyrite ore. Chalcopyrite locally comprises up 1 to 2%. Deposit locally contact metasomatized into skarn during the intrusion of Paleozoic granite. Deposit is interpreted as of sedimentary-exhalative origin that was associated with felsic seafloor volcanism. Deposit hosted in Cambrian rhyolite of the Mamyn terrane. The rhyolite underlies a basaltic and limestone sequence that contains volcanogenic Fe (magnetite) Gar deposit.

P.N. Radchevsky, written commun., 1956 , V.V. Ratkin, this study.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N52-06 52°34'N 129°04'E	Gar Gar	Fe Volcanogenic Fe	Large. Average grade of 41.7% Fe. Estimated reserves of 389.1 million tonnes. Not mined

Consists of sheeted Fe layers, mainly magnetite, that occur in metamorphosed Early Cambrian(?) felsic and mafic volcanic and associated rocks with limestone lenses, all part of the Gar terrane. The Fe layers occur chiefly in the upper Early Cambrian(?) section, composed mainly of mafic volcanic rocks, within a section that is about 220 to 250 m thick. Most of the ore, about 75 percent, occurs within an interval ranging from 156 to 184 m thick. The deposit occurs for 4 km along strike. Deposit intruded by Early Paleozoic gabbro, diabase, and plagiogranite and is locally metamorphosed to skarn. Similar volcanogenic Fe deposis occur to the north and need further exploration.

Zimin, 1985; Zimin and Konoplev, 1989.

N52-07 52°19'N 128°22'E	Chagoyan Gar	Pb, Zn, Ag Stratiform Pb-Zn	Small. Average grade of 1.42% Pb, 5.16% Zn, and up to 3,000 g/t Ag. Estimated reserves of 65 thousand tonnes zinc.

Consists of a galena-sphalerite aggregate that occurs as cement between grains in sandstone, although veinlets are also common. Deposit isabout 270 m long and 1.0 m thick. Hosted in quartz-feldspar sandstone that underlies Cambrian(?) limestone and dolomite of Mamyn terrane. Galena and sphalerite are the dominant ore minerals, with subordinate pyrite, pyrrhotite, and chalcopyrite. Post-ore dikes and stocks of Early Cretaceous diorite and granodiorite cut ore bodies. The Mesozoic igneous rocks the stratiform ore bodies locally exhibit hydrothermal alteration to quartz, sericite, and tourmaline. Deposit occurs on the northern bank of the Zeya River.

I.G. Khel'vas, written commun., 1963; V.V. Ratkin, this study.

N53-01 55°38'N 133°42'E	Bogidenskoe Dzhugdzhur	Ti, P Anorthosite apatite Ti-P	Large. Average grade of 3-15% apatite averaging 5.7% P_2O_5. Contains an estimated 34.3 million tons P_2O_5. Extends to depth of 400 m.

Consists of densely disseminated and massive lenticular and sheeted bodies that occur in distinctly stratified rhythmic bands in olivine gabbro, gabbro-syenite, syenite, anorthosite, gabbro-norite, and pyroxene. The sheeted ore bodies extend for over 10 km along strike. Ore minerals are alternating massive, spotted, and disseminated apatite-ilmenite-titanium-magnetite. Apatite contains up to 2.4% F. Ti magnetite contains up to 21% TiO_2 and from 0.3 to 1.1 % V_2O_5; Ilmenite contains up to 3.1% Fe_2O_3. U-Pb isotopoic age determination on the igneous host rocks of 1,700 Ma . Deposit occurs in the upper basins of the Bogide and Soroga Rivers.

Lennikov, 1968, 1979; Panskikh and Gavrilov, 1984; Neimark and others, 1992.

N53-02 55°43'N 134°15'E	Gayumskoe Dzhugdzhur	Ti, P Anorthosite apatite Ti-P	Large. Average grade of 8.7% P_20_5. Locally contains up to 31.6% P_20_5. Estimated 40 million tonnes P_2O_5.

Consists of a series of closely-spaced, veined and stock-like bodies (nelsonites) of apatite, ilmenite, titanomagnetite hosted in anorthosite that is associated with lenticular and irregular bodies of olivine gabbro, gabbro-pyroxenite, pyroxenite, and dunite. Apatite is a hydroxyl-fluorine-bearing variety, containing up to 2.75% H_2O. Titanomagnetite contains from 3.8 to 21% TiO_2. Ilmenite is fairly oxidized and contains up to 2.5% Fe_2O_3. U-Pb isotopic age determination on the igneous host rocks of 1,700 Ma. Deposit occurs in the upper reaches of the Gayum River.

Lennikov, 1968, 1979; Panskikh and Gavrilov, 1984; Neimark and others, 1992.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N53-03 55°37'N 134°30'E	Maimakanskoe Dzhugdzhur	Ti, P Anorthosite apatite Ti-P	Large. Contains an estimated 63 million tons P_2O_5 extending to 400 m depth.

Consists of sparsely to densely disseminated, sheeted and lenticular, apatite-ilmenite-titanium magnetite ore bodies in olivine gabbro, gabbro-norite, gabbro-pyroxenite, and pyroxenite. Ore minerals are massive apatite, apatite-ilmenite, ilmenite, and apatite-ilmenite-titanium magnetite in steeply dipping (50-60°) veins (nelsonite) that are hosted in coarse-grained anorthosite. Apatite-ilmenite-titanium magnetite ore is predominate and comprised up to 80% of the deposit. Apatite contains fluorine. Titanium magnetite averages 13.6% TiO_2 and 0.37% V_2O_5. Ilmenite contains 6 to 7% Fe_2O_3. Apatite content up to 50-60% in massive and spotted apatite ore, but averages 15-20%. U-Pb isotoic age determination on the igneous host rocks of 1,700 Ma. Deposit occurs in the upper reaches of the Maimakan River near Kendeke Spring, over an area of approximately 30 km^2.

Lennikov, 1968, 1979; Panskikh and Gavrilov, 1984; Neimark and others, 1992.

N53-04 55°31'N 134°09'E	Dzhaninskoe Dzhugdzhur	Ti, P Anorthosite apatite Ti-P	Large. Low grade of up to 4% P_20_5 . Contain an estimated 78 million tons P_2O_5 to a depth of 400 m.

Consists of sparsely disseminated apatite, ilmenite, and titanium magnetite in olivine melanocratic gabbro, gabbro-pyroxenite, and pyroxenite that form stock-like bodies in anorthosite. Apatite contains up to 1.14% F;. Titanium magnetite is moderately titanium-bearing with up to 10.7% TiO_2 and with 0.28 % V_20_5 . Ilmenite contains 7.8% Fe_2O_3. U-Pb isotopic age determination on the igneous host rocks of 1,700 Ma. Deposit occurs on the right bank of the Dzhana River near the mouth of the Kurung River.

Lennikov, 1968, 1979; Panskikh and Gavrilov, 1984; Neimark and others, 1992.

N53-05 55°09'N 137°35'E	North-Shantarskoe Galam	P Sedimentary phosphorite	Small. Average grade of less than 6-8% P_2O_5.

Consists of phosphorite deposits that occur in a sedimentary breccia with indistinct borders. Deposit is as much as 15-16 m thick. Deposit hosted in carbonate rocks in a sequence of chert and volcanic rocks that are partially altered to quartz-carbonate rock. Sequence occurs for approximately 8-10 km at the northeast end of Bolshoi Shantar Island.

Shkolnik, 1973.

N53-06 54°18'N 134°59'E	Nelkanskoe Galam	P Sedimentary phosphorite	Small. Ranges from 4 to 30% P_2O_5 , averages 7-11%.

Consists of phosphorite sedimentary breccia that occur in a steeply-dipping sequence of jasper and volcanic rocks that are exposed in an erosional windows below gently-dipping Jurassic sedimentary rocks. Hosted in silicified dolomite and limestone. Phosphorite cannot be traced beyond altered carbonate rocks. Phosphorite beds range up to 1.8 km in length, although some are only several tens of meters long. Thickness varies from 2 to 41.4 m. Deposit drilled to almost 300 m. In addition to fragments of primary phosphorite, deposit contains fragments of silicified carbonate rocks that are generally 0.5 to 2 cm in diameter, and are cemented by phosphate and hydromica. Phosphates are radioactive.

Shkolnik, 1973.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N53-07 54°08'N 134°38'E	Ir-Nimiiskoe-2 Galam	P Sedimentary phosphorite	Medium. Phosphorus anhydrite ranges from 3 to 12%, averages 7-8%.

Consists of numerous deposits of unusual phosphorites, that occur in sedimentary breccia formed at atoll fans and seamounts. Deposits occur in an area 25-30 km long and 6-8 km wide and are hosted in complex, steeply-dipping and folded rocks that represent a reef edifice. Some of the carbonate is silicified. Boundaries of deposits are gradational due to the variable amount of fragments of primary phosphorite in host dominant limestone, dolomite, and cherty carbonate, and in rare jasper, volcanic, and cherty claystone fragments. Primary phosphorites seldom occur in situ, but occur in thin beds and small lenses of coquina formed predominantly of inarticulate brachiopods with phosphate shells and some Cambrian trilobites. Phosphorite breccia occurs at different stratigraphic levels and has no clear boundaries; margin determined by sampling. Approximately 30 phosphorite layers are identified. Layers range from several tens of m to several km long, but are commonly discontinuous. Deposit generally has simple mineral composition; in addition to phosphorite contain quartz, dolomite, calcite, rare pyrite, chert, and volcanic rock fragments. Thickness of the phosphorite ranges from 0.5 to 24 m, but varies greatly even over short distances.

S.G. Kostan'yuan and others, written commun., 1973.

N53-08 54°09'N 134°36'E	Ir-Nimiiskoe-1 Galam	Mn Volcanogenic Mn	Small. Average grade of 22.4% Mn.

Consists of partly metamorphosed, steeply-dipping, lenticular and sheeted, bedded Mn bodies that occur in a diverse Lower Cambrian sequence of jasper, shale, schist, spilite, basalt, and basaltic tuff that overlays a carbonate reef complex with seamounts. Mn bodies are several tens to several hundred m long, with a thickness of 1.5 to 120 m. Bodies vary from massive and banded to thinly-banded. Mn bodies consist of oxidized braunite to hausmannite-rhodochrosite and rhodochrosite, and rhodonite-rhodochrosite. Bodies also contain quartz and minor amounts of magnetite, hematite, manganite, sulfides, piedmontite, manganophyllite, tordite, viridine, amphiboles, muscovite, and plagioclase. Mn content varies greatly, reaching 50-56% in oxidized ore and 47% in carbonate ore. P ranges from 0.01 to 0.12%, Fe up to 3%, and SiO2 9 to 70%.

Shkolnik, 1973.

N53-09 54°04'N 134°08'E	Milkanskoe Galam	Fe Volcanogenic Fe	Large. Average grade of 30.9% total Fe, 29.1% soluble Fe, 2.1% Mn, 0.27% P, 0.01% S.

Consists of several deposits in a district of 100 km^2. Deposits consists of numerous lenticular and sheeted magnetite bodies that consist of conformable, steeply-dipping bodies of complex composition. Magnetite bodies occur in a layer up to 600 m thick that consists of alternating, weakly metamorphosed Cambrian jasper, schist, shale, spilite, basalt, and basaltic tuff that is interlayered with rare sandstone, siltstone, limestone, and dolomite. Largest deposit consists of a sheeted body over 6 km long and a variable thickness of 100 to 330 m that is ntercalated with jasper and poorly mineralized schist and shale. About 2/3 of sequence is potentially economic. Individual deposits range up to 40-50 m in thickness; maximum thickness of interlayered barren rock is 25 m. Deposit explored for 530 m downdip and exhibits constant thickness. Geophysical data indicates the deposit may extend about one km downdip. Seven smaller deposits extend 600 to 800 m along strike and contain mainly magnetite and local magnetite and hematite that is often intercalated with spherolitic siderite. Smaller deposits are finely-bedded, banded, rarely massive, have variable mineral compositions, and contain relatively abundant Fe chlorite, hydromica, stilpnomelane, muscovite, sericite, and apatite, and rare pyrite, covellite, and chalcocite.

Shkolnik, 1973.

N53-10 53°54'N 134°16'E	Lagapskoe Galam	P Sedimentary phosphorite	Medium. Contains from 4 to 30% anhydrous phosphorous, averages 5-7%.

Consists of carbonate beds that contain phosphorite-bearing breccia with Cambrian fossils. Beds are locally up to 30 m thick, but generally range from several tens of cm to 20 m. Phosphorite-bearing breccia contains fragments of primary phosphorite, dolomite, limestone, and rare jasper, schist, and shale. Carbonate is commonly completely altered to quartz. Carbonate bed intercalated with jasper, shale, schist, siltstone, spilite, basalt, and basaltic tuff.

Zagorodnykh, 1984.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N53-11 53°37'N 133°56'E	Galamskoe Galam	Fe Mn, P_2O_5, S Volcanogenic Fe	Large. Average grade of 42.4% total Fe; 39.8% soluble Fe; 1.7 to 13.6% Mn and averages 6.9%; averages 0.9% P_2O_5, 0.03% S.
Consists of six lenticular, steeply-dipping bodies in jasper beds that are contact metamorphosed zone adjacent to Late Cretaceous granite and granite porphyry. Additional undiscovered ore bodies may occur. Individual bodies range from 10 to 90 m thick, extend for up to 3 km, with beds of barren rock. Dominant ore mineral is magnetite that grades from massive to banded, brecciated, and fine-grained forms. Also occurring are minor pyrite, pyrrhotite, chalcopyrite, bornite, sphalerite, galena, arsenopyrite, actinolite, hornblende, cummingtonite, dannemorite, grunerite, olivine, chlorite, garnet, rhodonite, and apatite. Shkolnik, 1973.			
N53-12 53°29'N 133°12'E	Gerbikanskoe Galam	Fe Volcanogenic Fe	Large. Average grade of 42-43% Fe, soluble Fe is 33-53%; average of 1.8% Mn and 9.6% P.
Consists of two zones separated by a sequence of sandstone and siltstone that consists of approximately 30 steeply-dipping sheeted and lenticular bodies composed of magnetite-hematite, magnetite, and hematite. Individual bodies are several tens of m to 5 to 7 km long, are sometimes closely spaced in an en-echelon pattern. Thickness varies from 5 to 50 m and is commonly 8 to 28 m. Fe ore varies from banded to thinly-banded, lenticular-banded, and bedded and consists of finely-dispersed hematite, magnetite, and rare pyrite and chalcopyrite. Shkolnik, 1973.			
N53-13 53°23'N 132°53'E	Kurumskoe Galam	Fe Mn, S, P_2O_5 Volcanogenic Fe	Small. Averages 42% total Fe, 40% soluble Fe, 0.8% Mn, 0.4% S, 0.85% P.
Consists of steeply-dipping, lenticular and sheeted bodies of contact metamorphosed magnetite ore that ranges from 1.5 to 2.0 km long and 15-30 m thick. Bodies occur in a band up to 4.0 km long along the contact of a Late Cretaceous granodiorite. Host rocks are mainly jasper, schist, and shale, with rare sandstone and siltstone. Ore ranges from massive to fine-banded. In addition to magnetite, bodies contain from1-2% each of ilmenite, pyrrhotite, chalcopyrite, arsenopyrite, and pyrite, along with actinolite, tremolite, chlorite, biotite-like mica, and quartz. Shkolnik, 1973.			
N53-14 53°21'N 133°24'E	Itmatinskoe Galam	Fe P_2O_5, S, Mn Volcanogenic Fe	Medium. Averages 40-43% total Fe, 39-42% soluble Fe, 0.6% P, 0.05% S, 1.5% Mn.
Deposit hosted in a steep syncline that contains up to 17 conformable, lenticular, and sheeted bodies of magnetite-hydroxide iron minerals in a zone up to 4 km long and 40 to 50 km thick. Total length of zone of bodies is 12 to 15 km and total stratigraphic thickness ranges up to 135 m. Host rocks are dark gray jasper, schist, and shale, with subordinate mafic extrusive rocks, sandstone, and sedimentary breccia. Ore varies from massive to, banded, is fine-grained, and consists of magnetite-goethite-hydrogoethite with intergrowths of martite, manganosiderite, manganite, pyrite, and Mn hydroxides. Other minerals are quartz, colloidal silica, Fe-bearing quartzite, clay minerals, calcite, gypsum, and actinolite. Magnetite/iron hydroxide ratio ranges from 1:2 to 1:8. Fe hydroxides formed from weathering. S.G. Kostan'yuan and others, written commun., 1973.			
N53-15 53°08'N 132°12'E	Poiskovoe Selemdzha-Kerbi	Au Granitoid-related Au	Small. Average grade 37.4 g/t Ag. Partly mined at surface.
Consist of northeast-trending, steeply-dipping quartz veins. Six veins are identified that occur for 400 m, and range from 0.25 m to less commonly 1.5 m thick. In addition to fine-grained gold (less than 0.5 mm), veins contain galena, pyrite, and arsenopyrite. Pyrite and arsenopyrite are gold-bearing, containing 98.22 and 26.0 g/tonne Au respectively. Host granodiorite exhibits berezitie hydrothermal alteration. Veins occur in a Late Paleozoic granodiorite that intrudes metamorphosed Paleozoic shale. Deposit interpreted as forming between Late Jurassic and Early Cretaceous. Deposit not explored at depth. N.S. Ostapenko and G.I. Neronsky, written commun., 1975.			

Deposit No. / Latitude / Longitude	Deposit Name / Metallogenic Belt	Major Metals / Minor Metals / Deposit Type	Grade and Tonnage
N53-16 53°09'N 132°22'E	Zazubrinskoe Selemdzha-Kerbi	Au Au quartz vein	Small. Estimated reserves of 9,046 thousand tonnes ore grading 11.2 g/t Au. Mined from 1927 to 1947.

Consists of gently- and steeply-dipping quartz veins with gold (fineness 750), predominante arsenopyrite, and lesser pyrite, sphalerite, galena, chalcopyrite, cassiterite, and molybdenite. Up to 7% As. Veins are about 2.5 m thick and up to 600 m long. Steeply-dipping veins are richest in gold. Gold is fine-grained. Mineralization interpreted as forming in Late Jurassic to Early Cretaceous. Deposit hosted in quartz-micaceous schist of the Nilan subterrane (Galam terrane).

O.F. Shishkanova, written commun., 1970.

N53-17 53°09'N 132°49'E	Tokur Selemdzha-Kerbi	Au Au quartz vein	Medium. 27.1 tonnes Au mined between 1933 and 1940.

Consists of gold-bearing veins. Ore minerals comprise 3% of the veins and consist of pyrite, arsenopyrite, gold, sphalerite, galena, chalcopyrite, pyrrhotite, tetrahedrite, tennantite, and scheelite. Gangue minerals are quartz, adularia, sericite, chlorite, and calcite. Gold fineness of 650 to 800. Sphalerite and arsenopyrite increase with depth. Carbonaceous material occurs along vein margins. Vein zones normally range from 25 to 90 m thick. Veins commonly occur conformable to bedding of host rocks are are locally discordant. Veins range up to 800 m in length and vary from 0.2 to 0.7 m thick. Maximum depth of deposit is 500 m. Host rocks are argillite, sandstone, and quartzite. Diorite dikes and stocks cut the veins. Ar-Ar isotoipic study of adularia indicate an Early Cretaceous age of mineralization. Veins are hosted in a structurally-deformed Middle Paleozoic sandstone-schist sequence.

Radkevich E.A., Moiseenko V.G., Molchanov P.Ya., Melnikov V.D., and Fat'yanov I.I., 1969; Eirish, 1972; Mel'nikov V.D. & Fat'yanov I.I., 1970; P.H. Layer, V. Ivanov, and T.K. Bundtzen, written commun., 1994.

N53-18 53°04'N 133°22'E	Ingagli Selemdzha-Kerbi	Au Au quartz vein	Small.

Consists of a quartz vein hosted in a Late Paleozoic stock. Vein contains quartz, gold, arsenopyrite, pyrite, chalcopyrite, and sphalerite. Gold fineness of 720.

Eirish, 1972.

N53-19 52°59'N 132°36'E	Sagurskoe Selemdzha-Kerbi	Au Au quartz vein	Small. Average grade of 0.3 to 35.2 g/t Au. 2,940 kg gold mined from 1944 to 1956.

Consists of comformable quartz veins that crosscut foliation, and dip from 30° to 60°. Veins are 0.1 to 1.0 m thick and a few m to 240 m long. About 80 veins are known. Veins contain gold (grains up to 3 mm, fineness 857), and arsenopyrite, pyrite, sphalerite, galena, sheelite, and scorodite. Gold distributed unevenly in veins; hanging walls of veins generally richer in gold. Deposit hosted in Early Paleozoic metamorphic rocks consisting of quartz-micaceous schists with less common actinolite and epidote-actinolite schist.

Eirish, 1972; B.I. Shestakov, written commun., 1988.

N53-20 52°57'N 133°38'E	Kharga Selemdzha-Kerbi	Au Au quartz vein	Small. Intermittently mined from 1901 until 1955; 5.3 tonnes Au produced. Contains up to 40 g/t Au, up to 2.5 g/t Ag, and up to 0.4% WO_3 .

Consists of two types of veins: (1) thick veins that intrude Early Paleozoic greenstone (spilite); and (2) short, branching veins that intrude carbonaceous schist and highly altered zones in albite-micaceous-quartz schist. Veins have constant dip thickness and along strike range from 0.5 to 3 m across and up to a few hundreds of meters long. Quartz comprises up to 95 to 97% of veins. Ore minerals are gold and arsenopyrite, with minor pyrite, pyrrhotite, chalcopyrite, sphalerite, tetrahedrite, and tennantite. Scheelite occurs locally. Two generations of gold occur, early gold is 636 fine; later gold is 800 to 950 fine. Deposit cut by dikes. Thirty ore bodies are known, including both quartz veins and zones of hydrothermally altered rocks. Twenty-four bodies have been mined.

Moiseenko V.G., 1965; Eirish, 1972.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N53-21 52°50'N 133°24'E	Afanas'evskoe Selemdzha-Kerbi	Au Au quartz vein	Small. Average grade of 6.3 g/t Au. Mined from 1929 to 1949.

Consists of quartz veins and zones of hydrothermal alteration (quartz-albite-chlorite-carbonate-sulfide). Zones are up to 1100 m long; thickness rarely exceeds 2.0 m. Largest zone consists of a series of quartz veins and veinlets that occur in brecciated quartz- and chlortite-rich rock. Zone is 0.1 to 1.8 m thick and grades 10 g/tonne Au. Deposit hosted in early Paleozoic sequence of micaceous-albite-quartz, chlorite-quartz shale, and metamorphosed polymictic sandstone.

Eirish, 1972; Tsykunov Yu.P., 1981; B.D. Melnikov, written commun., 1993.

N53-22 52°42'N 133°24'E	Talaminskoe Selemdzha-Kerbi	Sb, Au Sb-Au vein	Small. Average grade of 6.94% Sb, 0.3% As, 1.5 g/t Au, 15 g/t Ag. Mined from 1938 to 1943. Produced 511 tonnes of stibnite concentrate.

Consists of quartz veins, less common quartz-calcite veins, with stibnite, pyrite, chalcopyrite, and arsenopyrite, and one vein of quartz-scheelite. Eighteen veins, dipping at 45° to 90°, have been prospected. Veins range from a few cm to 4 m thick, and from 40 to 680 m long. Prospecting occurs to 42 m depth. Deposit interpreted as forming during a Late Jurassic to Early Crtetaceous period of regional metamorphism. Deposit hosted in early Paleozoic micaceous schist of the Nilan subterrane.

A.F. Amerikantsev, written commun., 1953.

N53-23 52°28'N 134°11'E	Ezop Badzhal-Ezop	Sn Sn polymetallic vein	Small. Contains up to 0.2% Sn.

Consists mostly of sulfide-bearing veins, net-like veinlets, and disseminations. Disseminated zones range up to 18.7 m thick; veins vary from 0.1 to 2 m thick. Sulfides, including arsenopyrite and pyrrhotite, form up to 80% of the veins. Pyrite, cassiterite, sphalerite, and rare stannite and wolframite, are subordinate. Gangue minerals are quartz and tourmaline; with rare topaz. Deposit hosted in a system of east-west en echelon fracture zones in Upper Cretaceous felsic extrusive rocks. Deposit occurs along contact of the Late Cretaceous high-potassium Ezop Granite.

Usenko and Chebotarev, 1973.

N53-24 52°21'N 134°04'E	Olgakanskoe Badzhal-Ezop	Sn W, Mo, Bi Sn greisen	Small

Consists of three varieties of greisen: (1) pods and veins in granite; (2) flattened bodies in the apices of dome-like granite cusps and partly in Late Cretaceous felsic extrusive rocks; and (3) zones with late-stage, cassiterite-quartz and cassiterite-sulfide veinlets at the granite contacts. Quartz-mica greisen bodies are small, several m thick, and occur in zones up to 80 m along strike. In addition to quartz and mica, greisen contains wolframite, cassiterite, arsenopyrite; and minor molybdenite, bismuthinite, and native bismuth. Sulfide veinlets contain arsenopyrite, sphalerite, galena, chalcopyrite, and pyrite. Deposit associated with Late Cretaceous Ezop Granite.

Usenko and Chebotarev, 1973.

N54-01 54°06'N 142°57'E	Yuzhno-Tominskoe Schmidt and Terpeniya Peninsulas	Cr Podiform Cr	Small

Consists of of magnesium pyroxenite that contains disseminated and massive, lenticular magnesian chromite in zones up to 20 to 25 m long. Pyroxenite is Late Jurassic to Early Cretaceous in age and intrudes Mesozoic rocks. Deposit occurs on eastern Schmidt Peninsula .

Sidorenko, 1974.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N54-02 53°53'N 139°48'E	Mnogovershinnoe Lower Amur	Au, Ag Au-Ag epithermal vein	Medium

Consists of hydrothermally altered, adularia-sericite-quartz vein-like zones up to 800 m long that consist of a series of adularia-quartz veins and veinlets. Some veins and veinlets contain rhodonite-carbonate or lenses of skarns and sulfides. Ore minerals are pyrite, marcasite, gold, argentite, Au and Ag tellurides, galena, sphalerite, chalcopyrite, and freibergite. Ore minerals comprise up to 1% of veins. Au/Ag ratio is 1:1. Deposit hosted in Paleocene andesite-dacite that is part of a multiphase intrusion of highly alkaline granitic rocks. K/Ar isotopic studies indicate age of mineralization is 49 to 69 Ma. During formation of local Au-bearing skarns, presumably formed during intrusion of Paleogene subalkaline granite, gold was remobilized. Associated Placer Au deposits.

Zalishchak and others, 1978; Ivanov and others, 1989.

N54-03 53°23'N 140°14'E	Belaya Gora Lower Amur	Au, Ag Hg, Cu, Pb, Zn Au-Ag epithermal vein	Medium

Consists of disseminations and stockworks that occur in extrusive bodies of subalkalic rhyolite-dacite and explosive breccia in an Eocene-Oligocene igneous complex. Alteration consists of quartz (50-90%), kaolinite, dickite, sericite, hydromica, and adularia. Ore minerals are gold, silver, argentite, pyrite, marcasite, chalcopyrite, sphalerite, galena, hematite, and cinnabar. Ore assemblages are gold-quartz and gold-sulfosalts-sulfide-quartz. Gold distribution is highly irregular and ore bodies do not exhibit clear boundaries. Deposit extends to depth of 100 m.

Mel'nikov, 1978

N54-04 53°03'N 140°29'E	Bukhtyanskoe Lower Amur	Au, Ag Au-Ag epithermal vein	Small

Consists of lenticular and irregular mineralized zones consist of highly altered, orthoclase-adularia-sericite-pyrite-quartz rock with numerous thin quartz veinlets ranging from 5-10 mm thick. Ore minerals are gold, pyrite, marcasite, chalcopyrite, sphalerite, galena, argentite, and molybdenite. Ore-bearing assemblages are gold-quartz and gold-sulfide-quartz. Deposit explored to a depth of 50 m. Ar-Ar isotopic study of adularia yields of age of 38 Ma for the Au-Ag veins. Deposit hosted in Eocene-Oligocene extrusive subalkaline rhyolite-dacite and explosive breccia.

Martynov and others, 1985; P.Layer, V.Ivanov, and T.Bundtzen, written commun., 1994.

N54-05 52°57'N 140°27'E	Tyrskoe Lower Amur	Cu Au Porphyry Cu	Small. Average gradc of 0.02 to 0.7% Cu; up to 2.5 g/t Au, 0.005% Mo.

Consists of disseminated sulfides, and veinlets of quartz, quartz-sulfides, and carbonate minerals. Ore minerals are pyrite, chalcopyrite, magnetite, molybdenite, and gold. Hosted in a diorite porphyry stock that is hydrothermally altered over an area 0.5 by 20 km. Altered to orthoclase, hornblende-albite, and quartz-sericite rock. Typical porphyry Cu deposit of the Nizne-Amur zone.

Sukhov and Rodionov, 1986.

N54-06 52°32'N 139°32'E	Bichinskoe Lower Amur	W, Sn Sn greisen	Small. Avearge grade of up to 0.2% Sn, 0.155% W, and 0.01% Mo.

Consists of a stockwork of veinlets, small veins, and greisen in granite, porphyry dikes, and hornfels over an area of 0.2 km^2. Ore minerals are cassiterite and wolframite, with rare molybdenite, arsenopyrite, pyrite, pyrrhotite, chalcopyrite, sphalerite, and magnetite. Cassiterite, wolframite, molybdenite, and arsenopyrite form an early assemblage; other minerals form a later assemblage. Deposit occurs along contact of the Paleogene Chayatinsky granitic stock with K-Ar isotopic age of 55 Ma. The hornfels is cut by granite porphyry, aplite, and spessartite dikes. Complex composed of granite porphyry and fine-grained granite. Age of mineralization interpreted as Paleogene.

Usenko and Chebotarev, 1973.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N57-01 55°40'N 158°39'E	Sukharikovskie Grebni Central Kamchatka	Au, Ag Au-Ag epithermal vein	Medium. Average grade of 7.4 g/t Au, 21.6 g/t Ag.

Consists of zones of quartz-adularia and quartz-adularia-carbonate veins that form a series of thick, long zones in a Miocene dacitic ignimbrite sequence. Some veins dip steeply, others are oblique to strike of zones. Individual veins range from 50 to 700 m long and up to 60 m thick. Zones of veins are a few km long. Host rocks are hydrothermally altered along faults, where silica-rich and quartz-sericite-hydromica assemblages are found. High Au and Ag concentrations occur in quartz-adularia veins. Veins are sulfide poor. Two main ore assemblages are gold-chalcopyrite-quartz and gold-acanthite-adularia-carbonate-quartz. K-Ar age determinations on the host ignimbrite range 6 to 13 Ma; average is about 10 Ma.

Aprelkov and Frolov, 1970; Shchepot'ev , 1989.

N57-02 55°40'N 161°10'E	Kumroch East Kamchatka	Au, Ag, Cu, Pb, Zn Au-Ag epithermal vein	Medium. Up 15 g/t Au; up to 500 g/t Ag; about 10% Pb, 3% Zn, and 0.5% Cu. Inferred reserve of 60 tonnes Au.

Consists of steeply dipping, quartz and quartz-adularia veins and brecciated zones that occur in Paleocene clastic rocks cut by hypabyssal Miocene diorite porphyry. Host rocks are propylitiically altered and silicified. Veins range from 200 to 400 m long and 0.2 to 6.8 m thick. Ore minerals are pyrite, chalcopyrite, galena, gold, tennantite, tetrahedrite, argentite, and silver sulfosalts. Gold-sulfide-quartz and gold-sulfosalt-quartz assemblages are identified. Gangue minerals are quartz, adularia, sericite, hydromicas, montmorillonite, kaolinite, and chlorite. Au is distributed unevenly.

B.V. Oleinik and others, written commun.,1985.

N57-03 55°31'N 157°52'E	Aginskoe (Aga) Central Kamchatka	Au, Ag, Te Au-Ag epithermal vein	Medium. Estimated resource of 30-50 tonnes Au and 10-20 tonnes Ag. Average grade of 20 g/t Au.

Consists dominantly of fine-grained, chalcedony-like quartz, adularia, and hydromica with colloform banding. Ore minerals comprise 0.3 to 1.0% of veins. Major ore minerals are tellurides, including hessite, altaite, calaverite, silvanite, and petzite. A total of 55 ore minerals are identified. Fold fineness ranges from 740 to 990, and the Au/Ag ratio varies from 2:1 to 7:1. Six stages of ore deposition are identified: (1) quartz-pyrite; (2) gold-adularia-corrensite-quartz with a gold fineness of 924 to 968; (3) gold-adularia-quartz with a gold fineness of 936 to 952 at upper levels, and a gold fineness of 740 to 854 at deeper levels; (4) gold-calaverite-quartz with a gold fineness 940 to 960; (5) gold-hessite-corrensite-quartz with a gold fineness 816 to 880 and (6) quartz-zeolite-calcite. Endogenous zoning is marked by a vertical change of ore composition, texture, and structure. The concentration of tellurides and sulfides increases with depth. The deposit occurs in a volcanic caldera composed of Miocene basaltic andesite and basaltic andesite tuff. Ore occurs in fracture zones and zones of intense jointing. Ore-bearing structures consist of shear and breccia tectonic zones, which include numerous andesitic dikes and veins, lenses, and veinlets of adularia-quartz and quartz-carbonate composition. The main ore-bearing zones are at Aginskaya and Surpriz. In the main ore-bearing zones, short ore bodies merge at depth forming a gently-dipping mineralized band; complicated in the upper part by steeply-dipping ore shoots. Hydrothermal alteration, commonly propylitic, is common.

Shchepot'ev,1989.

N57-04 55°09'N 157°12'E	Shanuch Kvinumsky	Ni, Cu, Co, Au, Pt Hornblendite peridotite Cu-Ni	Small. Average grade of 4.62% Ni, 0.8% Cu, 0.24% Co, 0.3 g/t Au, 0.5 g/t Pt, 0.57 g/t Pd

Consists of two deposits that occur at the margin of a granite-granitic-gneiss dome approximately 5 km in diameter that intrude an Early Cretaceous metagabbro. One deposit, explored to a depth of 200 km, consists of a steeply-dipping pipe-like body with a northwest trend. This deposit consists of rich, massive, brecciated sulfide ore. The other deposit consists of disseminated sulfides, and sulfides in veinlets, and pods. Both deposits are presumed to join at a depth of about 200 m. Massive and brecciated ore contains an average of 4.62% Ni, 0.8% Cu, 0.24% Co, 0.3 g/t Au, 0.5 g/t Pt, and 0.57 g/t Pd. In both deposits, ore minerals are mainly pyrrhotite, pentlandite, and chalcopyrite. Deposit oxidized to a depth of about 10 m.

A.V. Ignatyev, written commun., 1979.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N57-05 55°01'N 157°38'E	Kirganik Iruneiskiy	Cu, Au Porphyry Cu	Medium. Average grade of 0.1-1% Cu and 0.2 to 0.4 g/t Au in disseminated and veinlet ore; up to to 0.8 g/t Au in oxidized ore.

Consists of zones of disseminated ore and veinlet copper and gold minerals. Ore minerals are pyrite, chalcopyrite, magnetite, bornite, chalcocite, hematite, and gold. The richest Au values occur in rich chalcocite-chalcopyrite-bornite ore with more than 1% Cu. An oxidized zone occurs in heavily fractured rocks, to a depth of 100 to 120 m, and contains up to 0.8 g/t Au. The richest ore consists of metasomatically-altered biotite-K-feldspar rock. Altered rocks containing both pyroxene and K-feldspar are essentially devoid of ore. Ore zones are generally conformable with the host rocks. Zones are steeply-dipping, exhibit biotite-K-feldspar metasomatic alteration, and occur in an area 10-15 m thick, up to 1200 m long. Deposit hosted in Late Cretaceous siliceous volcanic rocks. K-Ar isotopic age of the altered biotite-K-feldspar rocks is 65-75 Ma.

Vlasov, 1977; A.V. Ignatyev, written commun., 1980.

N57-06 55°06'N 158°13'E	Baran'evskoe Central Kamchatka	Au, Ag Au-Ag epithermal vein	Medium. Average grade of 15 g/t, Au 20-30 g/t Ag.

Consists of gold-bearing quartz-adularia veins that are associated with quartz-sericite-hydromica and diaspore-quartz alteration assemblages. Veins occur along northeast and north-south trending faults. Two ore assemblages are identified, tennantite-tetrahedrite-chalcopyrite and gold-quartz. Gold is fine-grained, and fineness ranges from 672 to 940, commonly about 770. Deposit occurs in a caldera of a Neogene volcanic complex consisting of stocks of hornblende and pyroxene-hornblende andesite and andesite-dacite. Complex is cut by hypabyssal subvolcanic andesite to dacite intrusions and dikes. Igneous rocks are propylitically altered.

Shchepot'ev, 1989.

N57-07 54°57'N 157°46'E	Oganchinskoe Central Kamchatka	Au, Ag Au-Ag epithermal vein	Small. Average grade of 10-15 g/t Au and 20-30 g/t Ag. Reserves of 2 tonnes Au.

Consists of veins and veinlets. Ore minerals are gold, galena, sphalerite, pyrite, chalcopyrite; and rare tetrahedrite, hessite, petzite, argentite, silver sulfosalts, and cinnabar. Seven mineral assemblages are distinguished, from oldest to youngest: (1) pyrite-quartz; (2) Au-quartz; (3) Au-sulfides (sphalerite and galena); (4) amethist-sulfides (sphalerite and galena); (5) wurtzite (sphalerite)-metacinnabatite; (6) cinnabar; (7) quartz-carbonate. Gold and silver occur in gold-quartz and gold-sulfide assemblages. The gold-sulfide assemblage increases with depth. Deposit exhibits both propylitic and silicifica alteration. K-Ar isotopic age of 35-36 Ma for adularia associated with deposit. Ore bodies trend northeast and are hosted occur in volcanic and hypabyssal rocks near the caldera of the Levinson-Lessing volcano, near the western contact of a Miocene granodiorite stock.

Shchepot'ev, ed., 1989

N57-08 55°03'N 158°21'E	Zolotoi Central Kamchatka	Au, Ag Au-Ag epithermal vein	Medium. Average grade of 10-125 g/t Au, 40 g/t Ag.

Consists of veins in a large northwest-trending shear zones, spaced up to 2 km apart. Richest orebodies occur in a small fault/fracture zone that trends diagonally to the main shear zones. Deposit occurs over an area of about 40 km^2. Gold is known in 100 quartz veins, but only 11 are of interest for exploration. Veins are up to 20 m thick and up to 2 km long. Mineralization occurs from about 500 to 1100 m elevation. The most carefully studied vein is 2.7 m thick, 700 m long, has a gold content of 10-125g/t, and silver content of 40 g/t. The gangue minerals are quartz (90%), calcite, hydromica, and adularia (up to 10%). Ore minerals (no more than 2%) are pyrite, chalcopyrite, galena, sphalerite, and argentite. Gold grains are 0.05-0.2 mm. Gold fineness is 720-980. Deposit hosted in Late Cretaceous volcanoclastic rocks (andesite tuff) and chert, near the contact with overlapping Miocene andesite and basalt. An economically important Au deposit in Kamchatka.

A.A. Shadrin, written commun., 1992.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N57-09 54°46'N 157°21'E	Malakhitovoe Sredinny	Cu, Mo Re Porphyry Cu-Mo	Medium. Average grade of 0.55% Cu and 0.021% Mo in oxidized zone. Contains up to 1.26% Cu and 0.1% Mo.

Consists of a Cu-Mo stockwork hosted in subalkaline granite porphyry stock. Richer part of deposit occurs along contact of stock. Both stock and the country rocks exhibit sericite, chloritie, and silica alteration and contain disseminations and veinlets of ore minerals. A central, quartz-rich core consists of silicified and K-feldspar-rich rocks with low-grade chalcopyrite-molybdenite that contains 0.03% Cu and 0.008% Mo. Quartz veinlets are up to one cm wide, rarely up to 0.4 m wide, and contain coarse-grained flakes of molybdenite. Richest part of deposit crops out over an area 200-300 by 600 m, and contains 0.4% Cu and 0.02% Mo. Oxidized zones average 0.55% Cu and 0.021% Mo; locally contains up to 1.26% Cu and 0.1% Mo. Molybdenite contains up to 600 g/t Re. Deposit size approximately 2.5 km^2.

A.V. Ignatyev, written commun., 1988.

N57-10 54°21'N 157°23'E	Tumannoe Sredinny	Au Au quartz vein	Small. Average grade of 0.4-2.2 g/t Au and 3 g/t Ag.

Deposit consists of a stockwork hosted in quartz phyllite interbedded with Late Paleozoic metasandstone and metasiltstone. Major ore minerals are gold, arsenopyrite, and pyrite, with rare chalcopyrite and magnetite. Mineralized zones are 30 to 115 m long and 20 to 50 m thick. Deposit probably remobilized from black shale.

D.A. Babushkin and others, written commun., 1986.

N57-11 54°04'N 157°24'E	Anomalnoe Sredinny	Ta, Nb Metamorphic REE(?)	Small. Average grade if 0.02% Ta, 0.04%Nb.

Consists of a quartz vein associated with K-feldspar and albite alteration. Deposit hosted in Proterozoic schist. Vein trends north-south and forms a steeply-dipping ore body over 1 km long, and from1 to 12.5 m thick. Ore minerals are columbite-tantalite and ilmenite-rutile, with accessory K-feldspar, albite, and rare epidote grains. K-Ar K-feldspar age of 170 Ma for vein.

D.A. Babushkin and others, written commun., 1986.

N57-12 53°58'N 157°28'E	Krasnogorskoe Central Kamchatka	Mo Porphyry Co-Mo	Small. Average grade of 0.04 to 0.1% Mo, 0.9% Cu.

Consists of a series of thin intersecting sulfide veinlets (10 to 30 per 1 m length) with pyrite, chalcopyrite, molybdenite, and pyrrhotite; as well as disseminated sulfides. Quartz veins with mostly molybdenite range up to 30 cm thick and up to tens of meters long. Ore minerals are molybdenite, chalcopyrite, and pyrite. Molybdenite contains up to 500 g/t Re. Deposit occurs along contact of Miocene diorite porphyry with Proterozoic gneiss and occurs along an east-west trending fracture zone that dips 50-80° south.

M.A. Sukharev, written commun., 1957.

N57-13 53°38'N 157°02'E	Kvinum Kvinumsky	Ni, Cu, Co, Au, Pt Gabbroic Cu-Ni	Small. Up to 1.0% Ni, 0.5% Cu, 0.03% Co, 0.5 g/t PGE.

Consists of disseminations and scattered pods of syngenetic and epigenetic breccia-like bodies. Ore minerals are pentlandite, chalcopyrite, gold, PGE, pyrrhotite, and Ni- and Co-arsenides. Hosted in pyroxenite-peridotite-norite at the base of gabbro-peridotite intrusions that occur along a thrust zone at the contact of Proterozoic schist and Late Paleozoic phyllite. Host rocks are regionally metamorphosed, ranging from chlorite-biotite subfacies of greenschist facies to epidote-amphibolite facies.

A.C. Gamovsky, written commun., 1990.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N57-14 53°28'N 157°24'E	Kuvalorog Kvinumsky	Ni, Cu, Co, Pt Hornblendite peridotite Cu-Ni	Small. Average grade of 0.1-9.8% Cu, 0.1-4.4% Ni, 0.1-0.04% Co, 0.1-6.7 g/t Pt.
Consists of steeply-dipping ore bodies in lenses and veins. Ore minerals are pyrrhotite, pentlandite, chalcopyrite, pyrite, magnetite, cobaltite, and marcasite. Hosted in lopolith-shaped multiphase Early Cretaceous Kuvalorog intrusion that includes gabbro, norite, and peridotite and intrudes Late Paleozoic and Proterozoic metamorphosed rocks. V.P. Zotov, written commun., 1982.			
N57-15 53°26'N 158°17'E	Kitkhoi East Kamchatka	Au, Ag, Zn, Pb Au-Ag epithermal vein	Small. Average grade of 2-3 g/t Au, up to 100 g/t Ag.
Deposit consists of veins and stockworks in a zone extending tens of km. Deposit contains Au, Ag, Pb, and Zn. Major ore minerals are sphalerite, galena, chalcopyrite, and pyrite. Gangue minerals are quartz, carbonate, chlorite, epidote, rare albite, prehnite, and adularia. Ore minerals are concentrated along vein contacts in thin veinlets and disseminations. Deposit occurs on both sides of the contact of a diorite porphyry stock that intrudes Miocene volcanic rocks. Age of mineralization interpreted as Middle Miocene. Vlasov, 1977.			
N57-16 52°50'N 158°16'E	Rodnikovoe East Kamchatka	Au, Ag Au-Ag epithermal vein	Medium. Average grade of 11.3 g/t Au and 40-50 g/t Ag. Estimated reserves of 40 tonnes gold.
Consists of a major vein, and related quartz and quartz-carbonate veins and veinlets in the apical part of a gabbro-diorite intrusion. Veins and veinlets contain goldfieldite, silver sulfosalts, and argentite. Gold fineness of 400 to 600. Alteration includes propylitic, (chlorite-carbonate and epidote-chlorite), kaolinitic, quartz-hydromica alteration with montmorillonite, and silicic with quartz and pyrite. Altered rocks are laterally zoned. Deposit occurs in a complex vein system with several funnel-shaped ore shoots that narrow with depth. Shoots dip 30-50° south. Vertical extent of deposit less than 150 m. High Au concentrations (25-30 g/t) occur in upper level of deposit. Quartz-adularia veins with K-Ar ages of approximately 12 Ma. I.D. Shchepot'ev, 1989; D. Petrenko, written commun., 1991.			
N57-17 52°44'N 158°24'E	Mutnovskoe East Kamchatka	Au, Ag, Cu, Zn, Pb Au-Ag epithermal vein	Medium. Up to 3 g/t Au and 10 g/t Ag. Reserves for North deposit are 1.8 million tonnes ore averaging 16 g/t Au and 315 g/t Ag. Reserves for the South deposit are 5.2 million tonnes ore averaging 12.4 g/t Au, 1300 g/t Ag, and 69,000 tonnes combined Pb and Zn.
Consists of a thick vein and some apophyses, with intervening zones of quartz veinlets. Heavily weathered zones, generally at the Southern deposit, contain quartz with10-18% sulfides. Less weathered Northern deposit is sulfide-poor and contains 0.2-2% base metals. Major ore assemblages are gold-tennantite-tetrahedrite, gold-argentite-pearsite, and chlorite-galena-sphalerite. Canfieldite, as well as the telluride minerals, hessite and altaite, also occur. Deposit is vertically zoned, with gold, tennantite, and tetrahedrite that occur in upper part of the veins, and chalcopyrite, galena, sphalerite occurring in the lower part of the veins. Deposit extends to a depth of 500 m below the surface. Hosted in the central part of a paleovolcano composed of Oligocene-Miocene mafic- and intermediate-composition volcanic rocks. Plutonic rocks consist of Miocene diorite intrusions and numerous dikes of varied composition. Age of mineralization is interpreted as Oligocene to Early Miocene. Shchepot'ev, 1989; I.D. Petrenko, written commun., 1991; Lattanzi and others, 1995.			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
N57-18 52°08'N 157°54'E	Asachinskoe East Kamchatka	Au, Ag, Se Au-Ag epithermal vein	Medium. Up to 20 g/t Au and 40-50 g/t Ag. Estimated reserve of 1.56 million tonnes averaging 35 g/t Au and 62 g/t Ag.

Consists of a zone of quartz-adularia veins that occur along a north-south trending, strike-slip fault. Veins split and pinch out in tuff and andesitic lava. Ore body is a nearly flat-lying band, gently dipping to the south, and conformable to the hypabyssal host rocks. Ore exhibits colloform-banded structure. Ore minerals comprise less than 1% of the veins. Ore mineral assemblages are: gold-hydromica, gold-naumanite-polybasite, and gold-adularia-quartz. Major ore minerals are pyrite, gold, selenium polybasite, and naumanite. Deposit occurs in center of a hypabyssal dacite dome at the intersection of three large linear faults. Deposit associated with hypabyssal volcanic rocks that are inferred in cross-section. K-Ar isotopic age of 12 Ma for adularia associated with deposit.

Shchepot'ev, 1989; A.I. Pozdeev, written commun., 1991.

O04-01 59°52'N 159°54'W	Kagati Lake Southwestern Kuskokwim Mountains	Sb, Hg Sb-Hg vein	No data; minor production

Stibnite, cinnabar, and quartz veinlets along joint surfaces in a stock of Late Cretaceous monzonite and granodiorite. The zone of veinlets strikes northwest-southeast, varies from 10 to 600 cm thick, and is traceable for 15 m. The stock intrudes Lower Cretaceous volcaniclastic rocks of the Gemuk Group. Workings consist of several trenches and a few pits. Sporadic development from 1927 through 1981.

Sainsbury and MacKevett, 1965

O04-02 59°44'N 157°45'W	Kemuk Mountain Southwestern Alaska	Fe, Ti, PGE Zoned mafic-ultramafic	Estimated 2,200 million tonnes grading 15 to 17 % Fe, and 2 to 3 % TiO_2

Buried titaniferous magnetite deposit in crudely zoned pyroxenite, interpreted as part of zoned "Alaskan-type" ultramafic pluton. Steeply-dipping, high-temperature contact metamorphic zone with adjacent Permian quartzite and limestone. Aeromagnetic survey indicates pluton about 1,500 m thick and underlies about 6 km^2 area.

Humble Oil and Refining Company, written commun., 1958; Eberlein and others, 1977; Charles C. Hawley, written commun., 1980

O04-03 57°12'N 157°00'W	Rex Alaska Peninsula and Aleutian Islands	Cu, Au Porphyry Cu	No data

Stockwork of chalcopyrite, pyrite, and molybdenite in disseminations and coatings on joint surfaces in series of intensely fractured, small hypabyssal andesite stocks. Hematite zones in brecciated hornfels in contact metamorphic aureoles. Stock about 3 sq km in area. Stocks intrudes the lower Tertiary Tolstoi Formation and overlying volcanic rocks of the Meshik Formation. K-Ar ages of stocks and hydrothermal alteration range from 34 to 39 Ma. Drilling in 1977.

Thomas K. Bundtzen, written commun., 1984; Frederic H. Wilson, written commun., 1985

O04-04 57°11'N 156°24'W	Kilokak Creek Alaska Peninsula and Aleutian Islands	Pb, Zn Polymetallic vein(?)	No data

Zone of alteration and sparse veins with anomalous Pb and Zn values in black siltstone of the Upper Cretaceous Hoodoo Formation, and shallow-water to nonmarine sandstone, shale, and conglomerate of the Chignik Formation, and in Eocene(?) volcanic and hornblende andesite plug. Little alteration of andesite plug; extensive disseminated pyrite in country rock surrounding plug. Zone of alteration and sparse veins on periphery of, but predates, the Pliocene Agripina Bay (granodiorite) batholith.

Frederic H. Wilson, written commun., 1985

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O04-05 57°03'N 157°13'W	Mike Alaska Peninsula and Aleutian Islands	Mo Au, Ag, Pb, Zn Porphyry Mo	No data

Area of intense silicic alteration, and weak propylitic and potassic alteration, with disseminated molybdenite, pyrite, and chalcopyrite on joint surfaces with local pyrite zones. Alteration and mineralization occur in fractured Pliocene dacite and rhyodacite stock intruding sandstone, conglomerate, and siltstone of the Jurassic Naknek Formation. Samples with anomalous Au, Ag, and Mo from center of altered zone, and with anomalous Pb and Zn on periphery of altered zone. K-Ar age of 3.65 Ma for stock. Drilling in 1977.

Frederic H. Wilson and Dennis P. Cox, written commun., 1985; Robert L. Detterman, oral commun., 1986

O04-06 56°30'N 158°44'W	Cathedral Creek, Braided Creek Alaska Peninsula and Aleutian Islands	Cu, As, Zn, Pb Polymetallic vein	No data

Quartz, arsenopyrite, sphalerite, chalcopyrite, and galena in veins adjacent to various late Tertiary stocks of pyroxene andesite, hornblende andesite, and biotite dacite. Textures and field relations indicate shallow emplacement of stocks. Minor chalcopyrite and pyrite in zones of sericitic alteration of stocks and adjacent sedimentary rocks. Stocks intruded into the Chignik, Hoodoo, Tolstoi, and Meshik Formations. Stock at Cathedral and Bee Creek, and others in area aligned along 65 km east-west-trending lineament that ends at Black Peak, a Holocene volcanic center.

R.F. Robinson, written commun., 1975; Cox and others, 1981; Wilson and Cox, 1983; Frederic H. Wilson, written commun., 1985

O04-07 56°14'N 158°30'W	Mallard Duck Bay Alaska Peninsula and Aleutian Islands	Cu, Mo Porphyry Cu-Mo and(or) polymetallic vein(?)	No data

Pyrite, chalcopyrite, and molybdenite veinlets in swarms concentrated along intersections of joint systems in Oligocene andesite flows, breccias, and lahars. Cut by numerous diorite dikes. Intense sericitic alteration over several square kilometers with weak propylitic alteration to northwest.

Wilson and Cox, 1983

O04-08 56°31'N 158°24'W	Bee Creek Alaska Peninsula and Aleutian Islands	Cu, Au Porphyry Cu	Grab samples contain up to 0.25% Cu, 0.01% Mo, 0.06 g/t Au. Estimated 4.5 to 9.1 million tonnes grading 0.25% Cu, 0.01% Mo, and trace Au

Disseminated chalcopyrite in arkosic sandstone near late Tertiary hypabyssal dacite stock. Zonal alteration pattern with a potassic-altered core, and a propylitically altered periphery. Sericite alteration superposed on both core and periphery. Altered part of dacite stock about 3 sq km in area. Stock intruded into the Upper Jurassic Naknek Formation.

E.D. Fields, written commun., 1977; Cox and others, 1981; Wilson and Cox, 1983; Robert L. Detterman, oral commun., 1986

O04-09 56°10'N 158°20'W	Warner Bay (Prospect Bay) Alaska Peninsula and Aleutian Islands	Cu, Mo, Pb, Zn Porphyry Cu, Polymetallic vein	Average grade of 0.3% Cu, unknown Mo grade

Disseminated molybdenite and chalcopyrite along joint surfaces in closely jointed granodiorite. Galena and sphalerite in veins parallel to main set of joints, or in distinct hematite-rich breccia zones. Occurs in several square kilometer area in the late Tertiary Devils batholith which ranges from quartz diorite to granodiorite. Little to no sericite or argillic alteration. Diatreme or breccia pipe at north end of deposit contains clasts of propylitically altered granodiorite cemented by galena, sphalerite, pyrite, calcite, and zeolites.

Atwood, 1911; Wilson and Cox, 1983; Thomas K. Bundtzen, written commun., 1984

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O04-10 59°38'N 161°08'W	Canyon Creek Kilbuck	Fe Ironstone	Not estimated.

Deposits consists of rhythmically-layered hematite, magnetite, and siderite in layers up to 4 cm thick that occur in bleached Early Proterozoic quartzite (Bruce Hickok, T.K. Bundtzen, and M.L. Miller, written commun., 1992). The host rocks are mainly quartzite, garnet-biotite schist, metafelsic volcanic rocks, and amphibolite that are metamorphosed at amphibolite facies. The occurrence is about 150 m long, but is poorly exposed.

Bruce Hickok, T.K. Bundtzen, and M.L. Miller, written commun., 1992.

O05-01 59°53'N 155°24'W	Pebble Copper Eastern-Southern Alaska	Au, Cu, Mo Porphyry Au-Cu	Inferred reserves of 500 million tonnes grading 0.35% Cu, 0.4 g/t Au, 0.015% Mo

Disseminated chalcopyrite, pyrite, and molybdenum, accompanied by minor to trace galena, sphalerite, and arsenopyrite in stockwork vein system. Mineralization hosted in early Tertiary granodiorite porphyry and adjacent hornfels aureole. Granodiorite is part of larger composite 40 square km volcanic-plutonic complex that includes pyroxenite, alkali gabbro, quartz monzonite, and dacite volcanic overlyers. Chemically, volcanic and plutonic rocks plot in alkali-calcic and quartz alkali fields. Sulfides were introduced during late stage intense hydrofracture episode that was preceded by potassic, silicic, and sericitic alteration events. Tourmaline breccias locally present. Two K-Ar ages of 90 and 97 Ma, respectively, on hydrothermal sericite and igneous K-Spar.

Phil St. George, and T.K. Bundtzen, written commun., 1991; Bruce Bouley, oral commun., 1992

O05-02 59°31'N 154°23'W	Fog Lake (Pond) Alaska Peninsula and Aleutian Islands	Au, Cu, Ag Au-Ag epithermal vein	Grab samples with up to 37 g/t Au, 5 g/t Ag, >0.5% Cu

Zone with swarms of pyrite- and chalcopyrite-bearing veinlets that cut altered quartz porphyry that intrudes Tertiary dacite tuffs, lahars, and breccias. Zone about 550 by 305 m. Veinlets are best developed at intersections of northwest-, northeast-, and east-northeast-trending structures. Envelopes of argillic alteration about 7 cm wide adjacent to veinlets. Outer, weaker propylitic alteration. To the northwest, mineralization grades into sphalerite and minor galena with anomalous Ag and Au. Quartz porphyry altered to sericite and pyrite; propylitic alteration in adjacent volcanic rocks. Dacite tuffs, lahars, and breccia, and associated agglomerate and conglomerate unconformably overlie Late Cretaceous to Paleocene(?) quartz diorite to granodiorite pluton. Andesite to dacite dikes crosscut volcanic rocks.

Reed, 1967; Gary L. Andersen, written commun., 1984

O05-03 59°16'N 154°38'W	Kuy Alaska Peninsula and Aleutian Islands	Au, Ag, Cu Au-Ag epithermal vein	No data

Quartz veins and quartz-vein breccia with gold-silver tellurides and chalcopyrite. Veins occur in gash fractures that strike west-northwest and dip steeply southeast. Fracture zone about 300 m wide and 900 m long. Veins exposed for about 90 m along strike. Abundant vugs and comb quartz. Quartz bodies form flattened rods that plunge steeply southeast. Veins and fracture system occur in dacite tuff-breccia that is the upper part of a dissected Tertiary summit caldera. Fracture zone exhibits intense argillite and pyrite alteration; silicic alteration occurs in narrow envelope surrounding quartz veins. Basement is Mesozoic(?) sedimentary rocks.

Gary L. Andersen, written commun., 1984

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O05-04 59°08'N 154°40'W	Crevice Creek (McNeil) Alaska Peninsula	Au, Cu Ag, Fe Cu-Au skarn	Produced 11 tonnes from high-grade zones, with 4.5 g/t Au, 514 g/t Ag, and 17.5% Cu

At least ten epidote-garnet skarn bodies occur in limestone over a 2 km^2 area adjacent to southwest part of the Jurassic(?) granodiorite stock of Pilot Knob. Skarn bodies 3 to 800 m long and a few centimeters to 60 m wide. Magnetite-rich skarn in isolated pods in nearby metavolcanic rocks. Skarn bodies developed in limestone, chert, and argillite of the Upper Triassic Kamishak Formation and in overlying metavolcanic rocks of the Jurassic Talkeetna Formation. Local disseminated magnetite zones in epidote-garnet skarns. Largest skarn body at Sargent Creek contains epidote, garnet, actinolite, quartz, pyrite, and chalcopyrite. Lenses up to 1 m wide and 10 m long average 7% Cu. Numerous magnetic anomalies in area surrounding granodiorite stock.

Martin and Katz, 1912; Richter and Herreid, 1965

O05-05 59°33'N 150°35'W	Nuka Bay District (Nualaska, Lost Creek, Chugach Mountains	Au Au quartz vein	Produced about 258,000 g Au; channel samples contain from 1 to 300 g/t Au

Quartz veins up to 1.0 m wide and 100 m long with sparse gold, arsenopyrite, pyrite, chalcopyrite, and galena. Veins of irregular shape with local pinching and swelling generally strike east-west, normal to regional structure. Veins mainly fissure fillings in metagraywacke and to lesser extent in phyllite of the Upper Cretaceous Valdez Group. Veins probably fill tensional cross joints formed during late stages of regional folding of host rocks. Sparse Tertiary quartz diorite dikes are cut by quartz veins. Several mines and prospects. Explored and developed from about 1909 to 1940. About 1,300 m underground workings. Minor subsequent mining activity.

Richter, 1970

O05-06 59°22'N 151°30'W	Red Mountain Kodiak Island and Border Ranges	Cr Podiform Cr	Two largest deposits are estimated to contain 87,000 tonnes of about 25 to 43% Cr_2O_3. One additional low-grade deposit with 1.13 million tonnes Cr_2O_3

Layers and lenses of chromite concentrated in several areas several hundred meters long and 60 m wide in dunite tectonite. Largest chromite layer about 190 m long and up to 1.5 m wide. More than 10 smaller ore bodies. Occurs in Early Jurassic or older dunite tectonite interlayered with subordinate pyroxenite in zones about 60 m thick. Locally abundant serpentinite, especially at contacts of bodies. Ultramafic rocks part of the Early Jurassic or older, informally named, Border Ranges ultramafic and mafic complex of Burns (1985). Faulted at base. Sporadic exploration and development from about 1919 to present. Several hundred meters of underground workings and trenches. About 26,000 tonnes of ore, ranging from 38 to 42% Cr_2O_3, produced from 1943 to 1957. Nearby Windy River chromite placer deposit in glaciofluvial sand and gravel deposits downstream from Red Mountain, is estimated to contain 15.6 million m^3 with 1.33% Cr_2O_3.

Guild, 1942; Bundtzen, 1983b; Burns, 1985; Foley and Barker, 1985; Foley and others, 1985

O05-07 59°12'N 151°49'W	Claim Point Kodiak Island and Border Ranges	Cr Podiform Cr	Estimated 82,000 tonnes Cr_2O_3. Produced about 2,000 tonnes of chromite

Layers and lenses of chromite up to 60 m long and 14 m wide, over area of about 500 by 500 m, in Early Jurassic or older dunite tectonite. About 14 separate deposits. Few olivine-pyroxene dikes; locally abundant serpentinite. Ultramafic rocks part of Early Jurassic or older, informally named Border Ranges ultramafic and mafic complex of Burns (1985). Faulted at base. Explored and developed from about 1909 to 1919. Mining from 1917 to 1918. Several hundred meters of underground workings and trenches. Sporadic exploration since; most recently in mid-1980's.

Guild, 1942; Burns, 1985; Foley and Barker, 1985

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O05-08 57°48'N 152°20'W	Chalet Mountain (Cornelius Creek) Chugach Mountains	W, Au, Ag Au quartz vein	Grab samples with up to 1.75% WO_3, 9.6 g/t Au, 120g/t Ag

Silicified zones and quartz veins with disseminated scheelite and gold(?) occur within a 100 by 500 m area of silicified metagraywacke of the Upper Cretaceous Kodiak Formation at Chalet Mountain, and in nearby granodiorite pluton at Anton Larsen Bay. Scheelite concentrated in silicified zones localized in calcareous-rich part of metagraywacke.

Seitz, 1963; Rose and Richter, 1967

O05-09 57°22'N 154°36'W	Halibut Bay Kodiak Island and Border Ranges	Cr Podiform Cr	Eight low-grade deposits with estimated 180,000 tonnes Cr_2O_3

Scattered small layers and lenses of chromite in dunite and subordinate clinopyroxenite tectonite in areas up to 300 m long and about 100 m wide. Ultramafic rocks part of the Early Jurassic or older, informally named Border Ranges ultramafic and mafic complex of Burns (1985). Faulted at base.

Foley and Barker, 1984; Burns, 1985

O08-01 58°59'N 136°06'W	Nunatak (Muir Inlet) Central-Southeastern Alaska	Mo Cu Porphyry Mo-Cu	Medium. Main stockwork contains estimated 2.03 million tonnes grading 0.067% Mo and 0.16% Cu; remaining stockwork contains estimated 117.5 million tonnes grading 0.026% Mo and 0.18% Cu.

Consists of numerous closely spaced molybdenite-bearing quartz veins, stockwork, and minor disseminated molybdenite in hornfels, skarn, and a mineralized fault zone that occur around a Tertiary(?) granite porphyry stock. Disseminated sulfides in granite porphyry include varying amounts of pyrite, pyrrhotite, chalcopyrite, and sparse tetrahedrite and bornite. Some massive sulfide pods occur in silicified skarn adjacent to stock in calcareous sedimentary rocks. Granite porphyry intrudes tightly folded Paleozoic metasedimentary rocks.

MacKevett and others, 1971; Brew and others, 1978, 1991; Berg, 1984.

O08-02 59°44'N 137°45'W	Windy Craggy (Alsek River Area) Alexander	Cu, Co Au, Ag Cyprus massive sulfide	Large - World Class. Reserves of 265.7 million tonnes grading 1.44% Cu, 0.070% Co, 0.20 g/t Au.

Consists of two principal massive pyrrhotite, pyrite and chalcopyrite bodies that are hosted in Upper Triassic basaltic volcanic flows and intercalated siltstone and limestone. Both zones have adjacent sulfide stringer stockworks. Stockwork more extensive at North Zone. Reserves for the North zone are 148.3 million tonnes grading 1.44% Cu, 0.066% Co, 0.23 g/t Au and 4.16 g/t Ag. Reserves for the South zone are 117.5 million tonnes grading 1.44% Cu, 0.075% Co, 0.16 g/t Au and 3.37 g/t Ag. Additional 31.7 million tonnes are reported for the Ridge and other massive sulfide zones in the Windy Craggy mountain area. Five additional stratiform Cu occurrences were discovered in the area in 1992. Deposit age interpreted as Late Triassic.

Cordilleran Geology and Exploration Roundup, 1990; EMR Canada, 1989; Harper, 1992; Schroeter & Lane, 1991; G. Harper, Massive sulphide potential of the northwestern Cordillera of British Columbia and the significance of the Alta Basin, Geddes Resources Ltd., written commun., 1992; MacIntyre and others, 1993.

O08-03 59°39'N 136°44'W	O'Connor River Unassigned	Gypsum, Anhydrite Stratabound gypsum	Medium. Reserves of 6.35 million tonnes grading 90% gypsum.

Consists three stratabound gypsum layers that occur in deformed Permian to Triassic limestone, limestone breccia, and black calcareous argillite. Reserves are for the West and Kim zones. An additional reserve for East zone is 2.5 million tonnes grading 79% gypsum. Deposit age interpreted as Permian-Triassic.

White, 1986; B.C. Minfile, 1988.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O08-04 59°43'N 133°24'W	Adanac-Adera (Ruby Creek) Surprise Lake	Mo, W U, Sn, Cu Porphyry Mo	Medium. Reserves of 182.3 million tonnes grading 0.059% MoS_2.

Summary and References

Consists of molybdenite with accessory pyrite, fluorite, chalcopyrite, scheelite and wolframite with minor arsenopyrite that occur in a quartz-vein stockwork. Hosted by a quartz monzonite stock associated with the Late Cretaceous Surprise Lake Batholith. Siliciic and potassic alteration occur as envelopes up to several centimeters thick around quartz veins. Minor uranium occurs in the deposit. K-Ar age of 70.6 ± 3.8 Ma for Surprise Lake Batholith. Associated W-, Cu-, Sn-greisen veins and W-, Sn- (Cu, Pb, Zn) skarns occur along stock contacts with limestone of Cache Creek Assemblage. Deposit age interpreted as Late Cretaceous.

Christopher and Pinsent, 1982; B.C. Minfile, 1988; EMR Canada, 1989; Dawson and others, 1991; Mining Review, 1992.

O08-05 59°26'N 135°53'W	Klukwan Klukwan-Duke	Fe, PGE, Ti, V Zoned mafic-ultramafic Fe-Ti	Large. Estimated 12 billion tonnes grading 13% magnetite, 1.5 to 4.4% TiO_2, and 0.2% V_2O_5. Reserves of 45 million tonnes grading 10.3 g/t Au, 0.1% Cu, 1.0 g/t Pt and 1.0 g/t Pd.

Consists of titaniferous magnetite with minor chalcopyrite, hematite, pyrite, pyrrhotite, spinel, and leucoxene that occur either as disseminations or in tabular zones in a pyroxenite body surrounded by diorite. Magnetite occurs interstitial to pyroxene and is idiomorphic against hornblende. Cretaceous pyroxenite and diorite intrude Triassic or older rocks. Best known part of the deposit is nearby Klukwan fan (Takshanuk Mountain) magnetite placer deposit that contains estimated 453 million tonnes grading 10% titaniferous magnetite. Placer deposit occurs in an alluvial fan at the foot of the mountain slope along a road below Klukwan lode deposit.

Wells and Thorne, 1953; Robertson, 1956; MacKevett and others, 1974; Wells and others, 1986; Brew and others, 1991; Berg, 1984; Wells and others, 1986.

O08-06 59°15'N 135°30'W	Haines Klukwan-Duke	Fe, Ti Zoned mafic-ultramafic Fe-Ti	Large. Reserves of greater than 1 billion tonnes grading less than 10% magnetite, 1.3% to 1.8% TiO_2.

Consists of titanium-bearing magnetite that occurs as primary magmatic segregations in pyroxenite that forms part of zoned complex of the Union Bay Suite. Complex contains a pyroxenite core that surrounded by epidote-bearing granite, and intrudes metabasalt of the Taku Terrane. Deposit age interpreted as mid-Cretaceous.

Wells and others, 1986; Brew and others, 1991.

O08-07 58°55'N 136°60'W	Orange Point Alexander	Zn, Cu Ba,Pb,Ag,Au Kuroko Zn-Pb-Cu massive sulfide	Medium. Reserves of greater than 1 million tonnes grading 19% Zn, 5.2% Cu, 3.5 g/t Au, 70 g/t Ag.

Consists of pyrite, pyrrhotite, sphalerite and chalcopyrite that occur as elongated zones of massive and disseminated sulfides up to 25 meters wide and 170 meters long. Deposit hosted in Permian and (or) Triassic meta-andesite flows and tuffs. Deposit age interpreted as Permian and Triassic.

Berg, 1984; Brew and others, 1991.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O08-08 58°52'N 135°05'W	Kensington Juneau	Au Ag, Pb Au quartz vein	Produced 10,900 tonnes grading about 5.8 g/t Au. Proven and probable reserves are 7.6 million tonnes grading 5.2 g/t Au

Stockworks of quartz veins in high-angle zones of sheared and chloritized Cretaceous quartz diorite. Veins contain mainly pyrite with some chalcopyrite and rare galena. Pyrite varies from disseminated euhedral crystals to massive veins up to 0.1 m wide. Alteration varies with intensity of veining, and is marked by chlorite, epidote, sericite, and locally K-feldspar. Gangue dominantly quartz with lesser amounts of carbonate and albite. Veins are irregular and vary from 2 to 10 cm wide. Veins generally parallel stockwork boundaries. Vein system trends generally north-south with an areal extent of 24 by 48 m and a vertical extent of 300 m. The deposit occurs in Cretaceous diorite that intrudes Upper Triassic greenstone, graywacke, and argillite of the western border of the informally named, Coast plutonic-metamorphic complex of Brew and Ford (1984). Origin of gold interpreted to be from deep-crustal metamorphic fluids. Mined from 1886 to 1924. About 1,800 m of workings.

Wright and Wright, 1908; Knopf, 1911; Eakins, 1918; Goldfarb and others, 1988, 1991; Harvey and Kirkham, 1991

O08-08 58°52'N 135°05'W	Jualin Juneau	Au Ag, Cu, Pb Au quartz vein	Medium. Reserves of 907,000 tonnes grading 10.5 g/t Au. Produced about 1.5 million g Au

Consists of four or five major quartz fissure veins and pipe-like stockworks that contain minor gold, and considerable pyrite, chalcopyrite, galena, minor sphalerite, and secondary copper minerals. Deposit hosted in Cretaceous quartz diorite. Pyrite is dominant sulfide. Gold associated with pyrite as minute blebs in goethite rims and fracture fillings in corroded crystals. Gangue of quartz with lesser ankerite, chlorite, and sericite. Age of mineralization is interpreted as 55 Ma. Quartz diorite adjacent to veins exhibit proximal ankerite, quartz, and sericite alteration, and more widespread propylitic alteration. Quartz diorite intrudes Upper Triassic greenstone, graywacke, and argillite of Alexander terrane. More than 5,500 m of horizontal workings. Origin of gold interpreted to be from deep-crustal metamorphic fluids. Principal mining from 1895 to 1920.

Knopf, 1911; Jones and others, 1984a; Barnett, 1989; Bundtzen and others, 1990; Goldfarb and others, 1991; Brew and others, 1991; Swainbank and others, 1991.

O08-09 58°44'N 133°35'W	Tulsequah Chief (Big Bull) Coast	Zn, Cu, Au, Ag, Pb Kuroko Zn-Cu-Pb massive sulfide	Medium. Reserves of 8.8 million tonnes grading 1.21% Pb. Grade: 6.42% Zn,1.3% Cu, 2.51 g/t Au, 106.36 g/t Ag.

Consists of massive to disseminated pyrite, sphalerite, chalcopyrite and galena with tennantite and tetrahedrite that are hosted in mafic volcanic rocks of the Upper Devonian to early Mississippian Mount Eaton series. Hanging wall composed of dacite tuffs; footwall composed of more massive andesitic flows. Alteration associated with mineralization consists of sericite-pyrite with local anastomosing quartz veins grading to pervasive silicification. Deposit contains lenses of massive sulfides up to 10 meters thick and 170 meters long. Seven conformable lenses are identified. Deformation of the lenses is intense, with at least 3 phases of deformation. Production from 1951 and 1957 was 574,000 tonnes grading 1.8% Cu, 1.3% Pb, 6.7% Zn, 3.4 g/t Au and 110 g/t Ag. Deposit age interpreted as Devonian and Mississippian.

B.C. Minfile, 1989; EMR Canada, 1989; Dawson and others, 1991; Redfern Resources Ltd., summary report,1995.

O08-10 58°40'N 133°28'W	Erikson-Ashby Unassigned	Ag, Pb, Zn, Au Kuroko Zn-Pb-Ag massive sulfide and Zn Skarn	Medium. Reserves of 907,190 tonnes grading 215 g/t Ag, 2.3% Pb, 3.8% Zn, 1.7g/t Au.

Volcanogenic massive sulfides occur in Upper Cretaceous to Lower Eocene rhyolitic volcanics and associated volcaniclastic sediments and Mn-rich skarn replacement bodies in Permian (?) limestone and Paleozoic to Triassic chert, greywacke and intercalated intermediate volcanics and phyllites. Rhyolite-hosted part of deposit generally consists of lenses of pyrite and magnetite overlain by massive pyrite, sphalerite and galena. Galena and magnetite are concentrated upward in massive sulfide sections. Skarns occur as veins and replacement bodies with associated rhodochrosite and magnetite. Deposit age interpreted as Late Cretaceous-E. Tertiary.

B.C. Minfile, 1988; EMR Canada, 1989.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O08-11 58°32'N 132°47'W	Sutlahine River Area (Thorn, Kay) Surprise Lake	Cu, Mo, Ag Pb Porphyry Cu-Mo	Medium.

Consists of brecciated rhyolite contains chalcopyrite, pyrite, quartz, minor galena, barite, calcite and siderite. Chalcopyrite and molybdenite occur as disseminations and fracture fillings with quartz and orthoclase. Minor enargite, tetrahedrite, pyrite and stilbite occur in quartz veins in shear zones and in breccias. Deposit hosted in a silicic intrusive-extrusive complex of Tertiary Sloko Group, cored by a quartz feldspar porphyry intrudes the contact between pre-Upper Triassic metasedimentary rocks, and volcanic rocks, including porphyritic andesite, rhyolite and tuff of the Upper Triassic Stuhini Group. Complex is extensively altered to pyrite, hydrothermally altered. Deposit age interpreted as Early Tertiary.

B.C. Minfile, 1988.

O08-12 58°26'N 133°22'W	Mount Ogden (Nan, Moly-Taku) Surprise Lake	Mo Zn, Cu, Ag, W Porphyry Mo	Large. Reserves of 218 million tonnes grading 0.30% MoS_2.

Consists of molybdenite hosted by an alaskite-quartz monzonite stock of the Coast Plutonic Complex (Cretaceous and early Tertiary), that intrudes amphibolite-grade, metamorphosed Permian and Triassic limestones, clastic sedimentary and volcanic rocks. Country rocks locally contain skarn that contains disseminated pyrite, pyrrhotite, magnetite and traces of sphalerite and scheelite, and a white calc-silicate hornfels with calcite, and wollastonite or tremolite. Molybdenite occurs mainly in the alaskite as platy crystals in veins, in veinlets, as rosettes in vuggy quartz and as interstitial grains. Some molybdenite veins range up to 10 cm wide and occur over 30 meters. Alteration consists of quartz-sericite, with fluorite, biotite, minor pyrite and sphalerite. Deposit age interpreted as Late Cretaceous and early Tertiary.

Mining Review, 1981; B.C. Minfile, 1988; EMR Canada, 1989.

O08-13 58°18'N 134°20'W	Alaska-Juneau Juneau	Au Pb, Ag Au quartz vein	Medium. Produced 108 million g Au, 59.1 million g Ag, and 21.8 million kg Pb from 80.3 million tonnes ore. Reserves of 61.6 million tonnes grading 1.8 g/t Au

Consists of a network of lenticular quartz veins a few centimeters to 1 m thick contain sparse scattered masses of gold, pyrite, pyrrhotite, arsenopyrite, galena, with minor sphalerite, chalcopyrite, and silver. Vein lode system about 5.6 km long and 600 m wide. Deposit consists of a series of parallel quartz stringers in phyllite and schist near the contact between the Upper Triassic Perseverance Slate, in amphibolite derived from late(?) Mesozoic gabbro dikes and sills, and in the informally named Gastineau volcanics of Permian and (or) Upper Triassic age. Deposit is in the western metamorphic belt of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Most of ore occurs in quartz veins; some in adjacent altered metamorphic rocks. Metagabbro forms irregular dikes and sills. Large-volume, low-grade mine. A few hundred kilometers of underground workings and several large glory holes. Production from about 1893 to 1944. Origin of gold interpreted to be from deep-crustal metamorphic fluids, or possibly a remobilized strata-bound deposit.

Spencer, 1906; Twenhofel, 1952; Wayland, 1960; Herreid, 1962; Goldfarb and others, 1986, 1988, 1991; Newberry and Brew, 1987, 1988; Light and others, 1989; Brew and others, 1991; Alaska Mineral Industry, 1993, p.13.

O08-14 57°59'N 136°25'W	Bohemia Basin (Yakobi Island) Yakobi	Ni, Cu Gabbroic Ni-Cu	Medium. Estimated 19 million tonnes grading 0.33% Ni, 0.21% Cu, 0.01% Co

Consists of magmatic segregations, chiefly of pyrrhotite, pentlandite, and chalcopyrite. Occur in trough-like body about 45 m thick near base of basin-shaped, composite norite La Perouse lopolith of Tertiary age. Norite locally grades into gabbro and diorite. Norite stock intrudes metagraywacke, phyllite, and greenschist of the Cretaceous and Cretaceous(?) Kelp Bay Group. Considerable drilling exploration during late 1970's to early 1980's.

Kennedy and Walton, 1946; Johnson and others, 1982; Himmelberg and others, 1987, Still, 1988; Brew and others, 1991; Berg, 1984.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O08-15 58°05'N 134°38'W	Greens Creek Alexander	Ag, Zn, Au, Pb Cu,Bi,Sb Kuroko Zn-Pb-Cu massive sulfide	Medium. Reserves of 12.5 million tonnes grading 456 g/t Ag, 4.1 g/t Au, 12.8 % Zn, and 4.0 % Pb.

Consists of sphalerite, galena, chalcopyrite, and tetrahedrite in a pyrite-rich matrix in massive pods, bands, laminations, and disseminations, associated with pyrite-carbonate-chert exhalite. Hanging wall of chlorite and sericite sedimentary rocks. Footwall of black graphitic argillite. "Black ore" forms an extensive blanket deposit, and is composed of fine-grained pyrite, sphalerite, galena, and Ag-rich sulfosalts in laminations in black carbonaceous exhalite and argillite; "white ore" occurs along edges of massive pods, and is composed of minor tetrahedrite, pyrite, galena, and sphalerite in laminations, stringers, or disseminations in massive chert, carbonate rocks, or sulfate-rich exhalite. Local veins with bornite, chalcopyrite, and gold below massive sulfides. Veins may be brine conduits. Sulfides and host rocks underlain by serpentinized mafic volcanic flows and tuffs. Host rocks form Triassic suite of metasedimentary and metavolcanic rocks in Alexander terrane and apparently overlain structurally several kilometers away by fossiliferous Permian black carbonaceous metasedimentary rocks. Host rocks tightly folded into southeast-plunging, overturned antiform. Interpreted to be an exhalative marine massive sulfide deposit formed in a Triassic back-arc or wrench fault extensional basin during deposition of arc- or continent-derived clastic and volcaniclastic sediments intermixed with mafic flows and tuffs.

Dunbier and others, 1979; Drechsler and Dunbier, 1981; J. Dunbier and D. Sherkenbach, written commun., 1984; Henry C. Berg, written commun., 1984; Newberry, Brew, and Crawford, 1990; Brew and others, 1991; Wells and others, 1986; Berg, 1984.

O08-16 57°40'N 136°06'W	Chichigof, Hirst-Chichagof Baranof	Au Ag Au quartz vein	Medium. Produced about 24.6 million g Au, 1.24 million g Ag, and minor Pb and Cu from 700,000 tonnes of ore. Average grade of 7.2 g/t Au, 2.0 g/t Ag. Reserves of 91,000 tonnes grading 41.2 g/t Au in several ore bodies

Consists of tabular to lenticular quartz veins a few meters thick, extend a few hundred meters along strike, and up to a few thousand meters along plunge. Mainly ribbon quartz with minor pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, and some scheelite and tetrahedrite locally. Ore shoots localized within shear and gouge zones in Hirst and Chichagof faults, especially along undulations in the fault planes. Veins cut metagraywacke and argillite of the Cretaceous Sitka Graywacke. Production from about 1905 to 1940. Extensive underground workings on 12 levels to 1,200 m deep and 1,440 m long. Considerable drilling and exploration in the 1980's.

Reed and Coats, 1941; Still and Weir, 1981; Johnson and others, 1982; Berg, 1984; Bundtzen, Green, Deager, and Daniels, 1987; Brew and others, 1991.

O08-17 56°39'N 133°10'W	Castle Island, Kupreanof Island Alexander	Ba Zn, Pb, Ag, Cu Bedded barite, kuroko Ba-Zn-Pb-Cu massive sulfide	Medium. Produced 680,000 tonnes ore grading 90% barite. Sulfide-rich layers contain up to 5% galena and sphalerite, and 100 g/t Ag.

Castle Island: Consists of lenses of massive barite interlayered with metamorphosed Devonian or Triassic limestone, calcareous and tuffaceous clastic rocks. Sulfide-rich interbeds contain sphalerite, galena, pyrite, pyrrhotite, bornite, tetrahedrite, and chalcopyrite. Mined by surface and underwater stripping. Kupreanof Island Deposit: Consists of lenses of massive pyrite and lesser galena and sphalerite in Upper Triassic metamorphosed felsic volcanic and volcaniclastic rocks, chert, slate, and marble. Sulfide lenses up to 30 m long and 3 m wide. Complexly folded and faulted.

Berg and Grybeck, 1980; Berg, 1984; Grybeck and others, 1984; Brew and others, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O08-18 58°42'N 133°38'W	Polaris-Taku (Whitewater) Texas Creek	Au, Ag, Cu, As, Sb Au quartz vein	Medium. Resource of 2.196 million tonnes grading 14.74 g/t Au.

Summary and References

Consists of native gold associated with arsenopyrite and stibnite in quartz-ankerite veins. Deposit underlain by late Paleozoic to Triass Stuhini Group volcanic and sedimentary rocks. Volcanic rocks composed of andesite and basalt flows and pyroclastic rocks host gold in that occurs in an assemblage of arsenopyrite, ankerite, sericite, pyrite, fuchsite, and stibnite. Structures hosting deposit are splays of the Tulsequah River shear zone. Production of 231,000 oz Au from 760,000 tons of ore, with a recovered grade of 0.30 oz Au/t. Deposit age iinterpreted as Early Jurassic(?).

B.C. Minfile, 1983; Marriott, 1992; Mihalynuk and Marriott, 1992.

O08-19 58°13'N 132°17'W	Muddy Lake (Golden Bear, Totem) Texas Creek	Au Ag Au quartz vein	Medium. Reserves of 720,000 tonnes grading 5.75 g/t Au.

Consists of disseminations and fracture-fillings of extremely fine-grained pyrite that occur along fault contacts of tuffite and limestone. Deposit interpreted as a mesothermal Au-quartz veins hosted by silicified limestone, dolostone and tuff of the Permian Asitka Assemblage. Occurs in a north-trending, 20 km long fault zone. Production started in 1983. Four deposits occur on the property: Bear, Fleece, Totem and Kodiak zones. Deposit age interpreted as Early Jurassic.

Schroeter, 1987; Northern Miner, August 31,1987; Melis and Clifford, 1987; Osatenko and Britton, 1987; Dawson and others, 1991; North American Metals Corp, news release, February 1995.

O08-20 59°24'N 136°23'W	Glacier Creek Alexander	Ba, Cu, Zn Pb, Ag, Au Kuroko massive sulfide	At least 680,000 tonnes of 45% barite and up to 3% combined Cu and Zn

Fine-grained sphalerite, galena, chalcopyrite as disseminations, and in massive layers and lenses associated with metamorphosed Paleozoic and lower Mesozoic mafic pillow flows, highly altered and metamorphosed quartz-feldspar porphyry, thin phyllitic siltstone and limestone. Sparse disseminated pyrite, magnetite, and tetrahedrite. Main sulfide layers and lenses associated with lenses of sericite-talc-quartz schist as much as 180 m thick in the metamorphosed mafic volcanic rocks. Schist formed partly by alteration of mafic extrusive rocks, and partly from quartz-feldspar porphyry. Deposits up to 9 m thick and 600 m long. Sulfide layers and lenses interfoliated with beds of nearly pure barite up to 20 m thick. Sedimentary origin indicated by conformable relations between sulfide layers and bedding. Host rocks part of Alexander terrane; age of host rocks uncertain.

MacKevett and others, 1971; Hawley, 1976; Still, 1984; Still and others, 1991

O08-21 59°01'N 137°05'W	Margerie Glacier Central-Southeastern Alaska	Cu, Ag, Au Porphyry Cu and lesser polymetallic vein	Estimated 145 million tonnes of 0.02% Cu, 0.27 g/t Au, 4.5 g/t Ag

Chalcopyrite, pyrite, arsenopyrite, sphalerite, molybdenite, and minor scheelite in quartz veins in shear zones, masses of sulfide, and as disseminations in propylitically altered, Cretaceous or Tertiary porphyritic granite stock and in adjacent hornfels. Granite intrudes Permian(?) metamorphosed pelitic and volcanic rocks, and sparse marble of Alexander terrane.

Brew and others, 1978

O08-22 58°52'N 136°52'W	Reid Inlet Baranof	Au, Pb Au quartz vein	Produced 220,000 to 250,000 g Au

Zone of narrow, discontinuous, steeply dipping quartz veins up to a few hundred meters long and up to 1.1 m thick in altered Cretaceous granodiorite, contact-metamorphosed Permian(?) pelitic and volcanic rocks, and sparse marble of Alexander terrane. Veins trend north-south, northeast, and east-west.

MacKevett and others, 1971; Brew and others, 1978

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O08-23 58°33'N 136°56'W	Brady Glacier Yakobi	Cu, Ni, PGE Gabbroic Ni-Cu	Estimated 82 to 91 million tonnes of 0.53% Ni, 0.33% Cu, 0.03% Co, minor PGE. Grab samples of 0.18 to 1.30 g/t PGE

Summary and References

Disseminated and lenses of pyrrhotite, pentlandite, and chalcopyrite, with rare pyrite near base of large layered Tertiary lopolith consisting mainly of gabbro with sparse peridotite, all part of the La Perouse layered gabbro. Locally up to 10% disseminated sulfides. Deposit almost entirely beneath Brady Glacier, but exposed in small nunataks. Gabbro intrudes metagraywacke and phyllite of the Cretaceous Sitka Graywacke. Considerable drilling and exploration in 1970's, but now in National Park. Exploration stopped short of development.

Brew and others, 1978; Czamanske and Calk, 1981; Himmelberg and Loney, 1981

O08-24 57°57'N 136°16'W	Apex and El Nido Baranof	Au, Ag Cu, Pb, W, Zn Au quartz vein	Produced about 622,000 g Au and 93,300 g Ag

Quartz fissure veins up to 2 m thick and stockworks with sparse pyrite, arsenopyrite, chalcopyrite, galena, sphalerite, tetrahedrite, and gold. Host rocks are altered Mesozoic diorite pluton and amphibolite mass within pluton. Minor sulfides in the altered diorite wall rocks. Deposit also contains disseminations, veinlets, and small masses of scheelite. Vein system symmetrical around vertical fault that bisects deposit. Pluton intrudes upper Paleozoic low-grade pelitic and intermediate volcanic rocks. About 1.6 km of workings. Production from 1912 to 1939.

Reed and Coats, 1941; Still and Weir, 1981; Johnson and others, 1982

O08-25 57°51'N 136°13'W	Cobol Baranof	Au Cu, Pb, Zn Au quartz vein	Produced about 3,100 g Au from about 120 tonnes ore

Quartz fissure vein up to 0.6 m wide with arsenopyrite, sphalerite, galena, pyrite, and chalcopyrite cuts Cretaceous(?) quartz diorite, and upper Paleozoic greenstone, quartzite, and siliceous limestone. Quartz diorite locally altered near veins.

Reed and Coats, 1941; Johnson and others, 1982

O08-26 57°47'N 136°19'W	Mirror Harbor Yakobi	Ni, Cu Co Gabbroic Ni-Cu	Largest ore body contains about 7,300 tonnes with about 1.57% Ni, 0.88% Cu, and 0.04% Co

Disseminated, intergrown pyrrhotite, pentlandite, and chalcopyrite in composite Tertiary norite stock. Sulfide pods locally. Stock intrudes contact-metamorphosed metagraywacke and phyllite of the Cretaceous Sitka Graywacke.

Pecora, 1942; Kennedy and Walton, 1946; Johnson and others, 1982

O08-27 58°15'N 134°21'W	Treadwell Juneau	Au, Ag, Cu Au quartz vein	Produced about 90.1 million g Au from 25 million tonnes ore

Large deposit with disseminated sulfides and quartz and quartz-calcite vein systems that contain sparse gold, pyrite, magnetite, molybdenite, chalcopyrite, galena, sphalerite, and tetrahedrite in shattered albite diorite dikes and sills. These intrude Jurassic(?) and Lower Cretaceous(?) slate and greenstone derived from basaltic tuff or agglomerate; part of the Treadwell Slate in the Gravina-Nutzotin belt. Some ore in zone at least 1,100 m long in slate inclusions and in adjacent wall rock. Best ore associated with abundant quartz and calcite veinlets. Deposit mined from above sea level to 790 m beneath Gastineau Channel. Four major mines connected underground. Principal mining from 1885 to 1922 when most workings flooded during a catastrophic influx of sea water. Origin of gold interpreted to be deep-crustal metamorphic fluids.

Spencer, 1905; Buddington and Chapin, 1929; Light and others, 1989; Goldfarb and others, 1991

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O08-28 57°55'N 133°37'W	Sweetheart Ridge Tracy	Ag, Au, Cu, Pb, Zn Kuroko massive sulfide	Estimated 6,600 tonnes of 7.9 g/t Au, 10.6 g/t Ag, 0.7% Cu

Strata-bound sulfide disseminations and thin, layers of massive chalcopyrite, pyrite, subordinate sphalerite, and sparse galena occur in zones up to 2 m thick in cataclastic upper Paleozoic or Mesozoic quartz-rich paragneiss and to a lesser extent in schist. Deposit occurs just west of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Scattered sulfides in veins may represent remobilized portions of strata-bound deposit.

Brew and Grybeck, 1984; Kimball and others, 1984

O08-29 57°47'N 133°28'W	Sumdum Tracy	Ag, Cu, Zn Kuroko massive sulfide(?)	Estimated 24 million tonnes grading 0.57% Cu, 0.37% Zn and 10.3 to 103 g/t Ag, assuming deposit continues beneath Sumdum Glacier.

Massive lenses and disseminated zones with pyrrhotite, pyrite, chalcopyrite, sphalerite, and lesser bornite, malachite, azurite, and galena in bodies up to 15 m wide. Zones occur parallel to layering along crest and flanks of isoclinal fold in Paleozoic or Mesozoic metasedimentary schist and gneiss at the western edge of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Sulfide-bearing veins(?) and fault breccia that may postdate strata-bound deposit and represent remobilization of the original mineralization.

MacKevett and Blake, 1963; Brew and Grybeck, 1984; Kimball and others, 1984

O08-30 57°39'N 133°27'W	Sumdum Chief Juneau	Au, Ag, Cu, Pb, Zn Au quartz vein	Produced about 750,000 g each of Ag and Au. Average grade about 13.7 g/t Au

Two quartz-calcite fissure veins with gold, auriferous pyrite, galena, sphalerite, chalcopyrite, and arsenopyrite. Uneven gold distribution, mainly in pockets where small veins intersect main veins. Veins, up to 6 m thick, occur in upper Paleozoic(?) or Mesozoic graphitic slate and marble of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Minimum of 1,820 m horizontal workings. Moderate former production. Origin of gold interpreted to be deep-crustal metamorphic fluids.

Spencer, 1906; Brew and Grybeck, 1984; Kimball and others, 1984; Goldfarb and others, 1988, 1991

O08-31 56°31'N 132°04'W	Groundhog Basin Central-Southeastern Alaska	Ag, Pb, Zn Polymetallic vein(?), Sn granite, Porphyry Mo	Estimated several hundred thousand tonnes massive sulfide ore grading 8% Zn, 1.5% Pb, 51.5 g/t Ag. Equal amounts of disseminated sulfide ore grading 2.5% Zn and 1% Pb.

Disseminated to massive pyrrhotite, sphalerite, and galena with lesser pyrite, arsenopyrite, chalcopyrite, cassiterite,and magnetite. Sulfides occur in several tabular or stratiform zones up to 1 m thick and in veins adjacent to altered Miocene granite porphyry. Zones and veins occur in upper Paleozoic or Mesozoic calc-silicate, quartz-feldspar, and hornblende-rich gneiss and schist of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). Deposits and host rocks intruded by granite porphyry and by younger quartz porphyry sills and dikes. Deposit interpreted as skarn and polymetallic vein deposit related to tin granite. Altered granite porphyry may contain 1 million tonnes of undiscovered resources containing 0.8% Sn.

Buddington, 1923; Gault and others, 1953; Grybeck and others, 1984; Newberry and Brew, 1988

O08-32 58°14'N 134°52'W	Funter Bay Klukwan-Duke	Cu, Ni, Co Gabbroic Ni-Cu	Estimated 450 to 540 thousand tonnes with 0.33 to 1% each of Cu and Ni, and 0.05 to 0.32% Co

Disseminated pyrrhotite, pentlandite, and chalcopyrite in Mesozoic olivine-hornblende gabbro at base of Late(?) Mesozoic gabbro-norite pipe. Remainder of pipe contains much less sulfide. Pipe intrudes upper Paleozoic or Triassic quartz-mica schist of Alexander terrane.

Barker, 1963b; Noel, 1966

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O09-01 59°56'N 130°20'W	Midway (Silver Tip) Cassiar	Ag, Pb, Zn Au, Sb, Bi Pb-Zn-Ag skarn and manto	Medium. Reserves of 1.18 million tonnes grading 9.6% Zn, 7.0% Pb, 410 g/t Ag.
Consists of sphalerite, galena and pyrite with minor silver, gold, antimony and bismuth minerals occur as irregular, pipe-like, open-space filling and replacement bodies. Deposit hosted by Middle Devonian McDame Group carbonates beneath a major unconformity. SEDEX Ba, Pb, and Zn deposits occur in the overlying Devonian and Mississippian Earn Group turbiditic clastic rocks. K-Ar age of 66 Ma for sericitized Earn Group sedimentary rock near quartz-feldspar porphyry dikes, about 2 km from the deposit, interpreted as age of mineralization. Deposit age interpreted as Late Cretaceous.			
B.C. Minfile, 1988; Bradford and Godwin, 1988; EMR Canada, 1989.			
O09-02 59°46'N 127°12'W	Leguil Creek (Letain) Liard	Ba Bedded barite	Medium. Production of about 10,000 tonnes (1987-88). Grade not available.
Consists of veins and lenses of barite that occur in a thinly bedded sequence of Lower Paleozoic shale and siltstone of Cambrian and Devonian age. Sequence gently folded into a series of northwest-trending anticlines and synclines. Three zones are identified. The main zone occurs in a braided fault zone, rarely exceeding 3.5 m thickness, and is intruded by a diorite dike. Veins in the other two zones vary from 1 to 4 meter wide, trend northeast, and are vertical. Deposit age interpreted as Devonian(?).			
B.C. Minfile, 1990.			
O09-03 59°27'N 126°05'W	Lower Liard (Gem, Tee, Tam) Liard	F, Ba Southeast Missouri Ba-F	Medium. Reserves of 2.4 million tonnes grading 34-73% CaF2.
Consists of fluorite with barite, witherite, barytocalcite, quartz and calcite that occur along contact between limestone of the Middle Devonian Dunedin Formation and shale of the overlying Middle to Upper Devonian Besa River Formation. Fluorite occurs in limestone, as veins and pods, and in brecciated shale. Deposit age interpreted as Mississippian, based on fission track dating.			
BCGS, 1972; B.C. Minfile, 1988; EMR Canada, 1989.			
O09-04 59°21'N 129°52'W	Windy (Balsam, Star, Kuhn, Dead Goat) Surprise Lake	W, Mo Zn, Cu W skarn	Medium. Reserves of 616,500 tonnes grading 0.48% WO_3, 0.13 MoS_2.
Consists of scheelite, molybdenite, pyrite, pyrrhotite and rare magnetite form coarse disseminations interstitial to calc-silicates in massive skarn. Locally, quartz-molybdenite veins crosscut skarns. Retrograde massive pyrrhotite-sphalerite skarn replaces other skarn facies. Skarn minerals include garnet, diopside, actinolite, powellite and fluorite. Skarn occurs along the lower contacts of marble layers in the Lower Cambrian Atan and Late Proterozoic Ingenika Groups. Skarns occur adjacent to Late Cretaceous Needlepoint stocks of the Surprise Lake Suite with a K-Ar isotopic age of 72.4 Ma. Deposit age interpreted as Late Cretaceous.			
Cooke and Godwin, 1985; B.C. Minfile, 1988.			
O09-05 59°20'N 129°49'W	Cassiar (Mount McDame) Cassiar Asbestos	Asbestos, jade Serpentine-hosted asbestos	Large. Pre-production reserves of 55 million tonnes with high quality chrysotile.
Consists of a chrysoltile asbestos stockwork hosted in serpentinized alpine ultramafic intrusive rocks that are emplaced at the contact of Slide Mountain terrane and overlying shelf sediments of Cassiar terrane. Area is underlain by four major thrust sheets. Deposit composed of two-fibre vein type with magnetite in vein partings and in wall rocks. Pyrite and jade also occur. Production between 1953 and 1984 of 2.05 million tonnes of fibre. Deposit age uncertain.			
Burgoyne, 1986; Leaming,1978; Northern Miner, December 12, 1987.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O09-06 59°21'N 129°31'W	Mt. Haskin West (Joem, Rain, Moly Zone) Surprise Lake	Mo, W Porphyry Mo-W, Mo skarn	Medium. Reserves of 11.76 million tonnes grading 0.17% MoS_2.

Summary and References

Consists of molybdenite and lesser scheelite in a quartz-muscovite stockwork in fine- and coarse-grained monzogranite and syenogranite of the Eocene Mt. Haskin Stock and scheelite-molybdenite skarn extend into adjacent dolomitic sediments. K-Ar dating of the Mt. Haskin stock gives an age of 50.9 Ma ± 1.5 Ma. Located on the northwestern flank of Mt. Haskin. Deposit age interpreted as middle Eocene.

B.C. Minfile, 1989; EMR Canada, 1989; Gower and others, 1985.

O09-07 59°15'N 129°52'W	S.Q.E. (Storie, Casmo) Surprise Lake	Mo Porphyry Mo	Medium. Reserves of 100.5 million tonnes grading 0.129% MoS_2.

Consists of pyrite and molybdenite that occur as fracture-fillings and rosettes in quartz feldspar porphyry dike-like phases of quartz monzonite of the Late Cretaceous Needlepoint Intrusions of the Surprise Lake plutonic suite. K-Ar isotopic age of 73.2 Ma ± 2.5 Ma for igneous rocks that form plugs or sheet-like dikes. Deposit related to stockwork greisen and pegmatite. Deposit age interpreted as Late Cretaceous.

Panteleyev, 1979; Bloomer, 1981; Sinclair, 1986; EMR Canada, 1989; Dawson and others, 1991; Woodsworth and others, 1991.

O09-08 58°30'N 129°09'W	Eaglehead (Eagle) Unassigned	Cu, Mo Ag, Au Porphyry Cu-Mo	Medium. Reserves of 30.0 million tonnes grading 0.41% Cu, 2.71 g/t Ag, 0.2 g/t Au, 0.0216% Mo.

Consists of chalcopyrite, bornite, molybdenite and pyrite that occur at the contact between Early Jurassic Eaglehead granodiorite of the Guichon Suite (K-Ar isotopic age of186 Ma) and Upper Triassic volcanic and sedimentary rocks of the Kutcho Creek Formation. Deposit hosted in granodiorite cut by feldspar porphyry dikes and is concentrated in steep, chlorite-rich shear zones. Alteration is dominantly phyllic and propylitic, but chalcopyrite veins exhibit potassium feldspar alternation. Malachite, chalcocite, chrysocolla, tetrahedrite, cuprite and native copper also occur. Deposit age interpereted as Early Jurassic.

Sinclair, 1986; EMR Canada, 1989; B.C. Minfile, 1990; Mining Review, 1992.

O09-09 58°15'N 129°50'W	Gnat Lake Area (June, Stikine) Galore Creek	Cu Au Porphyry Cu	Medium. Reserves of 22.7 million tonnes grading 0.44% Cu, 0.31 g/t Au.

Consists of chalcopyrite and minor bornite that occur in andesitic greenstone and porphyritic andesite of the Upper Triassic Stuhini Group. Sulfides occur as blebs, wisps, disseminations and fractures associated with, and proximal to quartz monzonite and granodiorite of the Middle to Late Jurassic Hotailuh Batholith, part of Three Sisters Suite. Carbonate alteration is widespread, sericite and silica occur in patches, chlorite and tourmaline occur in veins. All the rocks exhibit a cataclastic breccia texture. Pyrite is rare, but magnetite concentrations are common with chalcopyrite. Deposit age interpreted as Middle Jurassic.

Panteleyev, 1977; EMR Canada, 1989; B.C. Minfile, 1990; Woodsworth and others, 1991; Mining Review, 1992.

O09-10 58°20'N 128°44'W	Letain (Kutcho Creek) Unassigned	Asbestos Serpentine-hosted asbestos	Medium. Reserves of 15.7 million tonnes grading 4.7% asbestos fibre.

Consists of chrysotile cross-fibre veins that occur in variably serpentinized alpine ultramafic rocks concordant with metasedimentary and metavolcanic rocks of the French Creek subterrane of Cache Creek terrane. Deposit occurs in fracture-related veinlets in two prominent sets that strike northeast and northwest. Deposit age interpreted as Late Paleozoic(?).

Leaming, 1978; Burgoyne, 1986; Northern Miner, December 12, 1987; B.C. Minfile, 1990.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O09-11 58°12'N 128°22'W	Kutcho Creek (Sumac, Esso) Unassigned	Cu, Zn, Pb Kuroko Zn-Pb-Cu massive sulfide	Medium. Reserves of 28.5 million tonnes grading 1.42% Cu, 1.92% Zn, 35 g/t Ag, 0.37 g/t Au.

Consists of stratabound, dispersed and massive pyrite, chalcopyrite, sphalerite and bornite that occur in sedimentary and epiclastic calc-alkaline volcanic rocks of the Upper Triassic Kutcho Creek Formation, near the top of a volcaniclastic pile which overlies Cache Creek tholeiite. Ore zone footwall is a distinctive quartz-eye crystal tuff, often strongly foliated. Alteration extends 75 meters below the ore zone, and coarse-grained euhedral pyrite occurs in a zone 10 to 20 m above the ore. Deposit occurs in three lenses, separated by thin argillaceous horizons. Each lens is zoned from copper-rich at the bottom to zinc-rich at the top. Reserves include the easternmost Kutcho deposit (17 million tonnes), the central Sumac West deposit (10 million tonnes) and the westernmost Esso West deposit (1.0-1.5 million tonnes). Deposit age interpreted as Late Triassic.

Bridge and others, 1986; Thorstad and Gabrielse, 1986; B.C. Minfile, 1987; EMR Canada, 1989; Dawson and others, 1991; Mining Review, 1992.

O09-12 57°42'N 129°48'W	Red Chris (Money) Galore Creek	Cu, Au, (Zn, Pb, Mo) Porphyry Cu-Au	Large. Reserves of 320 million tonnes grading 0.38% Cu, 0.30 g/t Au.

Consists of pyrite, chalcopyrite and rare bornite with trace molybdenite, galena and sphalerite that occur as stockworks and sheeted veins in the elongate 5 km-long porphyritic monzodiorite Red stock. The Early Jurassic monzodiorite intrudes Late Triassic alkaline volcanic and volcaniclastic rocks. An early stage of orthoclase-albite-biotite alteration, with varying quartz-sericite was followed by pervasive quartz-ankerite-sericite-pyrite alteration. Pyrite occurs as a halo to the deposit that is genetically related to east-northeast subvertical faults. Deposit age interpreted as Early Jurassic.

B.C Minfile, 1989; EMR Canada, 1989; American Bullion Minerals Ltd., news release, Jan. 1995.

O09-13 57°22'N 130°56'W	Schaft Creek (Liard Copper) Texas Creek	Cu, Mo Porphyry Cu-Mo	Large. Reserves of 910 million tonnes grading 0.3% Cu, 0.025% MoS_2, 0.14 g/t Au.

Consists of bornite, chalcopyrite and molybdenite that in fractures, veinlets and disseminations in hydrothermally altered Triassic andesite associated with diorite and granodiorite of the Late Triassic Hickman Batholith. Granitic rocks contain only 10% of the mineralization. Quartz vein stockwork with biotite and potassium feldspar occur in a low grade core. K-Ar biotite age of 182±5 Ma. Most of deposit occurs in the intermediate zone with chlorite-sericite alteration. Epidote occurs appears near boundaries of the main deposit. Gold grade ranges from 0.11 to 0.32 g/t. Deposit age interpreted as Late Triassic.

Fox and others, 1976; B.C. Minfile, 1988; EMR Canada, 1989.

O09-14 57°20'N 127°11'W	Toodoggone District (Lawyers) Toodoggone	Au, Ag Cu, Zn, Pb Au-Ag epithermal vein	Medium. Pre-production resource of 1.76 million tonnes grading 6.8 g/t Au, 242.7 g/t Ag.

Consists of native gold, silver and electrum occur with quartz, calcite and barite in veins, stockwork and breccia. Deposit hosted in Early Jurassic Toodoggone volcanic rocks. Production from four principal deposits, the Cheni, Chappelle, Shas, and AC. Deposit mainly occurs in intensely silicified zones within propylitic and argillic altered volcaniclastic rocks. Deposit associated associated with faults and plutons of the calc-alkaline Black Lake Suite, coeval and comagmatic with the Early Jurassic Toodoggone volcanics. Deposit age interpreted as Early Jurassic.

Schroeter, 1983; Vulimeri and others, 1986; B.C. Minfile, 1990.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O09-15 57°08'N 131°27'W	Galore Creek (Stikine Copper) Galore Creek	Cu Au, Ag, Zn, Mo Porphyry Cu-Au, Cu-Au skarn	Large. Reserves of 125 million tonnes grading 1.06% Cu, 7.7 g/t Ag, 0.4 g/t Au.

Consists of chalcopyrite, pyrite, bornite and magnetite that occur as disseminations, skarns, coarse replacements and fracture fillings in syenitic porphyry and breccias and Triassic Takla Group metasedimentary and metavolcanic rocks. Approximately 80% of deposit occurs as skarn and replacement deposits associated with contacts between syenitic intrusives and Triassic volcanic and sedimentary rocks. Alteration and lithologies are typical of alkalic porphyry deposits. A U-Pb zircon age of 210 Ma is reported for the intramineral syenite porphyry. Deposit age interpreted as Late Triassic.

Allen and others, 1976; Christopher and Carter, 1976; EMR Canada, 1989; Dawson and others, 1991; Mining Review, 1992, J. Mortensen, written commun., 1993.

O09-16 57°00'N 126°45'W	Kemess (Kemess N., Kemess S.) Copper Mountain (North)	Cu, Au Porphyry Cu-Au	Medium. Reserves of 345 million tonnes grading 0.21% Cu, 0.55 g/t Au.

Consists of pyrite, chalcopyrite, magnetite, hematite, molybdenite and digenite that occur in stockwork veinlets and fractures and as disseminations. Deposit hosted in Upper Triassic Takla Group volcanic flows and tuffaceous sedimentary rocks. Mineralization is related to the local emplacement of monzodiorite porphyry intrusives of Early Jurassic age, probably related to the Copper Mtn. Suite. Kemess deposit consists of two main zones; the Kemess North, where 44 drill holes have defined a reserve of 116 million tonnes grading 0.19% Cu and 0.38 g/t, and the Kemess South, where reserves, based on systematic drilling on 100 meter centers, are 229 million tonnes grading 0.23% Cu and 0.65 g/t Au. Deposit age interpreted as Early Jurassic.

B.C. Minfile, 1991; El Condor Resources Ltd., annual report, 1992.

O09-17 56°40'N 131°06'W	Snip (Shan) Texas Creek	Au Zn, Pb, Mo Au-Pb-Zn polymetallic vein	Medium. Production and reserves of 1.90 Mt grading 29.5 g/t Au.

Deposit occurs in a 1 meter to 10 meter thick (avg. 2.5 meters) shear-vein system that cross-cuts Lower Jurassic thick bedded greywackes and siltstones that are intruded by an orthoclase-phyric quartz monzonite stock with K-Ar isotopic age of 195 Ma. Drilling indicates deposit extends along strike length for 500 m as confirmed by drilling. The main Twin zone exhibits a pronounced internal banding of four ore types: (1) biotite and potassium feldspar with minor pyrite and pyrrhotite; (2) calcite, siderite, pyrite and sphalerite; (3) pyrite, pyrrhotite, arsenopyrite, sphalerite, chalcopyrite, magnetite and galena; and (4) quartz veins with lesser amounts (<2%) of the sulfides. Deposit age interpreted as Early Jurassic.

EMR Canada, 1989; Cominco Ltd., annual report,1990; Rhys and Godwin, 1992.

O09-18 56°35'N 130°41'W	Snippaker Creek (E & L) Texas Creek	Ni, Cu Pt, Pd, Au Gabbroic Ni-Cu	Medium. Reserves of 2.7 million tonnes grading 0.7% Ni, 0.8% Cu.

Consists of pyrrhotite, pentlandite and chalcopyrite that occur in Lower Jurassic Nickel Mountain olivine gabbro stock. The gabbro intrudes a thick sedimentary and volcanic sequence of the Jurassic Hazelton Assemblage which predate mid-Cretaceous deformation, and constrains the age of the gabbro to 185 to 110 Ma. Deposit occurs along the intrusion margins as irregular pipe-like zones of veins, disseminations and massive lenses. Textures indicate sulfides are magmatic. Gabbro is extensively altered to serpentinite, chlorite, amphibole, epidote, carbonate and prehnite. Deposit age interpreted as Early Jurassic.

EMR Canada, 1989; B.C. Minfile, 1990.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O09-19 56°38'N 130°27'W	Eskay Creek-21B Zone Coast	Au, Ag, Pb, Zn, Cu Kuroko Zn-Pb-Cu massive sulfide	Medium. Reserves of 3.9 million tonnes grading 26 g/t Au, 986 g/t Ag.

Consists of sphalerite, tetrahedrite, boulangerite and bournonite with minor pyrite and galena that occur as stratabound and stratiform massive, semi-massive and disseminated layers in carbonaceous and tuffaceous mudstone of the Lower Jurassic Mount Dilworth Formation of the Hazelton Assemblage. Gold and silver occur as electrum grains (5 to 80 microns) within fractured sphalerite, commonly in contact with galena. Included in the 3.9 million tonnes reserves for the 21B zone are 1.04 million tonnes grading 63.8 g/t Au and 2567 g/t Ag. The 21A zone of the Eskay Creek property is a coeval epithermal vein deposit with reserves of 0.97 million tonnes grading 9.6 g/t Au and 127 g/t Ag. Deposit age interpreted as Middle Jurassic.

EMR Canada, 1989; B.C. Minfile, 1991; Prime Equities Inc., 1991; Ettlinger, 1992; MacDonald, 1992.

O09-20 56°30'N 130°16'W	Sulphurets (Gold Zone) Texas Creek	Au, Cu Porphyry Cu-Au	Medium. Reserves of 18.2 million tonnes grading 0.82 g/t Au, 0.35% Cu.

Consists of chalcopyrite, pyrite and lesser bornite that occur in quartz vein stockworks and as disseminations hosted in intermediate volcanics of the Lower Jurassic Unuk River Formation of the Hazelton Assemblage. The Gold Zone forms a 1.5 km northeast-trending halo surrounding the Main Copper deposit. Alteration in the Copper deposit consists of quartz-albite-pyrite-chalcopyrite. Alteration associated with gold mineralization is quartz-pyrite-sericite. Deposit age interpreted as Jurassic.

B.C. Minfile, 1989; Prime Equities Inc., 1991; MacDonald, 1992.

O09-21 56°28'N 130°16'W	Kerr (Main Zone) Texas Creek	Cu, Au, Ag Porphyry Cu-Au	Large. Reserves of 134.9 millon tonnes grading 0.76% Cu, 0.34 g/t Au.

Consists of fine sooty black chalcocite with minor chalcopyrite, native copper and pyrite that occur in siliceous breccia. Hosted in Lower to Middle Jurassic Unuk River Formation volcaniclastic and sedimentary rocks of the Hazelton Assemblage. Deposit occurs along trace of an elongated tectonic shear zone approximately 2 km long and 800 to 900 meters wide. Deposit interpreted as hypogene zone of a porphyry Cu-Au deposit in a subvolcanic environment. Deposit age interpreted as Early Jurassic.

B.C. Minfile, 1989; EMR Canada, 1989; MacDonald, 1992.

O09-22 56°28'N 130°11'W	Snowfields (Sulphurets) Texas Creek	Au, Ag Cu, Mo Au-Ag polymetallic vein	Medium. Reserves of 20 milion tonnes grading 2.7 g/t Au.

Consists of Au and Ag in foliated, chlorite-sericite altered zones that occur in Lower-Middle Jurassic volcanic, and sedimentary rocks of the Unuk River formation. Low-grade gold part of deposit, with pyrite, minor chalcopyrite and molybdenite disseminated in mafic volcanic breccia is not noticeably different from barren rock. Deposit lacks quartz veins and silicification. Deposit age interpreted as Middle Jurassic.

B.C. Minfile, 1988; MacDonald, 1992.

O09-23 56°28'N 130°12'W	Brucejack Lake (West Zone, Shore Zone) Texas Creek	Au, Ag Au-Ag polymetallic vein	Medium. Reserves of 1.44 million tonnes grading 12.9 g/t Au, 764 g/t Ag.

Consists of electrum that occurs in quartz veins and stockwork with pyrite, pyrargyrite, sphalerite, tetrahedrite, argentite and galena with minor chalcopyrite and sulfosalts. Deposit hosted in intensely altered (quartz-carbonate-sericite-pyrite assemblage) alkalic volcanic and associated sedimentary rocks of the Lower to Middle Jurassic Unuk River Formation of the Hazelton Assemblage. Reserves for the West Zone are 0.95 million tonnes grading 14.8 g/t Au and 677 g/t Ag; reserves for the Shore Zone (also called Near Shore Zone) are 0.49 million tonnes grading 9.2 g/t Au and 933 g/t Ag. Deposit age interpreted as Middle Jurassic.

B.C. Minfile, 1988; MacDonald, 1992.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O09-24 56°37'N 126°41'W	Sustut Copper Sustut	Cu Basaltic Cu	Medium. Reserves of 50 million tonnes grading 1.25% Cu.
Consists of a stratabound assemblage of hematite, pyrite, chalcocite, bornite, chalcopyrite and native copper that occurs as disseminatations and as blebs and grains in the matrix of sandstone, conglomerate, tuff breccia and lahar of the Upper Triassic Takla Group. Deposit occurs in a sheet-like zone up to 76 m thick. Grade increases in finer grained units. Pyrite forms an incomplete envelope around cupiferous lenses. Hematite is ubiquitous. Deposit age interpreted as Late Triassic. Kirkham, 1970; Harper, 1977; Wilton and Sinclair, 1988; EMR Canada, 1989; Dawson and others, 1991; Mining Review, 1992.			
O09-25 56°13'N 130°21'W	Granduc (South Leduc) Coast	Cu Ag, Au, Co Besshi massive sulfide	Medium. Reserves of 32.5 million tonnes grading1.93% Cu, 7 g/t Ag, 0.13 g/t Au.
Consists of several overlapping tabular massive lenses of chalcopyrite, pyrite, pyrrhotite, magnetite, sphalerite, galena, arsenopyrite, bornite and cobaltite mineralization that occur in Upper Triassic Unuk River Formation, schistose, andesitic volcanic and gypsiferous, graphitic and calcareous sedimentary rocks. Stratified rocks intruded by Jurassic-Tertiary quartz diorite plutons and dikes. Individual ore zones range up to 10 m thick, several hundred m long, and are multiply deformed. Deposit age interpreted as Late Triassic. Grove, 1986; B.C. Minfile, 1988; Dawson and others, 1991.			
O09-26 56°03'N 130°01'W	Silbak-Premier (Premier Gold) Texas Creek	Au, Ag, Pb, Zn Au-Ag epithermal vein	Medium. Reserves of 6.1 million tonnes grading 2.33 g/t Au, 90.5 g/t Ag.
Consists of veins and stockwork in volcanic and volcaniclastic rocks of the Hazelton Assemblage that are intruded by coeval, subvolcanic quartz-K-feldspar porphyry dikes related to the Early Jurassic Texas Creek granodiorite. Pyrite, sphalerite and galena are the most abundant sulfides. Gold and silver occur in argentite and electrum. Deposit ranges from siliceous, low sulfide Au-Ag to semi-massive base metal sulfide ore. Deposit mainly hosted in the tuffaceous units and occurs as quartz-carbonate-chlorite veins. Pervasive sericite forms a halo to siliceous ore. Sulfide ore is flanked by carbonate alteration. Production between 1918 and 1987 was 56.117 tonnes of Au and 1270 tonnes of Ag from 4.237 million tonnes of ore milled. Deposit age interpreted as Early Jurassic. Alldrick and others, 1987; Britton and Alldrick, 1988; Dawson and others, 1991; Prime Equities Inc., annual report,1991.			
O09-27 56°23'N 131°23'W	North Bradfield Canal Central-Southeastern Alaska	Fe, Cu Fe skarn	Drill core averages 65% Fe and 0.1 to 0.5% Cu.
Eleven magnetite-chalcopyrite skarn bodies with sparse pyrrhotite form crude strata-bound lenses in upper Paleozoic(?) marble and paragneiss intruded by Tertiary granite of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984) intruded by Tertiary granite. Bodies range from 15 to 106 m long and 0.6 to 12 m thick. MacKevett and Blake, 1963; Sonnevil, 1981			
O09-28 56°00'N 130°04'W	Riverside Juneau	Ag, Au, Cu, Pb, W, Zn Au quartz vein or polymetallic vein	Produced about 27,200 tonnes, yielding 93,300 g Au, 3.1 million g Ag, 45,400 kg Cu, 113,500 kg Pb, 9,080 kg Zn, and 3,500 units (318,000 kg) WO_3
Disseminated galena, pyrite, tetrahedrite, pyrrhotite, chalcopyrite, sphalerite, gold, and scheelite in two large quartz veins and in the Lindeberg lode, a combined quartz vein and epigenetic replacement deposit. Veins occur either in shear zone in schist inclusion, or in mylonitic gneiss derived from the Triassic Texas Creek Granodiorite of the informally named Coast plutonic-metamorphic complex of Brew and Ford (1984). More than 1,820 m of underground workings. Production between 1925 and 1952. Buddington, 1929; Byers and Sainsbury, 1956; Smith, 1977			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O10-01 58°23'N 125°11'W	Churchill (Davis Keays) Churchill	Cu Cu vein	Medium. Reserves of 1.12 million tonnes; Production of 498,000 tonnes grading 3.43% Cu.

Summary and References

Consists of chalcopyrite in quartz-carbonate veins and stringers that occur in strongly folded Late Proterozoic dolomites and slates of the Aida Formation (with K-Ar isotopic age 780 Ma), of the Muskwa Assemblage. At least three, large north-trending diabase dikes locally intrude sedimentary rocks. The steeply dipping Magnum vein system forms a zone 100 meters wide that trends northeastward, parallel to two dikes. Grade is highly variable and discontinuous. Deposit age interpreted as Late Proterozoic.

Preto and Tidsbury, 1971; Bell, 1982; EMR Canada, 1989; B.C. Minfile, 1992; Dawson and others, 1991.

O10-02 58°05'N 125°54'W	Driftpile Creek (Saint, Roen) Gataga	Pb, Zn, Ba Sedimentary exhalative Pb-Zn	Medium. Reserves of 18.1 million tonnes grading 2.38% Pb+Zn.

Consists of three stratiform pyrite, galena, sphalerite, barite horizons that occur in siliceous black turbidites of the Upper Devonian Gunsteel Formation of the Lower Earn Group. Sedimentary rocks interpreted as a Devonian-Mississippian clastic wedge. Massive barite occurs in 4-10 cm thick beds over stratigraphic intervals of 3-6 meters and strike length of 50 km in the Gataga district. Deposit age interpreted as Late Devonian.

MacIntyre, 1982; B.C. Minfile, 1990; EMR Canada, 1989; Insley, 1991, Paradis and others, 1995.

O10-03 57°31'N 125°09'W	Cirque (Stronsay) Gataga	Pb, Zn, Ag, Ba Sedimentary exhalative Pb-Zn	Large. Reserves of 52.2 million tonnes grading 2% Pb, 8% Zn, 47 g/t Ag.

Consists of stratiform, laminar banded, massive barite with pyrite, galena and sphalerite that occur in turbiditic shale and argillite of the Upper Devonian Gunsteel Formation. Sedimentary rocks interpreted as a Devonian-Mississippian clastic wedge. Surrounding rocks are silicified and contacts between sulfide bodies and sediments are sharp. Deposit occurs as a tapering wedge-shaped lens, about 1000 m x 300 m x (10-60 m) that consists of a barite-rich, pyritic sphalerite-galena and laminar pyritic assemblage. Deposit age interpreted as Late Devonian.

Jefferson and others, 1983; Pigage, 1986; EMR Canada, 1989; Dawson and others, 1991; Mining Review, 1992.

O10-04 57°22'N 123°52'W	Redfern L. (Egg, Foo, Be) Robb Lake	Zn, Pb Ba, F Southeast Missouri Pb-Zn	Medium (estimate).

Consists of massive barite, barite-calcite and calcite zones that occur in Dunedin Formation limestone that form aprt of a Cambrian-Devonian passive margin. Disseminated sphalerite, galena, and minor chalcopyrite occur in the silicified haloes of these zones. Sulfides also occur in calcite ± barite veins. Deposit age interpreted as Middle Devonian.

Macqueen, 1976; B.C. Minfile, 1992.

O10-05 56°57'N 123°44'W	Robb Lake Robb Lake	Zn, Pb Southeast Missouri Pb-Zn	Large. Resource of: 20.1 million tonnes grading 5.1% Pb-Zn.

Consists of sphalerite, galena and pyrite that occur primarily in tabular and lenticular zones parallel to bedding in dolomite collapse breccias of the Middle Devonian Stone Formation. Sedimentary rocks interpreted as part of a Cambrian-Devonian passive margin. Deposit occurs on the west limb crest of a large south plunging anticline. Recent figures (1992) for reserves are significantly downgraded to 5.5 million tonnes grading 7.9% Pb+Zn. Deposit age interpreted as Middle Devonian.

Taylor and others, 1975; Macqueen, 1976; BC Minfile, 1982; EMR Canada, 1989; Dawson and others, 1991; Mining Review, 1992.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O10-06 56°27'N 123°44'W	Aley Unassigned	Nb, Phosphate, REE Carbonatite-related REE	Large. Reserves of 20 million tonnes grading 0.7% Nb.

Consists of fersmite, pyrochlore and columbite with lesser apatite and minor rutile, magnetite and zirconthat occur in the core zone of a carbonatitie complex that is cylindrical with a nearly vertical axis. Niobium exhibits zonation with columbite in the core, carbonatite and pyrochlore in the outer carbonatites, and fersmite as a transition between the two. REE associated with sovite (calcite carbonatite) veins. K-Ar age mica of 349 Ma ± 12 Ma. Deposit occurs in Mississippian Aley Carbonatite Complex that intrudes quartzite and mudstone of Cambrian and Silurian age juxtaposed by imbricate thrust faulting. The complex forms a rough oval approximately 3 km to 3.5 km in diameter with a rauhaugite (dolomitic) carbonatite core and an amphibolite margin. Deposit age interpreted as Mississippian.

Pell, 1986; B.C. Minfile, 1989; Mining Review, 1991.

O10-07 56°09'N 125°03'W	Wasi Lake Area (Suzie, Beveley, Regent) Ingenika	Pb, Zn, Ag, Ba Southeast Missouri Pb-Zn	Medium. Reserves of 2.82 million tonnes grading 2.24% Zn, 1.42% Pb, 36.3 g/t Ag.

Consists of galena and sphalerite that occur in veinlets and disseminated in barite masses. Deposit hosted in Late Proterozoic, Lower Cambrian, and Ordovician to Devonian dolomite. Deposit also consists of stockwork veinlets and fracture fillings in brecciated dolomite. Deposit occurs in four zones. Deposit age interpreted as Cambrian to Devonian.

EMR Canada, 1989; Ferri and others, 1992.

O10-08 57°13'N 124°29'W	Akie Gataga	Zn, Pb, Ag, Ba Sedimentary exhalative Zn-Pb	Large. Resource of 20 million tonnes grading 4% Zn, 1% Pb, 10 g/t Au.

Consists of layers of pyrite, sphalerite, galena and barite that are interlaminated with black shale of the Upper Devonian Gunsteel formation that forms part of a Devonian and Mississippian clastic wedge. Preliminary drilling in 1994 defined a zone 6-30 m thick, 1400 m long and up to 300 m deep. Deposit age interpreted as Late Devonian.

Metall Mining Corp. news release, January, 1995.

O53-01 59°56'N 137°00'E	Gornoe Ozero Khamma River	REE, Ta, Nb Carbonatite-related REE	Average grade of 0.35% REE oxides; 0.09-0.36% Nb_2O_5 ; 0.011% Ta_2O_5 .

Consists of early- and late-stage carbonatites. Early stage occurs in steep veins up to 25 m thick and to 150 m long. Veins composed of augite-diopside-calcite, forsterite-calcite, and pyrochlore-betafite. Late stage occurs in a small stock with an area of 1 km^2, composed of aegirine-dolomite, aegirine-ankerite, and ankerite along with contains bastnaesite, parisite, monazite, pyrochlore, and columbite. K-Ar isotopic ages of 280 to 350 Ma. Deposit hosted in a Late Devonian intrusive complex that is concentrically zoned and composed of 90% carbonatite along with pyroxenite, ijolite, and nepheline and alkalic syenite. Complex covers an area of 10.3 km^2. Age of mineralization interpreted as probably 290 Ma.

Elyanov, Moralov, 1973; Kobtseva, Devyatkina, written commun., 1988; Samoilov, 1991.

O53-02 59°55'N 137°48'E	Yur Allakh-Yun	Au Au quartz vein	Small. Average grade of 3.5-5.7 g/t Au.

Consists of four interbedded quartz veins that occur in a zone of meridional faults in middle Carboniferous sandstone-shale. Veins range from 0.3-0.4 m thick and are 100-500 m long. Main ore minerals are gold, arsenopyrite, galena, pyrite, and sphalerite. Ore minerals comprise up to 2% of veins. Gangue minerals are quartz, ankerite, and albite. Wallrock alteration is insignificant, but includes sericitie, silicifica, and arsenopyrite alteration.

Strona, 1960; Kobtseva, written commun., 1988.

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O53-03 59°52'N 136°47'E	Urui Sette-Daban	Pb, Zn Southeast Missouri Pb-Zn	Medium to large. Average grade of 9.9-25.6 Pb; 6.4-21.3% Zn; 6.8-200 g/t Ag; up to 10 g/t Ge.

Consists of stratified ribbon-like deposits, from 2-3 to 40 m thick and 0.5 to 1.2 km long, that occur in metamorphosed Late Proterozoic (Vendian) dolomite. Ore bodies are conformable to host rocks and strike 30-45°NW; and commonly wedge out at a depth of 30-40 m. Deposits vary from massive, pocket-stringer-disseminated, to banded. Galena and sphalerite are the main ore minerals; pyrite, maracasite, and arsenopyrite are secondary; pyrrhotite, chalcopyrite, and electrum are scarce. Calcite, quartz, and anthraxolite also occur. Deposit associated with a significant recrystallization of dolomite and formation of peculiar zebra dolomite rocks. General structural pattern of deposit controlled by monoclinal strike of sedimentary rocks to the west and by numerous post-ore faults that trend roughly east-west and strike northwest. Local Paleozoic diabase dikes in area.

Ruchkin and others, 1977; Volkodav and others, 1979; Bogovin and others, 1979; Kobtseva and Devyatkina, written commun., 1988.

O53-04 59°48'N 137°44'E	Duet Allakh-Yun	Au Au quartz vein	Medium. Average grade of 29 g/t Au.

Consists of eighteen rootless, conformable, sheet-like quartz veins that occur at different levels within an 60-80 m interval of Middle Carboniferous sandstone and siltstone that is 150 to 120 m thick. Veins occur in both the limbs and hinge of the Duet syncline, and are up to 1,600 m long and up to 0.9 m thick. Ore minerals comprise 1-3% of veins and include arsenopyrite, galena, sphalerite, and gold.

Kobtseva, written commun., 1988.

O53-05 59°43'N 136°25'E	Khamna Khamma River	REE, Nb Carbonatite-related REE	Average grade of 0.2-1.93% REE; 0.03-0.26% Nb_20_5 .

Consists of steep-lying fluorite-carbonate veins and stockworks that occur in Late Proterozoic metasomatic carbonate in the vicinity of dikes and stocks of probable Late Devonian alkalic syenite and alkalic magmatic breccia. Veins range from 0.1 to 1.5 km long and from 1.4 to 30 m thick. Individual stockworks are 100-500 m^2 in size. Disseminated mineralization also occurs. Main ore minerals are bastnaesite, parisite, and galena. U-Th-Pb isotopoic age of 240 to 417 Ma for syenite.

Elyanov and Moralev, 1973; Kobtseva and Devyatkina, written commun., 1988.

O53-06 59°08'N 136°39'E	Lugun Sette-Daban	Pb, Zn Southeast Missouri Pb-Zn	Medium.

Consists of stratiform galena-sphalerite layers in Late Proterozoic (Vendian) algal dolomite. Sulfide layers range from 3 to 15 m thick. Deposit associated with bedding silicification and recrystallization of dolomite. Sulfide layers in zone that is 350 m thick. Deposit and enclosing strata occur in brachyform fold.

Stavtsev, 1976; Krasny and others, 1979.

O53-07 58°40'N 135°34'E	Algaminskoe Algama	Zr, W Carbonate-hosted Zr (Algoma type)	Large. Weathered zones containing 2.8 to 3.2% W_2O_3 and 0.5 to 40% ZrO_2.

Consists of lense-like bodies up to 1,100 m long with irregular bodies of W-Zr minerals. Ore bodies range from 2, 3, and 5 m thick occur in layers of siliceous, cavenous dolomite. Layers spaced between14 and 25 m apart. Layers contain loose aggregate that is rich in baddeleyite, the principal mineral that contains the Zr and W. Weathered zones contain from 2.8 to 3.2% W_2O_3. Baddeleyite forms cryptocrystalline and colloform aggregates that fill cavities and voids in quartz-bearing dolomite. Hydrous zircon and Ca- and Fe-zirconium silicates also occur in weathered ore. Zircon dominates primary ore. Baddeleyite was deposited from oversaturated chloride-hydroxide solutions at 100-180°C. Deposit originally interpreted as of Latest Proterozoic (Vendian) age; however a recent U-Pb zircon isotopic age of 110 Ma indicates a Cretaceous age. Deposit hosted in the Yudomsky Dolomite sequence of Latest Proterozoic (Vendian) age at about 7 km from the contact of the alkalic to mafic Ingili stock.

Nekrasov and Koezhinskaya, 1991; J.N. Aleinikoff, written commun., 1993.

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O53-08 58°48'N 137°38'E	Muromets Allakh-Yun	Cu, Mo, W Cu-Mo skarn	Small to medium. Up to 10% Cu, up to 0.92% WO_3, up to 0.3% Mo.

Skarn occurs in Middle Cambrian dolomite along the contact with Early Cretaceous quartz monzodiorite as a band of skarn bodies that are 1 km long and dip gently (20-40°) under the intrusion. Several ore bodies, range from 6 to 12 m thick, consist of disseminated, stringer-disseminated, and more seldom massive ore. Minor magnesian skarn in deposit consists of spinel, forsterite, phlogopite, tremolite, diopside, and serpentine. Predominant limestone skarns consist of salite, diopside, scapolite, grossular, and andradite. Ore minerals are magnetite, chalcopyrite, molybdenite, scheelite, pyrrhotite, bornite, pyrite, galena, and sphalerite. Skarn formed several stages: (1) magnesian skarn with magnetite; (2) calcareous pyroxene-garnet skarn with magnetite and scheelite;and (3) metasomatic quartz-feldspar rocks with molybdenite and Cu sulfides. Disseminated Cu also occurs in adjacent altered quartz monzodiorite that constitutes a skarn-related porphyry Cu deposit.

Krasny, Rasskazov, 1975; Nikitin, Rasskazov, 1979.

O53-09 58°38'N 137°16'E	Malyutka Allakh-Yun	Au Au quartz vein	Small. From 0.01-98 g/t Au.

Consists of approximately east-west-trending mineralized shear zones, up to 1 km long and 0.3-3 m thick, and quartz veins up to 40 m long and 0.5 to 40 cm thick. Shear zone minerals are quartz, ankerite, barite, rutile, fluorite, hematite, pyrite, sphalerite, galena, chalcopyrite, and gold. Deposit hosted in Early Cambrian sedimentary rocks on the the southeast limb of a syncline.

Kobtseva, written commun., 1988.

O53-10 58°33'N 137°40'E	Borong Bilyakchan	Cu Sediment-hosted Cu	Small. Average grade of 0.1 to 1% Cu.

Consists of supergene minerals such as malachite, azurite, and chrysocolla that occur in fine-fissured stringers. Hosted in a bed of Late Proterozoic quartz-feldspar and polymictic sandstone that is 2 m thick and extends for 7 km.

Kogen and others, 1976; Kobtseva and Devyatkina, written commun., 1988.

O53-11 57°33'N 134°38'E	Kondyor Kondyor	Pt Zoned mafic-ultramafic Cr-PGE	Medium

Consists of two types: (1) short lenses about 2 to 50 m long and up to few m thick with veinlet and disseminations; and (2) oval-shaped deposits, roughly equidimensional in plan, and up to 200 by 300 m in size. PGE in the first type is associated with chromite and olivine and occurs in intergrowths, small inclusions, and vesicles. Second type consists of chrome diopside, phlogopite, and magnetite with PGE forming intergrowths with magnetite, pyroxene, and rarely with phlogopite. Isoferroplatinum is the major PGE mineral. In addition to isoferroplatinum and tetraferroplatinum, second type commonly contains up to 5-8% sulfides and arsenides, including cooperite, sperrylite, hollingworthite, konderite, inaglyite, and laurite-euclimanite. Both types of deposits are cut by veins and dikes of alkalic rocks including nepheline syenite, lujavrite, ijolite, and urtite. PGE mineralization is associated with a dunite stock 6 km^2 in diameter, part of a ring-shaped, Late Proterozoic ultramafic-alkalic stock approximately 12 km^2 in area.

Marakushev and others, 1990.

O53-12 57°42'N 137°24'E	Severny Uy Bilyakchan	Cu Sediment-hosted Cu	Small. Average grade of 0.1 to 3.7% Cu.

Consists of Cu-bearing horizons, from 1 to 3 m thick that occur in Late Proterozoic (Riphean) quartz- and polymictic sandstone and siltstone. Deposit defined by fine disseminations and pockets of massive ore. Ore minerals are pyrite, chalcopyrite, bornite, chalcocite, and hematite. Cu mineralization occurs for more than 30 km along strike.

Kutyrev and others, 1986.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O53-13 57°22'N 137°13'E	Dzhagdag Bilyakchan	Cu Basaltic Cu	Small. Average grade of 0.3 to 2.94 Cu.

Mineralization occurs in two layers of Upper Proterozoic (Upper Riphean) amygdaloidal basalt, which are 90 and 60 m thick respectively, and are intercalated with tuff and sandstone. The copper-bearing horizons are 0.4-5 m thick. Ore is fine disseminated and spotted-disseminated. Ore minerals include: chalcocite, bornite, native copper, cuprite, covellite, and malachite. Copper content correlates with silver content.

Kutyrev and others, 1988.

O53-14 57°23'N 137°32'E	Maly Komui Eastern Asia-Arctic: Koni-Yablon	Cu Pb, Zn Cu skarn	Small-to-medium. Average grade of 0.1-11.0% Cu; 0.1-9.3% Zn; 0.1-4.9% Pb.

Disseminations and pockets of chalcopyrite, chalcocite, malachite, galena, and sphalerite occur in garnet-pyroxene skarn bodies along the contact between Upper Proterozoic limestone and Cretaceous granitoid bodies. Skarn forms three zones with a combined length of 1.5 km and thickness ranging from 1 to 80 m. No detailed studies of this deposit.

Krasny and Rasskazov, 1975; Kobtseva and Devyatkina, 1988, written commun.

O53-15 56°19'N 134°49'E	Ulkanskoe Ulkan	REE, Be, Zr Felsic plutonic REE	Data are not available

Deposit hosted in alkalic, rapakivi-type granitic stock that occurs in the Ulkansky basin containing Proterozoic and Mesozoic volcano-sedimentary and intrusive rocks. Four groups of ore minerals occur: (1) columbite, zircon, and cassiterite that occur in albitite veins; (2) cassiterite, wolframite, and chrysoberyl that occur in topaz-muscovite-biotite greisen; (3) phenakite, zircon, pyrochlore, polylithionite, chevkinite, and columbite that occur in hydrothermal molybdenite-quartz veins and with alkalic granitic pegmatite and fenite; and (4) bertrandite, helvite, genthelvite, gold, zircon, thorite, gagarinite, parisite, bastnaesite that occur in hydrothermal veins. Deposit similar to the Pikes Peak area in Colorado.

Nedashkovsky, 1984; Kirillov, 1993.

O54-01 59°56'N 138°51'E	Burgali Allakh-Yun	Mo, W Porphyry-Mo (W)	Average grade of 0.2-0.9% Mo; 0.08-1.4% W.

Consists of a quartz stockwork that extends over an area 60 by 80 m composed of veins that range from 0.5 to 40 cm thick. Veins hosted in Middle Carboniferous clastic rocks of the Ekachan suite, near the contact of Cretaceous granite intrusions. Ore minerals are molybdenite, wolframite, and cassiterite. Gangue minerals are biotite and sericite.

Rasskazov and others, 1979; Kobtseva and Devyatkina, written commun., 1988.

O54-02 59°51'N 139°01'E	Balaakkalakh, Diring-Yuryak Verkhne-Yudomsky	Sn Sn polymetallic vein	Average grade of 0.002-0.04% Sn: 0.01-0.03% W; from 1% to 10% As; up to 10 g/t Au.

Consists of three ore zones that strike northeast, are 10 to 200 m thick, and 100 to 1,100 m long. Zones consist of quartz-chlorite-sulfide stockworks and stringers. Stringers range from 0.2 to 1.5 cm thick and consists of shear zones that contain intergrown quartz, tourmaline, and arsenopyrite. Major ore minerals are arsenopyrite, wolframite, chalcopyrite, and pyrrhotite. Subordinate ore minerals are cassiterite, scheelite, galena, fahlore, and acanthite. Zones hosted in sandstone, siltstone, and conglomerate of the Middle Carboniferous Ekachan suite and also in a diorite porphyrite dike. Aeromagnetic data indicate a granitic body occurs at a depth of 50-150 m.

Rasskazov and others, 1979; Kobtseva and Devyatkina, written commun., 1988.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O54-03 59°45'N 138°11'E	Zhar Allakh-Yun	Au Au quartz vein	Small. Average grade of 4.2 g/t Au.

Consists of a quartz vein that is about 500 m long and 1.5 m thick. Vein strikes west to northwest and dips steeply (85°) to east. Ore minerals are disseminated pyrite, chalcopyrite, sphalerite, and gold that constitute up to 1% of the vein. No indications of wallrock metasomatic alteration. Vein hosted in Permian clastic rocks.

Kobtseva, written commun., 1988.

O54-04 59°41'N 141°44'E	Yurievka Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Proven reserves of 7536 kg Au. Average ore grade of 14.7 g/t Au; Reserves of 9.12 tonnes Ag. Average ore grade of17.9 g/t Ag.

Consists of adularia-quartz and quartz veins with less common carbonate-quartz veins. Other vein minerals are chalcedony, barite, hydromica, chlorite, with disseminations and masses, up to 1-3%, of pyrite, pyrrhotite, sphalerite, galena, chalcopyrite, arsenopyrite, sulfosalts of silver, acanthite, and gold (fineness 600-700). Ore grade decreases with depth. Veins occur at a depth of 350 m, are 0.5 to 15 m thick, and range up to 650 m long. Deposit hosted in Early and Late Cretaceous volcanic rocks including andesite, andesite-basalt, ignimbrite, and dacite tuff, and in felsic subvolcanic bodies. Deposit occurs at the intersection of four faults.

Kobtseva, written commun., 1988.

O54-05 59°28'N 140°22'E	Krasivoe Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Veins average 4.2 g/t Au and 5.6 g/t Ag. Zones contain 15 g/t Au and 18 g/t Ag.

Consists of linear zones of stringers up to 15 m thick, and five quartz-adularia veins about 3.5 m thick. Deposit is about 2 km long and hosted in a Late Cretaceous trachyrhyolite flow or tuff and a trachybasalt dike that occur in the middle of a volcanic dome. Ore minerals are pyrite (1-3%), galena, sphalerite, chalcopyrite, cinnabar, and gold.

Kobtseva, written commun., 1988.

O54-06 59°10'N 138°11'E	Dies Allakh-Yun	Cu Cu skarn	Average grade of 0.2-15% Cu; up to 0.8% Zn; 17.3-70 g/t Ag; 0.3-1.7 g/t Au.

Consists of garnet-diopside and garnet-epidote skarns that are 20 to 60 m thick and 400 m long. Skarns occur along the contact of Ordovician clastic and carbonate rocks and Lower- to Middle-Cretaceous granitoids that occur along a north-south-trending fault. Ore minerals occur as stringers and lenses of chalcopyrite, malachite, azurite, bismuthine, acanthite, scheelite, and galena.

Kobtseva and Devyatkina, written commun., 1988.

O54-07 58°17'N 139°06'E	Verkhnenyotskoe Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Average grade of 5.0 g/t Au; 94.0 g/t Ag.

Consists of quartz and quartz-adularia-calcite veins and linear zones of quartz stringers that are 40-50 m long, 0.5 m thick. Veins and zones composed of up to 25% disseminated galena, sphalerite, chalcopyrite, pyrite, and gold. Deposit occurs around the periphery of a paleo-caldera. Host rocks are Late Cretaceous andesite-dacite tuff, rhyolite, and granite-porphyry dikes.

Kobtseva, written commun., 1988.

O54-08 57°29'N 138°39'E	Etandzha Eastern Asia-Arctic: Koni-Yablon	Cu, Mo Porphyry Cu-Mo	Average grade of 0.02-2.0% Cu; 0.02-0.74% Mo; up to 4 g/t Au; up to 15 g/t Ag.

Consists of stringers and disseminations of molybdenite and chalcopyrite that occur in Cretaceous quartz diorite. Deposit occurs in a northeast-trending zone 400 by 200 m.

Kobtseva and Devyatkina, written commun., 1988.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O55-01 59°21'N 146°59'E	Ikrimun Eastern Asia-Arctic: Koni-Yablon	Cu, Mo Porphyry Cu-Mo	Small.

Consisits of a stockwork of sulfide veinlets with abundant disseminated sulfides and rare quartz veins that occur in the middle of the Ikrimun granitic pluton of Early Cretaceous age. Pluton intrudes Early Cretaceous rhyolitic to basaltic volcanic rocks. Ore minerals are pyrite, chalcopyrite, arsenopyrite, and magnetite, with subordinate molybdenite, ilmenite, and sphalerite. Deposit occurs in silicified, sericitized, and propylitized quartz diorite, tonalite, extrusive breccia, and plagiogranite porphyry. Plutonic rocks are spatially related to a plagiogranite porphyry dike.

Skibin, 1982

O56-01 59°44'N 150°16'E	Osennee, Oksa, Usinskoe Eastern Asia-Arctic: Koni-Yablon	Mo, Cu W, Ag Porphyry Cu-Mo	Small to medium. Ranges from 0.1 to 0.33% Mo and up to 0.1% Cu. Up to 5 g/t Ag.

Osennee: Crescent-shaped ore body in a north-south-trending fractured and foliated zone within the granitic rocks of the Cretaceous Magadan batholith. Ore body is more than 400 m long and about 30 m thick, with dips of 35°-65°. Host rocks are gabbro, granodiorite, subalkalic granite and syenite, granite porphyry, and lamprophyre. Molybdenite is accompanied by pyrite and lesser pyrrhotite, sphalerite, chalcopyrite, and scheelite. Molybdenite occurs in quartz, quartz-feldspar, and quartz-tourmaline veinlets and veins; disseminated in porphyry; and in veinlets in silicified, sericitized, chloritized, K-feldspathized, and pyritized rocks within a fault and in adjacent areas.
Oksa: Molybdenite is disseminated in quartz and in quartz-feldspar veinlets cutting silicified and sericitized granite porphyry and adjacent amphibole-biotite granodiorite of the Magadan batholith. Associated minerals are pyrite, with rare chalcopyrite, sphalerite, and pyrrhotite. Gold ioccurs in the ore along with up to 5 g/t silver. Deposit is controlled by a zone of fracturing and schistosity that trends northwest to about north-south.
Usinskoe: Quartz, feldspar-quartz, and pegmatite veinlets contain molybdenite and locally scheelite. Minerals also occurs in veinlets and disseminated in the K-feldspathized and tourmalinized granitic rocks of the Magadan batholith. Mineralization is confined to a nearly north-south fault which controls the porphyry intrusions.

Firsov and Soboleva, written commun., 1952; Sendek, written commun., 1965

O56-02 59°25'N 154°52'E	Yapon Eastern Asia-Arctic: Koni-Yablon	Cu Porphyry Cu	Small. Ag to 1-2 g/t.

Stockwork zone more than 20 m wide is composed of a dense network of quartz and quartz-epidote veinlets with pyrite and chalcopyrite that cut sulfidized, Middle Jurassic basalt and andesite-basalt. Disseminated veinlets contain native gold and 1-2 g/t silver.

Yaskevich and Yudina, written commun., 1972

O56-03 59°25'N 153°29'E	Nakhtandjin, Lora Eastern Asia-Arctic: Koni-Yablon	Cu Mo Porphyry Cu	Medium to large. Probable resource of 178 million tonnes grading 0.5% Cu, 0.025% Mo, and 2.1 g/t Ag.

A stockwork of sulfide, sulfide-quartz, and sulfide-chlorite-quartz veinlets associated with disseminated sulfides occurs along east-, northeast-, and northwest-trending fault zones at the southeast and northern contacts of Srednin granitic pluton. Pluton intrudes Triassic-Jurassic and Early Cretaceous volcaniclastic and volcanic rocks. Early Cretaceous tonalite, granodiorite, and explosive breccias that host the deposit are weakly sericitized and propylitized. Ore minerals are pyrite, chalcopyrite, and molybdenite, with subordinate magnetite and ilmenite. Deposit is closely associated with a pipe of explosive breccias.

Skibin, 1982; Vorob'ev, 1986 (written commun.)

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O56-04 58°58'N 152°34'E	Viking Eastern Asia-Arctic: Koni-Yablon	Cu, Mo Porphyry Cu-Mo	Small.

A stockwork of sulfide, sulfide-quartz, and sulfide-feldspar-quartz veins, veinlets, and zones of disseminated sulfides, occurs in Early Cretaceous hydrothermally altered tonalite, plagiogranite, and less commonly in quartz monzonite porphyry. Granitic rocks form the core of a concentrically zoned dome made up mostly of Jurassic volcanic rocks. The ore body extends several hundred meters along strike, with a vertical extent of 350-400 m; and is parallel to the contact of a porphyry stock. An inner alteration zone consists of a podiform zone of potassic alteration; quartz-sericite and epidote-chlorite alteration occurs in the outer zone. Main ore minerals are chalcopyrite, molybdenite, magnetite, and ilmenite; with minor pyrite and chalcocite.

Skibin, 1982

O57-01 59°04'N 161°44'E	Tutkhlivayam Central Kamchatka	Au, Ag, Cu, Pb, Zn, Te, Cd Au-Ag epithermal vein	Medium. Average grade of 9.6 g/t Au, 530 g/t Ag, 2.3% Cu, 4% Pb, 0.8% Zn, 0.12% Cd, and 5.38 kg/t Te.

Consists of 27 zones of veins and veinlets distributed over length of 13 km. Zones range from 50 to 1250 m long and 0.2 to 25.5 m thick. Zones have complicated morphology and are dominantly brecciated veins that grade into veins and veinlets. Ore beds are generally up to 6 m thick. Three geochemical types ore are distinguished: gold-silver low in sulfides (gold/silver ratio of 1:50), gold-silver (1:1 to 1:2), and gold (1:0.5 and more). K metasomatism very common. Deposit occurs along closely-spaced system of linear deep faults and normal faults around a volcano-tectonic depression filled with Miocene intermediate composition volcanic rocks.

A.K. Borovtsov and others, written commun., 1980.

O57-02 57°35'N 160°47'E	Ozernovskoe Central Kamchatka	Au, Ag, Te Au-Ag epithermal vein	Medium. Grade ranges from 2-20 g/t Au and 0.01-0.1% Te. Rare high-grade zones.

Consists of gold-bearing quartz-adularia veins, veinlets, and disseminations that are superimposed on various facies of hydrothermally-altered rocks. Ore occurs in fracture-filling veins and veinlets, and as metasomatic replacement of earlier aggregates. Four stages of mineralization are distinguished: (1) gold-goldfieldite-quartz (fineness of 933-938); (2) tellurium-silvanite-goldfieldite-kaolinite-quartz (gold 945 fine); (3) gold-hessite-hydromica-quartz (gold 894 fine); and (4) gold-adularia-hydromica-quartz (gold 643 to 679 fine). Local associated Cu-Mo sulfides and realgar-orpiment. Host rocks exhibit mainly propylitic and silicia alteration. Altered argillite, of quartz-sericite, quartz-kaolinite, and quartz-montmorillonite-hydromica facies, occurs the central part of the ore field, near the main volcanic vent. Altered rocks consist of quartz and pyrite-alunite-kaolinite-quartz assemblages that form tabular, linear, major ore bodies up to 100 m along northwest-trending fault zones. Deposit occurs in a weakly-eroded volcano composed of basaltic andesite, andesite, and dacitic pyroclastic rocks and lava.

Shchepot'ev, 1989.

O57-03 56°12'N 159°18'E	Chempura Central Kamchatka	Hg Volcanic-hosted Hg	Small. Average grade of 0.95%Hg.

Consists of disseminations or veins associated with hydrothermal alteration that occur in quartz-diorite porphyry bodies emplaced at intersections of northeast- northwest-, and east-west-trending faults. Mercury distribution is irregular; cinnabar forms major ore mineral. Other ore minerals are common pyrite and subordinate realgar, stibnite, sphalerite, and chalcopyrite. Carbonate-chlorite propylitic alteration is most common. All ore bodies are parallel to altered silicified rocks of quartz and quartz-kaolinite-hydromica assemblages. A few lense-like ore bodies are traced to a depth of approximately 100 m. Maximum thickness of lenses ranges up to 8 m. Deposit is hosted in hypabyssal quartz diorite porphyry that intrudes a Pliocene agglomerate sequence. Deposit and associated hydrothermally altered silicified rocks occur along steeply dipping faults.

Vlasov, 1977.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
O58-01 58°52'N 164°02'E	Karagin group Koryak Highlands	Cu, Zn, Au, Pt, Ni, Co Gabbroic Cu	Medium. Average grade of 0.5 g/t, Au, 2-5 g/t Ag, 3-5% Cu, 0.5% Zn.

Hosted in Late Cretaceous serpentinized peridotite and serpentinite, and in a complexly faulted Late Cretaceous-Paleogene(?) spilite-siltstone sequence. Tectonic contacts occur between ultramafic and spilite-siltstone sequence. Richest part of deposit, with up to 5% Cu, occurs in spilite-siltstone sequence. Deposit occurs in steeply dipping lenses extending to a depth of 200 m, determined from geophysical studies, and has maximum dimensions of 170 m length and 25 m thickness. Ore assemblages in ultramafic rocks are: (1) chalcopyrite-cubanite-pyrrhotite with pentlandite; (2) chalcopyrite-magnetite with pyrrhotite and pentlandite; and (3) magnetite-chalcopyrite-sphalerite. Average Cu content of the ultramafic rocks is 1 to 3%. In spilite-siltstone sequence, about 90% of ore consists of about equal proportions of chalcopyrite, magnetite, and pyrite; with minor sphalerite, magnetite, pentlandite, and cubanite. Relative to ore in spilite-siltstone sequence, ore in ultramafic rocks contains more magnetite, pyrrhotite, and pentlandite.

V.D. Mel'nikov, written commun., 1974.

P04-01 63°16'N 159°16'W	McLeod Southwestern Kuskokwim Mountains	Mo Porphyry Mo	Extensive chip samples grade 0.09% MoS_2 over a 350 by 30 m surface area

Platy aggregates of molybdenite in quartz veinlets in sericite core of altered Late Cretaceous to early Tertiary quartz-feldspar (granite) porphyry stock. Deposit underlain by 3-square-kilometer granite stock and associated with biotite latite dikes that intrude mid-Cretaceous graywackes. High-grade quartz-molybdenite veins up to 15 cm thick associated with nearby latite dikes in sedimentary host rocks. Pyrite-pyrrhotite-chlorite veinlets, locally comprise up to 10 percent by volume of contact metamorphosed country rock. Quartz-feldspar porphyry, and to lesser extent, biotite latite dikes exhibit intense silicic, phyllic, and hydrothermal alteration in a 300 by 1,100 m area of southern and western part of stock. Low-grade stockwork molybdenite occurs in northern part of biotite latite dike system over a 30 by 350 m area.

Mertie, 1937a, b; West, 1954; Jason Bressler, written commun., 1979; Harold Noyes, written commun., 1984

P04-02 63°14'N 156°55'W	Mount Hurst Yukon River	Cr, PGE Podiform Cr	Grab samples contain 22.0 to 61.2% Cr_2O_3

Masses and bands of chromite in dunite layers in wehrlite tectonite. Largest of 16 chromite bands strikes north-south; pinches and swells from 10 to 800 cm over strike length of 10 m. Within bands, chromite varies from 30% to 80% by volume. Deposit truncated on north by fault. Cr:Fe ratios in six samples average 1.0. Probable source of Pt placer on Boob Creek 10 km to north. Dunite and wehrlite tectonite faulted at base; interpreted as part of intensely deformed and dismembered ophiolite occurring in klippe.

Chapman and others, 1982; Loney and Himmelberg, 1984; Roberts, 1984

P04-03 63°13'N 156°04'W	Win-Won or Cloudy Mountain Southwestern Kuskokwim Mountains	Sn, Ag, Cu Sn polymetallic vein	Grab samples with up to 2% Sn and 1,720 g/t Ag

Chalcopyrite, tetrahedrite, and cassiterite in en echelon quartz veinlet stockwork. Hosted in hornfels on northeast margin of Cretaceous(?) Cloudy Mountains volcanic field and related monzonite complex. About 4 veinlets per meter over a 100-m-wide area.

Thomas K. Bundtzen, written commun., 1984

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P04-04 62°53'N 156°59'W	Cirque, Tolstoi Southwestern Kuskokwim Mountains	Cu, Ag, Sn W, Nb Polymetallic vein and porphyry Cu	Grab samples with up to 20% Cu, 1,340 g/t Ag, 0.5% Sn; locally to 0.1% Nb

Chalcopyrite, tetrahedrite, pyrite, arsenopyrite, and scheelite associated with tourmaline, axinite, and quartz occurring in (structurally) high-level, tourmaline greisen. Greisen usually along faults, or in tourmaline breccia pipes in cupolas of the Late Cretaceous Beaver Mountains (monzonite) stock. Monzonite capped by altered olivine basalt and andesite tuff.

Bundtzen and Laird, 1982

P04-05 62°57'N 156°59'W	Independence Southwestern Kuskokwim Mountains	Au Porphyry Au	Independence deposit was briefly developed in 1912. 5 kg of gold were produced from about 113 tonnes of ore. Grab samples from massive vein material at Katz deposit average 1.2 g/t Au and 35% Sb.

Consists of gold-bearing quartz-carbonate-sulfide veins and sulfide disseminations that occur in peraluminous granite porphyry of the Ganes-Yankee Creek dike swarm (Bundtzen and Laird, 1982). The dike swarm extends about 40 km. The best concentration of veins and disseminations occurs in a 4-km by 1/2 km-wide zone that is near the divide separating Ganes and Yankee Creeks, the two largest placer gold mines in the Innoko district. At the Independence deposit, disseminated arsenopyrite, pyrite, cinnabar, stibnite, and sulfosalt minerals occur in dikes and in altered sandstone of the Late Cretaceous Kuskokwim Group. Massive siderite-calcite veins occur in sandstone adjacent to the granite porphyry. The Katz deposit occurs about 2 km southwest of the Independence Mine and consists of massive stibnite-quartz-gold veins that occur along the contact zones between a granite porphyry sill and sandstone.

Bundtzen and Laird, 1982, 1983a.

P04-06 62°37'N 157°10'W	Broken Shovel, Iditarod Southwestern Kuskokwim Mountains	Ag, Pb, Sb Polymetallic vein	Estimated 14,000 tonnes with 178 g/t Ag, 0.15% Pb, 0.15% Sb

Tourmaline, tetrahedrite, arsenopyrite, and undetermined sulfosalts in quartz veins in central part of the Cretaceous Moose Creek pluton (monzonite). Veins, 1 to 3 m wide, occur in altered area marked by sericite and tourmaline about 300 by 400 m in size.

Bundtzen and Gilbert, 1983; Bundtzen and Laird, 1983a, 1988; Bundtzen and others, 1985

P04-07 62°31'N 157°55'W	Golden Horn, Minnie Gulch, Malemute, Iditarod (Flat Southwestern Kuskokwim Mountains	Au, Ag, Sb, Hg, W Polymetallic vein or Sb-Au vein	Golden Horn: produced 479 tonnes grading 174 g/t Au, 171 g/t Ag, up to 20% WO_3. Estimated resource of about 3.15 million tonnes grading 1.3 g/t Au, 2.0 % As and 30 g/t Ag

Golden Horn: Quartz-tourmaline-calcite veins of stibnite, cinnabar, scheelite, sphalerite, Pb-Sb sulfosalts, and chalcopyrite. Stibnite and cinnabar crosscut arsenopyrite, scheelite, and silver sulfosalt mineralization. Veins occur in irregularly distributed quartz-filled shear zones in the Late Cretaceous Otter Creek pluton (monzonite), or near intrusive contacts. Vein system from 3 to 30 m wide and at least 1 km in length; occurs along 3-km-long fault zone on eastern side of pluton. Pluton intrudes graywacke and shale of Cretaceous Kuskokwim Group. Malemute and Granite: Cinnabar, arsenopyrite, pyrite, and gold in quartz-calcite zones that strike north-south to northeast occur in altered basalt west of Otter Creek pluton.

Bundtzen and Gilbert, 1983; Bundtzen and Laird, 1983a; Bundtzen and others, 1985, 1988, 1992a; Bull, 1988

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P04-08 62°30'N 158°00'W	Chicken Mountain (Flat District) Southwestern Kuskokwim Mountains	Au, As, Hg, Sb, Cu, Mo Granitoid-related Au-Ag (Cu)	Estimated resource of about 14.5 million tonnes grading 1.2 g/t Au, 0.09 % Cu, 0.46% Sb

Deposit contains quartz-sulfide veinlets containing a wide variety of ore minerals including free gold, stibnite, cinnabar, arsenopyrite, chalcopyrite molybdenite, silver sulfosalts, and arsenian pyrite. Quartz veins contain (5% total) sulfides. All mineralization hosted in cupola zones of altered monzonite and syenite of Chicken Mountain stock. Earlier monzodiorite, alkali gabbro, and wehrlite phases also present. Pervasive sericite and ankerite alteration halos present. Dolomite breccia phase synchronous with major sulfide phase. Surface extent of mineralization occupies a 300 by 800 meter area; drilling indicates at least 250 meters of vertical extent. Drill results and mapping indicates a vertical temperature zonation is present with epithermal gold-mercury-antimony zones crosscutting older mesothermal gold-copper-molybdenum and arsenic-copper events. Pluton and mineralization yield coeval K-Ar ages of 70 Ma.

Bundtzen and others, 1988; 1992a; Bull, 1988; Jason Bressler, written commun., 1980; Richard Gosse, written commun., 1990

P04-09 62°15'N 158°30'W	DeCourcey Mountain Southwestern Kuskokwim Mountains	Hg, Sb, As Hot-spring Hg	Produced 1,200 flasks Hg. Grab samples contain up to 6.5% Hg

Cinnabar, minor stibnite, and traces of arsenopyrite in silica-carbonate dikes that cut sandstone and shale of Cretaceous Kuskokwim Group, and olivine basalt dated at 76 Ma. Sulfides occur usually in irregular breccia zones, or as replacement along intrusive contact. Individual ore bodies, from 0.2 to 2.0 m thick in zone 600 by 100 m in area with vertical relief of 20 m. Individual sulfide bodies rarely more than 20 m long, with common pinching and swelling. The silica dikes consist largely of quartz, carbonate, and clay minerals and probably represent altered basalt dikes.

Cady and others, 1955; Sainsbury and MacKevett, 1965; Thomas K. Bundtzen and Marti L. Miller, written commun., 1985

P04-10 62°13'N 158°15'W	Snow Gulch-Donlin Southwestern Kuskokwim Mountains	Sb, Au, As, Hg Sb-Au vein	Drill-indicated reserves of 40.4 milion tonnes containing 111, 930 kg gold.

Stibnite, arsenopyrite, and complex arsenic sulfosalts and minor to trace cinnabar and free gold as blades, crystals and disseminations in quartz veins and shear zones associated with 4 km long sheeted dike and sill complex. At least three ages of dikes have been identified; dikes range in composition from quartz monzonite to alaskite to granite porphyry. One granite porphyry dike yields K-Ar age of 65 Ma. Mineralization usually occurs at contacts between dikes and mid-Cretaceous Kuskokwim Group flysch, but locally extensive auriferous zones up to 20 meters wide found permeating clastics and hornfels. Considerable gold found in lattice structures of arsenic minerals.

T.K. Bundtzen and M.L. Miller, written commun., 1988; Bruce Hickok and Robert Rutherford, written commun., 1990; Bundtzen and others, 1996.

P04-11 61°46'N 158°32'W	Mission Creek, Headwall, Louise, and Owhat Prospect Southwestern Kuskokwim Mountains	Au, Ag, Cu, As Sb, Bi, Co, W, Sn, U Polymetallic vein	Inferred reserve of 225,000 tonnes grading 4.0 g/tone Au,9.5% As, 0.61% Cu, 0.01% Sn, 0.2% Sb, and 0.02% Co

Sheet-like greisen veins with tourmaline, tetrahedrite, chalcopyrite, arsenopyrite, cassiterite, metazeunerite, scheelite, and axinite. Zones of en-echelon vein-greisens all trend N20-25W and dip steeply or vertically. Zones occur about 3 km along strike and are about 1 km wide. Gold occurs as both free milling grains in gangue and in lattice structures of arsenopyrite. Bismuth sulfosalts bismuthinite, aramayoite, pekoite, and gladite locally in abundant. Veins occur in zones in cupola of Late Cretaceous porphyritic quartz syenite stock. Zones up to 20 m wide. About 300 m of drifts at Mission Creek. Local numerous euhedral gangue minerals. Louise deposit contains up to 1.50% Sn.

Bundtzen and Laird, 1991

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P04-12 61°45'N 157°23'W	Red Devil Southwestern Kuskokwim Mountains	Hg, Sb Clastic sediment-hosted Hg	Produced 34,745 flasks from 68,000 tonnes through 1963. Produced 4,000 flasks, 1970 to 1972. Average grade of 1.5% Hg and 2% Sb

Cinnabar and stibnite in about 20 plunging chimney-like ore bodies located along intersections of north-northwest trending silica-carbonate dikes and bedding plane faults in graywacke and shale of the Cretaceous Kuskokwim group . Ore bodies are crudely prismatic and range from a few centimeters to about 0.4 m in thickness and from 0.1 to 10 m in strike length. Ore bodies plunge along and near intersections between northeast-southwest-trending altered dikes and northwest-southeast-trending faults. Vertical zonation in deposit with pure cinnabar at surface, and increasing stibnite to cinnabar ratios at depth. At 200 m below surface, mainly stibnite and quartz with trace cinnabar. Largest and best exposed of 15 deposits in Kuskokwim mercury belt. Produced about 80 percent of Alaska mercury from 1942 to 1974. Silica-carbonate dikes composed of fine-grained calcite, chalcedony, limonite, and sericite, and subordinate quartz, hematite, and clay minerals. Relict phenocrysts replaced by calcite. Relict diabasic textures in Parks and Willis deposits to northwest. Silica-carbonate veins are interpreted as altered basalt dikes that intrude graywackes and argillite of the Cretaceous Kuskokwim Group. Approximately 3,000 m of underground workings on five levels as of 1963.

Herreid, 1962; MacKevett and Berg, 1963; H.R. Beckwith, written commun., 1965; Thomas K. Bundtzen, written commun., 1985; Miller and others, 1989; Goldfarb and others, 1990

P04-13 62°20'N 161°29'W	Wolf Mountain Southwestern Kuskokwim Mountains	U, Th, As, Nb, Mo, REE Hg Felsic plutonic U	150 meter wide zone at Little Lockwood Creek with 180 ppm U, 130 ppm Th, 290 ppm As, 0.02 % Mo, 175 ppm Nb, about 0.10 % REE, and 0.01% Hg

A circular field of andesite, dacite, and pyroclastic tuff has collapsed on an underlying composite pluton composed of granite, alaskite, and adamellite; radiometrically dated (K-Ar) at 57 Ma. This caldera complex intrudes and overlies oceanic stratigraphy of the Koyukuk terrane. Extensive ferricrete gossan and ferricrete breccias occur, mainly within high level portions of the Wolf Creek stock at 1) structurally controlled (fault) zones on Little Lockwood Creek, 2) northeast-trending fractures(?) on Tom Gray Creek, and 3) disseminated near pluton-volcanic contacts throughout the caldera complex. The only sulfides recognized in the field are arsenopyrite and cinnabar. Monazite and bastinite were also recognized. Metallogeny similar to that described in Sischu Volcanic field in northeast Medfra quadrangle (Sischu Creek deposit, WC21).

T.K. Bundtzen, written commun., 1992, Bruce Hickok and T. Turner, written commun., 1987, 1989

P04-14 61°52'N 161°58'W	Arnold prospect Southwestern Kuskokwim Mountains	Au,Ag W,Cu,Mo Granitoid-related Au	Grab samples with up to 97 g/t and 100 g/t Ag

Consists of an approximate east-west-trending system of low sulfide polymetallic veins system that contain gold in a quartz and carbonate gangue. The sulfide minerals, that comprise less than one percent of the deposit, are disseminated chalcopyrite, molybdenite, galena, and tetrahedrite. Ore zone extends along strike for least 400 meters and ranges from 0.5 to 2m thick. The vein system occurs in or near sheared alaskite sills. A distinctive albite rhyolite dike or sill parallels the main vein system. The sills intrude Neocomian (early Early Cretaceous) greenstone derived from tholeiite metabasalt and meta-andesite. The deposit extends extends along strike for least 400 meters and ranges from 0.5 to 2 m thick. Abundant carbonate alteration occurs adjacent to the main polymetallic veins. Molybdenum anomalies occur in soils, and Mo averages about 80 ppm in the veins. Deposit is interpreted as forming from late stage hydrothermal fluid derived from Late Cretaceous or early Tertiary alaskite.

T.K. Bundtzen, written commun., 1991

P04-15 61°07'N 158°15'W	Fortyseven Creek Southwestern Kuskokwim Mountains	Au, W Polymetallic vein(?)	Grab samples with up to 17.2 g/t Au

Pyrite, arsenopyrite, gold, wolframite, jamesonite, Au-Ag tellurides, and scheelite in numerous, discontinuous quartz veins and pods in mineralized zone about 1.6 km long and 153 to 256 m wide. Veins trend northeast and dip from 50° west to 70° east. Several stockwork zones. Mineralized zone locally sheared and intruded by altered rhyolite dikes. K-Ar age of 57 Ma for white mica in veins. Subsurface drilling shows zone in lithic sandstone about 300 m wide by 4,000 m long, east of Holitna fault. Veins occur in contact metamorphosed siltstone and sandstone of the Kuskokwim Group.

Cady and others, 1955; Thomas E. Smith, written commun., 1985

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P04-16 60°52'N 157°40'W	Taylor Mountains Southwestern Kuskokwim Mountains	Hg, Au As, Ag Hg-Ag epithermal vein(?)	No data
Disseminated arsenopyrite, cinnabar, pyrite, and minor gold in Late Cretaceous rhyolite over an area at least 200 by 300 m. Sparse sulfide concentrations in quartz-tourmaline veinlets in rhyolite. Sparse massive pyrite along contacts between lithic sandstone and rhyolite. Pyrite, cinnabar, and stibnite in nearby placer deposits in Taylor Creek. Cady and others, 1955; Thomas K. Bundtzen, written commun., 1984			
P04-17 60°46'N 158°46'W	Cinnabar Creek Southwestern Kuskokwim Mountains	Sb, Hg Hot-spring Hg	Produced about 525 flasks of Hg from selected high-grade ore
Stibnite and cinnabar in shear zones, disseminations, irregular veinlets, and breccias in or near silica-carbonate dikes interpreted as hydrothermally altered basalt dikes. Dikes intrude argillite and other clastic rocks of the late Paleozoic to Cretaceous Gemuk Group. Most sulfides in altered sedimentary rocks. Deposit includes Cinnabar Creek shear zone, Lucky Day, and Landau areas. Ore chutes at Cinnabar exceed 40 m long and 0.5 m wide. Several periods of small-scale mining; the last in the early 1970's from surface trenches. Cady and others, 1955; Sainsbury and MacKevett, 1965			
P04-18 60°03'N 157°05'W	Sleitat Southwestern Kuskokwim Mountains	Sn, Ag, W, As Tin Greisen and Skarn	Inferred reserves of 25 million tonnes grading 0.20 % Sn with minor Ag, W
Cassiterite, topaz, and quartz greisen accompanied by lesser amounts of arsenopyrite, pyrite, wolframite, argentite, chalcopyrite, and galena. Two largest greisens form resistant, irregular, east-west trending, vertically dipping dike-like features that protrude through less resistant host granite. Greisens vary from less than a meter wide and 20-30 meters long to zones 20-50 meters wide and 1200 meters long. Most greisens occur at contact between biotite-muscovite granite and muscovite granite phases of Sleitat pluton. Some mineralization in surrounding hornfels aureole. Pluton crops out across an area of 1.5 km^2. A much larger 20 km^2 hornfels aureole indicates a much larger intrusive mass underlies prospect area. Pluton intrudes Mesozoic flysch of Kahiltna Terrane or Kuskokwim Group. About 735 meters of diamond drilling completed; best hole yielded 29 meters of 1.56% Sn and 28 ppm Ag. Sleitat is probably correlative with other stanniferous plutons of 55-60 Ma McKinley sequence. Ar 40-39 age determinations indicate 58-59 Ma ages for granite and 56-57 Ma for greisen event. Burleigh, 1991; Farnstrom, 1991; T.K. Bundtzen and Paul Layer, written commun., 1991			
P04-19 62°48'N 158°54'W	Fox Hills Southwestern Kuskokwim Mountains	Mo Porphyry Mo	Selected rock-chip samples contain from 0.01 to 2.0% MoS_2 and up to 11 g/t Ag;
Occurs in an alkali granite pluton that contains a central phyllic and sericitic alteration zone rimmed by a thin, 50-m-wide argillic zone. In the southern part of the alteration halo are molybdenite-quartz veinlets that strike 335° in a 120 by 100 m zone. The alkali granite pluton has a surface area of about 8 km2, contains alkali amphibole, and intrudes the Late Cretaceous Kuskokwim Group in the Fox Hills, about 60 km west of Flat (Fig. 7). The phyllic and sericitic alteration zone is about 2 km2 in area and occurs in the western part of the pluton. The Fox Hills alkali granite has a K-Ar amphibole age of 62.9 Ma . Miller and Bundtzen, 1994; Nokleberg and others, 1995a.			

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P04-20 62°05'N 158°48'W	Molybdenum Mountain Southwestern Kuskokwim Mountains	Mo Porphyry Mo	Selected rock samples from the Molybdenum Mountain stock contain up to 5.0% MoS_2.

Consists of a stockwork of vein quartz containing massive and disseminated molybdenite, galena, and pyrite in the Molybdenum Mountain (felsic) stock, a small hypabyssal intrusion of 2 km2 area that occurs in an area about 45 km northeast of Aniak. Alteration is mainly silicic and sericitic. A large, elongate contact metamorphic aureole surrounds the Molybdenum Mountain stock and several smaller intrusions that occur about 4 to 6 km to the northeast. The stock intruded pervasively altered, Late Cretaceous flysch of the Kuskokwim Group in a large shear zone that is a splay of the Iditarod-Nixon-Fork Fault, a major dextral-slip Cenozoic fault in west-central Alaska. A K-Ar white mica age of 60.9 Ma has been obtained from the stock.

T.K. Bundtzen, unpublished data, 1987; Nokleberg and others, 1995a.

P04-21 62°54'N 156°58'W	Beaver Mountains Southwestern Kuskokwim Mountains	Cu, Au, Ag Porphyry Cu-Au	Cirque prospect: Chip-channel samples range up to 21.0% Cu, 1,000 g/t Ag, 200 ppm Sn, and 1 g/t Au. Tolstoi prospect: scattered assay values range up to 10.0% Cu, 995 g/t Ag, 2.0% As, 0.6 g/t Au, 500 ppm Sb, and 39 ppm Bi.

Consists of a variety of mineralized vein stockworks, replacements, and tourmaline breccias that contain anomalous Au, Ag, Cu, Pb, W, Sn, Nb, and As. The deposit occurs in Late Cretaceous and early Tertiary volcanic and plutonic rocks in the Beaver Mountains, about 60 km west of McGrath. The major lode prospects are found in a 15 km2 area centered on the Cirque and Tolstoi prospects (Bundtzen and Laird, 1982) that are also called the South Quartz Zone area by Szumigala (1993). The Cirque deposit consists of a series of parallel tourmaline-axinite-sulfide fracture fillings that occur in the cupola of a quartz syenite phase of the Beaver Mountains pluton. The Tolstoi deposit consists of three, pipe-shaped, sulfide-bearing, tourmaline-bearing breccia zones that occur in another part of the cupola of the Beaver Mountains pluton. These near-vertical zones, possibly breccia pipes, appear to be enveloped in a larger, 2 km2 potassic alteration halo. Szumigala (1993) interprets the porphyry copper-gold deposits in the Beaver Mountains as occurring in veins that are peripheral to classic porphyry Cu systems. A K-Ar biotite age of 70.3 Ma was obtained by Bundtzen and Laird (1982) from quartz syenite near the northern margin of the Beaver Mountains pluton.

Bundtzen and Laird, 1982; Miller and Bundtzen, 1994; Nokleberg and others, 1995z.

P04-22 62°18'N 158°24'W	Donlin Creek Southwestern Kuskokwim Mountains	Au Porphyry Au	Trenching and drilling indicate that the seven ore bodies at Carolyn, Snow, Queen, Rochelieu, Upper Lewis, Middle Lewis, and Lower Lewis contain an inferred reserve of 3,871,025 tonnes grading 3.15 g/t Au 12,225 kg gold. Exhaustive mineral resource investigations have been completed by private mining firms.

Consist of seven distinct prospects that occur along strike in an approximately 6-km-long dike and sill swarm. The prospects consist of quartz-stibnite veins in porphyry and adjacent silicified sandstone, quartz-gold replacement of phenocrysts, and thick quartz veins with disseminated quartz-sulfide zones that occur along shears and in stockworks. The sulfide minerals are mainly pyrite, stibnite, cinnabar, arsenopyrite, and sulfosalt minerals. Alteration is mainly argillic, phyllic, silicic, carbonate, and dickite, and occurs along linear shears and faults rather than as concentric halos. Au deposition accompanied As deposition; other metals show low correlation coefficients with Au.

Mertie, 1936; Decker and others, 1984; Miller and Bundtzen, 1994; R.M. Retherford and J. McAtee, written commun., 1994; Nokleberg and others, 1995a.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P04-23 62°36'N 156°08'W	Vinesale Mountain Southwestern Kuskokwim Mountains	Au Porphyry Au	Based on about 6,000 m of drilling, a central zone contains a reserve of about 16 million tonnes grading 2.14 g/t Au and accessory Ag and Sb, or about 31,000 kg of gold.

Consists of Au-Ag-Sb-Pb-As sulfide minerals that occur as disseminations, and in breccias, dolomite veins, and segregations. Mafic minerals are altered by silicification, sericitization, and propylitic replacements. The highest gold concentrations in the central zone of the deposit occur in areas of intense sericite and silica alteration. Over ninety percent of the gold is contained in sulfides and sulfosalt minerals of arsenic and antimony. Correlation coefficients are highest between Au and As (0.81). Deposit hosted in various phases of the Vinasale pluton, a multiphase, 6 km2 intrusion composed of monzonite, quartz monzonite, and granite porphyry that intruded the Late Cretaceous Kuskokwim Group. A K-Ar biotite age of 69.0 Ma from a quartz monzonite phase of the Vinasale Mountain pluton is described by Bundtzen (1986).

Bundtzen, 1986; DiMarchi, 1993; Nokleberg and others, 1995a.

P05-01 63°58'N 153°17'W	Sischu Creek Southwestern Kuskokwim Mountains	U, Th Felsic plutonic U	Grab samples with 0.002 to 0.007% U and 0.011 to 0.013% Th

Strongly radioactive U- and Th-rich Late Cretaceous and early Tertiary porphyritic sanidine rhyolite and quartz porphyry flows in two belts, each about 1.5 to 3 km wide, 6 km long. Rhyolite flows exhibit 400 to 600 cps on hand-held scintillometer. Associated rocks include mafic and intermediate volcanic piles, volcanic-plutonic complexes, silicic dikes, sills, domes, and flows, and numerous granitic stocks and plugs of 60 to 70 Ma (K-Ar).

Miller and others, 1980; Patton and Moll, 1983

P05-02 63°40'N 154°04'W	Medfra Southwestern Kuskokwim Mountains	Fe, Cu, Zn, Au Fe skarn	Estimated 12,000 cubic meters grading 85% Fe_2O_3, with traces of Cu, Au

Magnetite, very minor chalcopyrite, and sphalerite in epidote and garnet skarn. Irregular, elliptically-shaped skarn body in Ordovician dolomitized limestone of the lower Paleozoic Telsitna Formation adjacent to Late Cretaceous granite stock. Computer modeling of magnetic survey suggests 40,000 to 50,000 tonnes of magnetite.

Patton and others, 1980, 1984

P05-03 63°29'N 154°10'W	Reef Ridge Mystic	Zn, Pb Southeast Missouri Pb-Zn	Grab samples with up to 20% Zn, 5% Pb, minor Ag. Estimated to contain about 181,000 tonnes of 15% combined Zn and Pb

Stringers of brown sphalerite and minor galena in hydrothermal breccia in carbonate rocks of the Silurian and Devonian Whirlwind Creek Formation, part of Nixon Fork terrane. Minimum strike length of 2,000 m and up to 15 m thick. Sulfides pinch and swell along strike. Best known of ten similar nearby occurrences.

Harold Noyes, written commun., 1984.

P05-04 63°14'N 154°47'W	Nixon Fork-Medfra Southwestern Kuskokwim Mountains	Au, Cu, Ag, Bi, Sn, W, Th Cu-Au skarn	Produced about 1.24 to 1.87 million g Au, and undisclosed Cu and Ag. Reserves of 85,600 tonnes grading 49.0 g/t Au with minor Bi.

Chalcopyrite, pyrite, bornite, and native bismuth occur as irregular replacement bodies in skarns in recrystallized Ordovician limestone of the Telsitna Formation. Gangue minerals include diopside, garnet, plagioclase, epidote, and apatite. Oxidized actinolite skarn with limonite, quartz, malachite, pyrite, and gold. Skarns mainly in fractures up to 1 to 4 m wide and 50 m long, usually within 40 m of intrusive contact with Late Cretaceous monzonite. A few skarns in roof pendants overlying pluton. The monzonite pluton about 10 square km near the Nixon-Iditarod fault. Additional smaller skarn veinlets in fault controlled areas away from main skarn bodies. Extensive sericitic alteration locally. Most of ore from zone of secondary enrichment that formed during alteration of primary skarn by groundwater. Lower grade sulfide-rich ore at depths greater than 60 m. About 1,300 m of underground workings to depth of 170 m. Includes Crystal, Garnet, High Grade, Main, Mespelt, Recreation, and Whalen deposits.

Martin, 1921; Brown, 1926; Jasper, 1961; Herreid, 1966; Bundtzen and Gilbert, 1983b; C. Puchner, written commun., 1991; Bundtzen and others, 1996.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P05-05 62°51'N 155°48'W	Candle Southwestern Kuskokwim Mountains	Cu, Pb, Ag Polymetallic vein or porphyry Cu?	Grab samples averaging 280 g/t Cu, 185 g/t Pb, 6.8 g/t Ag

Summary and References

Cinnabar, arsenopyrite, and quartz in stockworks in altered, sericite, late Cretaceous monzonite near intrusive contact with overlying altered olivine basalt. Local quartz-chalcopyrite disseminations in the pluton. Recent exploration indicates low grade auriferous quartz vein stockwork in monzonite near faulted contact with basalt. Zone up to 200 m wide and 700 m long. Central part of basalt field contains 300 by 500 m zone of disseminated sulfides. Monzonite in creek valley is weakly mineralized with gold and mercury within stockwork quartz veinlets.

Bundtzen and Laird, 1983a, b; Thomas K. Bundtzen, written commun., 1984, 1990

P05-06 63°45'N 150°25'W	Stampede East-Central Alaska	Sb Sb-Au vein	Estimated 410,000 tonnes with 10.5% Sb, minor Ag, Zn, and Au. Produced 1,570 tonnes ore

Quartz-carbonate fissure veins with stibnite, and minor pyrite and sphalerite in pods and kidneys. Massive stibnite zones up to 5 m wide. Extensive vein system localized in a 5 km long, northeast-trending fault system. Veins formed before, during, and after several periods of movement on fault. Paragenetic sequence, from older to younger: pyrite, sphalerite, and stibnite. Fault system cuts the Spruce Creek sequence which is composed of middle Paleozoic or older metasedimentary and metavolcanic rocks. Production from 1937 to 1970. About 1,000 m of underground workings on two levels.

Barker, 1963a; Bundtzen, 1981, 1983a; Thomas K. Bundtzen, written commun., 1984

P05-07 63°35'N 151°35'W	Spruce Creek East-Central Alaska	Au, Ag, Pb, Zn, Sb Polymetallic vein	Estimated 77,000 tonnes with 2.4 g/t Au, 276 g/t Ag, and 2.5% combined Pb, Zn, Sb

Quartz-carbonate fissure veins with galena, sphalerite, arsenopyrite, and gold. Veins occur along northeast-striking, steeply dipping fault zones in the Spruce Creek sequence composed of middle Paleozoic or older metasedimentary and metavolcanic rocks.

Bundtzen, 1981, 1983a; Thomas K. Bundtzen, written commun., 1984

P05-08 63°34'N 150°44'W	Banjo East-Central Alaska	Au, Ag, Pb, Zn, Sb Cu Polymetallic vein	Estimated 160,000 tonnes with 13.4 g/t Au, 123 g/t Ag, 1.5% combined Pb, Zn, Sb

Quartz-carbonate fissure veins with arsenopyrite, pyrite, gold, and minor scheelite. Veins occur along northeast-southwest-striking, steeply dipping fault zones within the Spruce Creek sequence composed of middle Paleozoic or older metasedimentary and metavolcanic rocks of Yukon-Tanana terrane.

Bundtzen, 1981, 1983a; Thomas K. Bundtzen, written commun., 1984

P05-09 63°33'N 150°45'W	Quigley Ridge East-Central Alaska	Ag, Au, Pb, Zn Polymetallic vein	Estimated 380,000 tonnes with up to 1,300 g/t Ag, 4.8 g/t Au, 6.4% Pb, and 2.3% Zn

Quartz-carbonate fissure veins with galena, sphalerite, tetrahedrite, pyrite, chalcopyrite, and siderite. Paragenetic sequence, from older to younger: arsenopyrite, pyrite, base-metal sulfides, Ag sulfosalts, stibnite, and covellite. Locally contain Ag and Pb sulfosalts. Veins occur along northeast-striking, steeply dipping fault zones in the Spruce Creek sequence composed of middle Paleozoic or older, metavolcanic and metasedimentary rocks.

Bundtzen, 1981, 1983a; Thomas K. Bundtzen, written commun., 1984

P05-10 63°25'N 151°12'W	Slate Creek, Eagles Den, Caribou Creek East-Central Alaska	Sb Ag, Zn Sb-Au vein	Estimated 64,000 tonnes grading 12.0% Sb, with minor Ag and Zn

Quartz-carbonate fissure veins mineralized mainly with stibnite, and mostly free of other sulfides common to district. Veins occur along northeast-striking, steeply dipping fault zones that cut metasedimentary and metavolcanic rocks of middle Paleozoic or older Yukon-Tanana terrane.

Bundtzen, 1981; Thomas K. Bundtzen, written commun., 1984

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P05-11 62°53'N 152°08'W	Boulder Creek (Purkeypile) Southern Alaska	Sn Sn greisen(?)	Contains an estimated 136,000 kg Sn. Grab samples with up to 18% Sn, 7,900 g/t Ag

Disseminated cassiterite and sulfides in clusters of narrow, open-space fracture fillings, suggestive of stockwork deposit. Deposit occurs in calc-silicate rock, quartzite, and argillite approximately 100 to 200 m north of Tertiary biotite granite, part of the lower Tertiary McKinley plutonic sequence.

Maloney and Thomas, 1966; Conwell, 1973; Reed and others, 1978; Warner, 1985

P05-12 62°40'N 152°30'W	Shellabarger Pass Mystic	Cu, Ag, Fe, Zn Besshi massive sulfide	Estimated several hundred thousand tonnes of unknown grade. Up to 5% Cu; average of about 2% Cu, 1% Zn

Very fine grained mixture of mainly pyrite and marcasite with lesser sphalerite, chalcopyrite, galena, and pyrrhotite in a gangue of siderite, calcite, quartz, and dolomite. Sulfides and gangue occur in massive, lenticular sulfide bodies, as replacements of carbonate-rich beds, and as fracture fillings, mainly in chert and siltstone. Host rocks are Triassic and(or) Jurassic age; and consist of lower sequence of chert, dolomite, siltstone, shale, volcanic graywacke, conglomerate, aquagene tuff, and upper sequence of pillow basalt, agglomerate, and breccia. At least six individual sulfide bodies. Highest chalcopyrite concentrations in basal parts of bodies. Minor sphalerite in or near hanging walls. Main sulfide bodies may be proximal to basaltic flow fronts. Extensive hydrothermal alteration in footwall; rare to absent in hanging wall. High background Cu values of 250 to 300 g/t.

Reed and Eberlein, 1972; Bundtzen and Gilbert, 1983

P05-13 62°23'N 153°38'W	Tin Creek Southern Alaska	Pb, Zn, Cu Cu-Pb-Zn skarn	Estimated 230,000 tonnes with 16% combined Pb and Zn

Pyroxene-rich skarn with abundant sphalerite and minor chalcopyrite, and garnet skarn with chalcopyrite and minor sphalerite; and locally abundant epidote and amphibole. Pyroxene skarn distal, and garnet skarn proximal to extensive Tertiary granodiorite dike swarm in mid-Paleozoic marble. Skarns form small, discontinuous bodies up to 3 m wide along dikes, as mantos in marble, and as irregular bodies along thrust and high-angle faults.

Herreid, 1966; Reed and Elliott, 1968a, b; Bundtzen and Gilbert, 1983; Bundtzen and others, 1982; Szumigala, 1984

P05-14 62°10'N 154°51'W	White Mountain Southern Alaska(?)	Hg Carbonate-hosted Hg(?)	Chip samples contains 5 to 30% cinnabar. Produced about 3,500 flasks of Hg.

Cinnabar in fault zones between Ordovician limestone and shale along belt about 1 km wide and 3 km long on northwest side of Farewell fault. In southern zone, cinnabar occurs as thin crystalline coatings in brecciated dolomite, as coatings on breccia fragments, and as irregular veinlets. In central zone, cinnabar is more irregular and occurs in silicified limestone and dolomite. In northern zone, rich cinnabar masses occur on both sides of major fault between middle Paleozoic shale and limestone. One area in north zone contains a massive cinnabar body up to 350 m long and 10 to 15 cm thick. Locally cinnabar occurs in small karst-like caverns in dolomitized limestone. Gangue minerals consist of dolomite, chalcedony, calcite, dickite, and limonite. Production from 1964 to 1974 when mined from a series of open pits.

Sainsbury and MacKevett, 1965; Brian K. Jones, written commun., 1984; Thomas K. Bundtzen, written commun., 1984

P05-15 62°14'N 154°20'W	Chip-Loy Unassigned	Ni, Co, Cu Gabbroic Ni-Cu(?)	Estimated 9,100 tonnes of 1% Ni, 0.1% Co

Massive to disseminated pyrrhotite, bravoite, and chalcopyrite in irregular, steeply dipping layer; occurs along contact between diabase and Ordovician shale. Other nearby Ni-Co sulfide deposits occur along contacts between diabase dikes.

Herreid, 1968; Gilbert and Solie, 1983; Bundtzen and others, 1985

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P05-16 62°14'N 153°48'W	Rat Fork, Sheep Creek Southern Alaska	Cu, Zn, Pb Cu-Pb-Zn skarn	Grab samples with up to 3% Cu and 10% combined Zn, Pb
Large slivers of Cu- and Zn-rich skarn between Tertiary granodiorite dikes in a 3-km-wide dike swarm that cuts lower Paleozoic marble. Johannsenite-sphalerite skarn in marble, and chalcopyrite-rich garnet endoskarn in dikes. Local Ag-rich galena vein in marble about 0.5 km north of dike swarm. Dikes trend east-west; skarn up to 25 m wide. Herreid, 1968; Reed and Elliott, 1968a, b; Bundtzen and others, 1982; Szumigala, 1987			
P05-17 62°11'N 153°40'W	Bowser Creek Southern Alaska	Ag, Pb, Zn Pb-Zn skarn	Higher grade: estimated 14,000 tonnes with 1,300 g/t Ag, and up to 10% combined Pb and Zn. Lower grade: estimated 272,000 tonnes with 20% Pb and Zn, and 100 g/t Ag
Pyrrhotite, sphalerite, galena, and chalcopyrite in a hedenbergite-johannsenite endoskarn occurring in marble adjacent to felsic dike that cuts an early Tertiary granitic pluton. Some veins with Ag-rich galena and pyrrhotite occur within marble adjacent to skarn. Small Zn- and Cu-rich stockwork veinlets in plutons, and disseminated sulfides in plutons and endoskarn occur nearby. Bundtzen and others, 1988; Szumigala, 1987			
P05-18 61°49'N 154°28'W	Gagaryah Mystic	Ba Sedimentary exhalative barite (Pb-Zn)	Inferred reserves of 2.3 million tonnes containing 51% barite
Nodular, laminated, composite, and massive, light gray barite in Frasnian (early Late Devonian) shale, limestone and minor chert of Mystic Terrane. Deposit has minimum strike length of 640 meters, an average thickness of 20 meters, and estimated down-dip extension of 300 meters. Gagaryah deposits contains slightly elevated levels of silver vanadium, and strontium (as celestite), but no lead or zinc. Sulfide isotopic analyses of +20 and +24 determined from nodular and massive barite respectively. Barite was deposited syngenetically into host shale basin with barite rapidly precipitating from low temperature hydrothermal fluids distal from exhalative vents. Bundtzen and Gilbert, 1991			
P05-19 60°45'N 154°30'W	Bonanza Hills Southern Alaska	Ag, Cu, Pb, Au Polymetallic vein and Porphyry Cu	At Main Saddle estimated 45,000 tonnes grading 81 g/t Ag, 0.15% Cu, 0.67% Pb, and 0.15 g/t Au
Main Saddle Deposit: tetrahedrite, arsenopyrite, galena, and chalcopyrite in quartz-limonite vein up to 3 m wide and 150 m long. Vein occurs in contact-metamorphosed dacite flow and sandstone sequence near Late Cretaceous, two-mica, hypabyssal, granite pluton. VABM Trail and Bonanza Deposits: stibnite, arsenopyrite, and gold in en echelon veinlets adjacent to dacite porphyry and quartz monzonite plutons. Extensive sericite and silicic alteration of plutonic rocks. Plutons intrude Lower Cretaceous shale and sandstone, part of regionally extensive Upper Jurassic and Lower Cretaceous flysch. Eakins and others, 1978; Thomas K. Bundtzen, written commun., 1984; Nelson and others, 1985			
P05-20 60°51'N 153°12'W	Glacier Fork Alaska Peninsula	Cu, Au Zn, Ag Cu-Zn skarn	Chip samples contain 0.76% Cu, 3.4% Zn, 0.38 g/t Au, 20g/t Ag
Layers and veinlets of disseminated and massive pyrrhotite, chalcopyrite, arsenopyrite, and sphalerite in iron-poor, garnet-rich skarn. Skarn occurs in large roof pendant over granitic pluton. Nelson and others, 1985			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P05-21 60°51'N 151°48'W	Miss Molly (Hayes Glacier) Southern Alaska	Mo Porphyry Mo	Grab and chip samples with up to 0.38% Mo, 0.16% Zn

Quartz veins with medium- to coarse-grained molybdenite, pyrite, and local fluorite. Regularly spaced, subparallel, veins 2 to 10 cm wide are spaced 2 to 10 m apart. Veins occur in two zones about 545 m long and up to 150 m wide in early Tertiary leucocratic, equigranular biotite granite stock. Veins locally fill joints and less commonly shears. Zones of hydrothermal alteration up to 0.3 m wide are marked by sericite and pyrite and occur adjacent to veins. Granite stock intrudes siltstone in an Upper Jurassic and Lower Cretaceous flysch unit. Granitic plutons nearby, yield K-Ar ages of 56 to 59 Ma.

Fernette and Cleveland, 1984

P05-22 60°17'N 154°15'W	Kijik River Southern Alaska	Cu, Mo Polymetallic vein and porphyry Cu	Grab samples with up to 0.25% Cu, and 0.17% Mo. Estimated 91 million tonnes

Large area of low-grade, disseminated sulfides in, and adjacent to early Tertiary dacite porphyry. Distinctive orange gossan over a 3 km^2 area with extensive stockwork, and zones of sericite and sulfides. Extensive propylitic and silicic alteration of dacite porphyry. Early Tertiary dacite porphyry intrudes older volcanic rocks.

Eakins and others, 1978; Nelson and others, 1985; Thomas K. Bundtzen, written commun., 1984

P05-23 60°13'N 154°05'W	Kasna Creek (Kontrashibuna) Alaska Peninsula	Cu Au, Ag, Zn, Fe Cu-Fe skarn	Chip samples averaging 0.95% Cu, 27% Fe, and traces of Au and Ag. Grab samples with up to 0.25% Zn. Estimated 9.1 million tonnes grading 1% Cu

Skarn bodies contain specular hematite and lesser magnetite and chalcopyrite in amphibole-chlorite-calcite-quartz gangue that replaces Upper Triassic dolomite and limestone. Skarn bodies occur parallel to bedding and occur in a zone about 320 m long and 700 m wide adjacent to Jurassic tonalite. Tuffs, mafic volcanic rocks, and agglomerate associated with limestone.

Warfield and Rutledge, 1951; Reed and Lanphere, 1969; Eakins, 1970

P05-24 60°14'N 152°51'W	Magnetite Island (Tuxedni Bay) Alaska Peninsula	Fe, Ti Fe skarn	Up to several thousand tonnes in zones with 20 to 75% magnetite

Two magnetite-bearing skarn bodies replace upper Paleozoic to lower Mesozoic marble. Skarn bodies occur along northeast-striking faults in Upper Triassic marble and associated sedimentary and volcanic rocks adjacent to Jurassic quartz diorite pluton. Disseminated magnetite in hornfels of eastern deposit. Massive magnetite and garnet between marble hanging wall and hornfels footwall in western deposit.

Grantz, 1956; Detterman and Hartsock, 1966

P05-25 60°07'N 152°57'W	Johnson Prospect Talkeetna Mountains-Alaska Range	Au, Zn, Cu, Pb Kuroko massive sulfide	Estimated resource of 16,795 kg gold and 127,000 tonnes Zn; includes 453,500 tonnes grading 19 g/t Au and 9.0% Zn

Stockworks of quartz-sulfide veins and massive sulfide lenses with chalcopyrite, pyrite, sphalerite, galena, and gold. Stockwork occurs in a discordant, pipe-like body of silicified volcanic rocks. Veins also contain chlorite, sericite, anhydrite, and barite alteration minerals. Deposit occurs in volcaniclastic, pyroclastic, and volcanic rocks, part of the Portage Creek Agglomerate Member of the Lower Jurassic Talkeetna Formation. Deposit may represent deposition of sulfides directly over capped submarine vent system during Jurassic volcanic cycle. Nearby Late Jurassic quartz diorite and quartz monzonite.

R. L. Detterman, oral commun., 1984; Steefel, 1987; Madelyn Mollholyn, written commun., 1988; J. Proffett, written commun., 1991

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P05-26 63°38'N 155°04'W	Von Frank Mountain Southwestern Kuskokwim Mountains	Cu, Ag Porphyry Cu-Ag	Average grade of 0.5 to 35 g/t Au and from 0.05% to 0.45% Cu; one drill hole intercepted about 45 m grading 1.2 g/t Au and 0.08% Cu.

Occurs about 100 km northeast of McGrath and consists of a stockwork in a quartz diorite and augite-rich, biotite granodiorite. These rocks occur in a down-dropped structural block along the southern limit of a volcanic-plutonic complex exposed at Von Frank Mountain. The stockwork consists of chalcopyrite, arsenopyrite, minor molybdenite, and free gold in quartz-carbonate veins in a cupola of the intrusive system. Alteration minerals include sericite, silica, and dolomite replacement zones that are similar to the Chicken Mountain porphyry Au deposit (Bundtzen and others, 1992). A K-Ar isotopic mineral age of 69.9 Ma was obtained from granitoid plutons north of the prospect (Moll et al., 1981).

J. DiMarchi, written. commun., 1994; Nokleberg and others, 1995a.

P06-01 63°54'N 148°17'W	Sheep Creek Alaska Range and Yukon-Tanana Upland	Zn, Pb, Ag, Sn Kuroko massive sulfide?	Grab samples contain up to 15% combined Pb and Zn, and 102 g/t Ag; zones up to 1 m wide with 1% Sn

Fine-grained sphalerite, galena, and pyrite in massive lenses in siliceous phyllite and metaconglomerate of the Precambrian or Paleozoic Keevy Peak Formation. Sulfide zone extends along strike for 300 m, and vertically for 200 m. Sulfide lenses isoclinally folded; may be distally associated with tuffaceous chlorite schist and metamorphosed lapilli tuff.

Gilbert and Bundtzen, 1979; Thomas K. Bundtzen, written commun., 1985

P06-02 63°48'N 147°57'W	Anderson Mountain Alaska Range and Yukon-Tanana Upland	Cu, Pb, Zn, Ag Kuroko massive sulfide?	Up to 19% Cu, up to 5% Pb, 28% Zn, and 171 g/t Ag.

Massive sulfide layers with pyrite, chalcopyrite, galena, sphalerite, enargite, and arsenopyrite in gangue of quartz, sericite, chlorite, calcite, barite and siderite. Hosted in metamorphosed marine tuffaceous rhyolite and metamorphosed calcareous clastic rocks correlated with the Moose Creek Member of the Mississippian Totatlanika Schist. Numerous high-angle faults. Sulfide beds appear to lie on irregular paleosurface in footwall. Domal sulfide accumulations at top of layers. Absence of footwall alteration and stringer mineralization suggests off-vent deposition. High geochemical values of As, Sb, Hg, and W may be derived from older schist basement.

Gilbert and Bundtzen, 1979; Curtis J. Freeman, written commun., 1984; T.K. Bundtzen, written commun., 1984

P06-03 63°45'N 147°22'W	WTF, Red Mountain Alaska Range and Yukon-Tanana Upland	Cu, Pb, Zn, Ag, Au Kuroko massive sulfide	At WTF, estimated 1.10 million tonnes grading 0.15% Cu, 2.5% Pb, 7.9% Zn, 270 g/t Ag, and 1.9 g/t Au

Massive pyrite, sphalerite, galena, and chalcopyrite in quartz-rich gangue occurs in felsic metavolcanic rocks derived from crystal and lapilli tuff, minor flows, and in metasedimentary rocks. Massive sulfide layers on both sides of large east-west trending syncline. The massive sulfide layers of the Red Mountain deposit occur in a proximal setting on the south limb of the anticline, within sulfide-silica exhalite up to 130 m thick. An older, southern horizon hosts sphalerite and coarse pyrite in black chlorite schist. The thin blanket of fine-grained sulfides of the WTF deposit on the north limb of the fold in a distal setting relative to the vent. Deposits occur immediately below the Sheep Creek Member and above the Mystic Creek Member of the Mississippian Totatlanika Schist.

Gilbert and Bundtzen, 1979; David R. Gaard, written commun., 1984

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-04 63°41'N 146°39'W	Miyaoka, Hayes Glacier Alaska Range and Yukon-Tanana Upland	Cu, Pb, Zn, Au, Ag Kuroko massive sulfide	Grab samples with up to 0.92% Cu, 0.72% Pb, 0.5% Zn, 50 g/t Au, 50 g/t Ag

Zone about 13 km long and up to 0.5 km wide of massive sulfide lenses, pods, and disseminations with pyrrhotite, chalcopyrite, sparse pyrite, and sphalerite. Individual lenses and pods up to 5 m long and 1 m thick. Sulfides are in interfoliated former marine sequence of quartz mica schist, muscovite-chlorite-quartz schist, quartz-feldspar augen schist, chlorite schist, calc-schist, and marble. Host rocks derived from Devonian felsic to intermediate volcanic rocks, mainly andesite, dacite, and quartz keratophyre flows and tuffs, and Devonian or older shale, marl, and marble. Metavolcanic and metasedimentary rocks part of Yukon-Tanana terrane. Two periods of metamorphism and deformation, an older period of lower amphibolite facies, and a younger period of lower greenschist facies. Intensely deformed with locally abundant mylonite schist.

Lange and Nokleberg, 1984; Nokleberg and Lange, 1985; Lange and others, 1993.

P06-05 63°36'N 146°14'W	McGinnis Glacier Alaska Range and Yukon-Tanana Upland	Zn, Cu, Pb, Ag Kuroko massive sulfide	Grab samples with up to 2.3% Zn, 0.26% Cu, 0.25% Pb, 50 g/t Ag

Disseminated to massive pods of pyrite, chalcopyrite, and sphalerite in two or three layers exposed discontinuously along a zone up to about 15 m thick and 2 km long. Individual pods up to 1 m thick. Gangue of quartz, chlorite, epidote, biotite, and actinolite. Sulfides occur in interfoliated marine sequence of metasedimentary rocks, mainly quartz schist, chlorite-quartz schist and marble, and lesser amounts of metamorphosed Devonian andesite, dacite, and keratophyre flows, tuff, and volcanic graywacke of the Yukon-Tanana terrane. Two periods of metamorphism and deformation: an older period of lower of amphibolite facies, and a younger period of lower greenschist facies. Intensely deformed with local abundant mylonite schist.

Lange and Nokleberg, 1984; Nokleberg and Lange, 1985; Lange and others, 1993.

P06-06 63°11'N 149°55'W	Ohio Creek Southern Alaska	Sn Ag, As, Cu, Zn Sn greisen and Sn vein	Grab samples with up to 0.1% Sn, and minor Ag, As, Cu, Zn

Zone of muscovite-tourmaline greisen and quartz arsenopyrite veins in tourmaline-bearing Tertiary granite stock. Zone about 1.6 km long and 0.8 km wide. Greisen zone about 4 m thick and 45 m long occurs along contact with biotite-rich inclusion. Stock part of the lower Tertiary McKinley plutonic sequence and intrudes argillite, graywacke, and conglomerate, part of Upper Jurassic(?), Cretaceous, and lower Tertiary(?) flysch in region.

Hawley and Clark, 1974

P06-07 63°09'N 149°52'W	Ready Cash Southern Alaska	Au, Cu, Pb, Ag, Sn, Zn Polymetallic vein(?)	Chip sample with 1.4 g/t Au, 857 g/t Ag, 1.5% Cu, and 5% Pb

Arsenopyrite, chalcopyrite, and galena in quartz-arsenopyrite-sulfide veins, massive sulfide-rich veins, and disseminations along a zone at least 1.6 km long. Zone occurs in Triassic(?) limestone and pillow basalt of Chulitna region.

Hawley and Clark, 1974

P06-08 63°13'N 149°39'W	Golden Zone Southern Alaska	Au, Cu, Zn, As, Sb, Ag, Pb Polymetallic vein and Au-Ag breccia pipe or Cu-Au porphyry	Inferred reserves of 1.6 million tonnes grading 5.2 g/t Au, and 0.5 % Cu. Produced 49,169 g Au, 267,990 g Ag, 19 tonnes Cu

Auriferous arsenopyrite with minor chalcopyrite, sphalerite, and pyrite in quartz gangue, fills open spaces of breccia pipe in center of early Tertiary quartz diorite porphyry, and fractures in porphyry adjacent to breccia pipe. One zone about 125 m in diameter; high-grade ore occurs in breccia pipe approximately 75 m in diameter at surface. Abundant veins adjacent to porphyry. Porphyry, dated at 68 Ma; intrudes Permian to Jurassic sedimentary rocks of Chulitna area. Extensive exploration through much of the 1980's.

Hawley and Clark, 1974; Swainbank and others, 1977; Charles C. Hawley, written commun., 1985, 1990

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-09 63°17'N 149°27'W	Nim, Nimbus, Silver King Southern Alaska	Au, Ag, Cu Zn, Mo, As Polymetallic vein and Porphyry Cu(?)	Nimbus and Silver King: grab samples with up to 2% Cu, 137 g/t Ag, 13 g/t Au

Nim Deposit: Veins, veinlets, and disseminations of arsenopyrite, chalcopyrite, molybdenite, and chalcocite, with some pyrite, bornite, and pyrrhotite in disseminations and fracture fillings in breccia pipes and in dikes of early Tertiary rhyolite porphyry and quartz porphyry within a body of granite porphyry. Igneous rocks intrude Triassic(?) and Jurassic(?) clastic sedimentary rocks. Deposit occurs in area about 1 km by 2 km. Nimbus and Silver King Prospects: Lenses of massive chalcopyrite, arsenopyrite, stibnite, pyrite, and sphalerite, 1 to 2 m thick, and up to 10 m long occur in brecciated early Tertiary quartz diorite porphyry dike that occurs in strand of Upper Chulitna fault.

Hawley and Clark, 1974; Swainbank and others, 1977; Richard C. Swainbank, written commun., 1985, 1988

P06-10 63°15'N 149°14'W	Coal Creek Southern Alaska	Sn, Ag, W, Zn Sn greisen(?) and Sn vein	Estimated 5 million tonnes of 0.28% Sn and about 0.5% Cu. Grab samples with up to 1.5% Sn, 148 g/t Ag

Cassiterite occurs in sheeted vein system as disseminated grains and locally high concentrations; and in minor disseminations within and above apical dome of early Tertiary granite, which intrudes older, related granite; and in thin quartz topaz-sulfide veinlets, 1 to 3 mm wide, that postdate alteration; and in stockwork veinlets. Veins vary from hairline to 1 cm width, are nearly vertical, and reach a density of 10 veins per m in the most intensely fractured zones. Veins form stockwork along fracture(?) zone in granite across area of about 4,000 m^2. Sulfides include arsenopyrite, pyrite, pyrrhotite, and sphalerite. Granite adjacent to veinlets pervasively altered to quartz, tourmaline, topaz, sericite, and minor fluorite. Granite intrudes and contact-metamorphoses Devonian argillite, graywacke, and minor limestone of Chulitna area. Granite probably part of the McKinley plutonic sequence (K-Ar ages of 55 Ma).

Reed, 1977; Warner, 1985; Gregory Thurow, written commun., 1984

P06-11 62°54'N 149°57'W	Partin Creek Southern Alaska	Cu, Au, Ag Polymetallic vein or Cu-Ag quartz vein	Grab samples with up to 0.7% Cu, 63 g/t Au, 300 g/t Ag

Zone contains pyrite, arsenopyrite, pyrrhotite, and chalcopyrite in veinlets, disseminations, or vesicle fillings. Zone at least 3,000 m long and 1,000 m wide in Triassic(?) metamorphosed pillow basalt and strongly limonite-stained marble.

Hawley and Clark, 1974

P06-12 62°53'N 149°18'W	Treasure Creek Southern Alaska	Mo, Cu Au, Zn Porphyry Cu-Mo	No data

Disseminated molybdenite, chalcopyrite, arsenopyrite, sphalerite, fluorite, and epidote in silicified and sheared Tertiary granite stock, and in argillite and metagraywacke intruded by the granite. Local intense argillic alteration and limonite staining adjacent to fault and extending irregularly up to 100 m into granite stock. Argillite and metagraywacke part of regionally extensive Lower Cretaceous flysch unit. Granite stock part of the lower Tertiary McKinley plutonic sequence.

Richter, 1963; Csejtey and Miller, 1978

P06-13 60°02'N 147°51'W	Latouche, Beatson Prince William Sound	Cu, Ag, Zn Au, Pb Besshi massive sulfide(?)	Produced more than 84.4 million kg Cu from 4.5 million tonnes ore. Average ore grade about 1.7% Cu, 9.3 g/t Ag

Two major deposits and several smaller ones consisting of massive sulfide lenses and disseminations composed mainly of pyrite and pyrrhotite with minor chalcopyrite, cubanite, sphalerite, galena, silver, and gold. Gangue of quartz, sericite, and ankerite. Zone adjacent to major fault in graywacke and argillite of the lower Tertiary Orca Group. Deposits along a zone up to 120 m thick and 300 long along strike. Developed and produced mainly from about 1903 to 1934.

Johnson, 1915; Tysdal, 1978; Jansons and others, 1984; Crowe and others, 1992

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-14 63°09'N 147°08'W	Denali (Pass Creek) Alaska Range	Cu, Ag Besshi massive sulfide?	Massive sulfide layers with abundant Cu and up to 13 g/t Ag

Stratiform bodies of very fine grained and rhythmically layered chalcopyrite and pyrite laminations in thin-bedded, shaly, carbonaceous, and limy argillite enclosed in the Upper Triassic Nikolai Greenstone. Ore body up to 166 m long and 9 m wide, and extends at least 212 m below surface. Sulfides and host rocks metamorphosed at lower greenschist facies and locally moderately folded. Several hundred meters of underground workings. Property developed from 1964 to 1969, but never put into production. Interpreted to have formed in a submarine volcanic environment of a reducing or euxinic marine basin with abundant organic matter and sulfate reducing bacteria.

Stevens, 1971; Seraphim, 1975; Smith, 1981

P06-15 63°13'N 146°48'W	Fish Lake Eastern Alaska Range	Cr, Ni, Cu, PGE Gabbroic Ni-Co	Grab samples with >0.5% Cr and 0.3% Ni

Chromite, disseminated and in wispy layers, in serpentinized olivine cumulate, and Ni-Cu-PGE sulfide minerals occuring at base of ultramafic sill. Zone up to 15 km long along strike and up to 2 km wide. Local anomalous Cu and Ni in stream-sediment and rock samples collected nearby. Olivine cumulate interpreted as comagmatic metamorphosed basalt of the Upper Triassic Nikolai Greenstone.

Nokleberg and others, 1984; Ian M. Lange and Warren J. Nokleberg, written commun., 1985; Bundtzen and others, 1996.

P06-16 63°13'N 146°42'W	Zackly Southern Alaska	Au, Cu, Ag Cu-Au skarn	Grab samples with up to 6.6% Cu, 4.4 g/t Au, 30 g/t Ag. Estimated 1.25 million tonnes of 2.6% Cu and 5.4 g/t Au

Disseminated chalcopyrite, bornite, pyrite, and gold in zone of andradite garnet-pyroxene skarn and adjacent sulfide bodies in contiguous marble. In Upper Triassic marble along east-west-striking contact with albitized Cretaceous quartz monzodiorite. Zone about 650 m long and about 30 m wide. Marble and diorite locally intensely faulted. Higher Au grades mainly associated with supergene(?) assemblage of malachite, limonite, chalcedony, and native copper. Gold occurs only in skarn; granitic pluton and wall rocks barren of gold. General zoning from granitic pluton to skarn with (1) brown garnet with chalcopyrite, (2) green garnet with bornite and chalcopyrite, (3) clinopyroxene and wollastonite, and (4) marble with magnetite and bornite.

Rose, 1965b; Ian M. Lange and Warren J. Nokleberg, written commun., 1984; Nokleberg and others, 1984; Rainier Newberry, written commun., 1985; Clint R. Nauman, written commun., 1985; Ford, 1987

P06-17 63°17'N 146°33'W	Kathleen-Margaret Wrangell Mountains	Cu, Ag, Au Cu-Ag quartz vein	Grab samples with up to 13% Cu, 3.2 g/t Au, 300 g/t Ag. About 1.8 tonnes ore produced

Quartz veins up to 140 m long and 3 m wide with disseminated to massive chalcopyrite, bornite, and malachite cut Upper Triassic Nikolai Greenstone. Veins strike east-west are intruded along shear zones. Some underground exploration but long dormant.

MacKevett, 1965; Nokleberg and others, 1984

P06-18 63°20'N 146°02'W	Rainy Creek District Alaska Range-Wrangell Mountains	Cu, Ag, Au Zn Cu-Ag skarn	Grab samples with up to 5.6% Cu, 300 g/t Ag, 1.2 g/t Au, 0.07% Zn

Scattered garnet-pyroxene skarn bodies that contain disseminated to small masses of chalcopyrite, and bornite, with minor sphalerite, galena, magnetite, secondary Cu-minerals, and sparse gold. Deposits occur in faulted lenses of marble of the Pennsylvanian and Permian Slana Spur Formation adjacent to late Paleozoic(?) metagabbro, metadiabase, and hypabyssal meta-andesite intrusive rocks. Local disseminated sulfides in meta-andesite. Zone of skarns up to about 10 km long and up to 5 km wide. Sulfide-bearing bodies and adjacent wall rocks locally intensely faulted.

Rose, 1966; Lange and others, 1981; Nokleberg and others, 1984; Ian M. Lange and Warren J. Nokleberg, written commun., 1984

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-19 63°20'N 145°41'W	Rainbow Mountain Alaska Range-Wrangell Mountains	Cu, Ag Porphyry Cu	Grab samples with up to 10% Cu, 44 g/t Ag, trace Au

Zone with scattered occurrences of disseminated to small masses of chalcopyrite and pyrite, and minor sphalerite and galena in Permian meta-andesite and meta-dacite hypabyssal porphyries. Zone up to 6 km long and up to 1 km wide. Locally disseminated sulfides in metavolcanic and metasedimentary rocks near porphyries and meta-andesites.

Lange and others, 1981; Nokleberg and others, 1984; Ian M. Lange and Warren J. Nokleberg, written commun., 1985

P06-20 63°14'N 144°10'W	Delta District Alaska Range and Yukon-Tanana Upland	Pb, Zn, Cu, Ag, Au Kuroko massive sulfide	Largest deposit contains 18 million tonnes of 0.3 to 0.7% Cu, 1 to 3% Pb, 3 to 6% Zn, 34 to 100 g/t Ag, 1 to 3.4 g/t Au

Large massive sulfide district covers about 1,000 sq km, with about 26 stratiform, transposed, and fewer replacement deposits occurring along four regional trends. Consist of varying amounts of pyrite, chalcopyrite, galena, sphalerite, and lesser malachite and bornite. Gangue mainly quartz, carbonate, and white mica. Hydrothermal alteration marked by chlorite, quartz, sericite, pyrite, and lead-silver-gold sulfides. Massive sulfides and adjacent layers with disseminated sulfides occur in zones typically 500 m long, 200 m wide, and 15 m thick. Hosted in metamorphosed Devonian spilite and keratophyre suite derived from flows, tuffs, and breccia, and metamorphosed shallow- and deep-marine sedimentary rocks; now mainly quartz schist, quartz-chlorite-feldspar schist, calc-schist, and marble of the Yukon-Tanana terrane. Numerous tholeiitic greenstone sills spatially associated with the massive sulfide bodies, and possibly genetically related to the metavolcanic suite.

Nauman and others, 1980; Lange and Nokleberg, 1984; Clint R. Nauman and Steven R. Newkirk, written commun., 1984; Lange and others, 1993.

P06-21 63°09'N 144°48'W	Slate Creek Alaska Range-Wrangell Mountains	Cu, Ag, Au Zn Porphyry Cu(?)	Grab samples with up to 2% Cu, 70 g/t Ag, 2 g/t Au

Zone with scattered occurrences of disseminated to small masses of chalcopyrite and pyrite, with minor sphalerite and galena in Permian(?) meta-andesite to metadacite hypabyssal porphyries. Zone about 2 km wide and up to 9 km long along strike. Disseminated sulfides locally in adjacent metavolcanic and metasedimentary rocks of the Pennsylvanian and Permian Slana Spur Formation.

Lange and others, 1981; Ian M. Lange and Warren J. Nokleberg, written commun., 1984; Nokleberg and others, 1984

P06-22 63°05'N 144°47'W	Chistochina District Alaska Range-Wrangell Mountains	Cu, Pb, Ag, Au Porphyry Cu and polymetallic vein	Grab samples with up to 20% Pb, 1.4% Cu, 21 g/t Ag, 1.4 g/t Au

Several small areas with galena, pyrite, chalcopyrite, tetrahedrite, and gold in quartz veins, small masses, and disseminations in margins of the Pennsylvanian and Permian Ahtell quartz diorite pluton and in adjacent volcanic and sedimentary rocks of the Pennsylvanian and Permian Slana Spur Formation. Quartz veins up to 10 m wide, locally contain massive barite, calcite, and cerussite over an area about 5 km long and 3 km wide. Local, small Cu-Au and Pb-Zn skarns.

Richter, 1966; Rainier J. Newberry, written commun., 1985

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-23 63°11'N 147°16'W	Lucky Hill, Timberline Creek Maclaren	Au, Ag Au quartz vein	348,000 tonnes, averaging 7.1 g/t Au

Summary and References

Free gold and minor pyrite, pyrrhotite, arsenopyrite, galena, and sphalerite in sheeted quartz veins striking east-northeast and dipping steeply to the northwest. Veins occur in semischist of the Maclaren Glacier metamorphic belt. Veins also cut granodiorite at Timberline Creek. Distinctive, yellowish ankerite-carbonate assemblage occurs in veins. At Lucky Hill and Timberline Creek, Ar-Ar isotopic ages on primary micas from pluton yield emplacement age of 90-100 Ma. The age of mineralization (vein formation) is 57-63 Ma or the same age as that determined for the biotite blocking temperature in the Maclaren Glacier metamorphic belt. Because of these relations, gold mineralization is interpreted as related to regional metamorphism. Fluid inclusions are low salinity, high CO_2 types with homogenization temperatures of about 270°C.

Smith, 1981; Adams and others, 1992

P06-24 61°45'N 149°30'W	Willow Creek District (Gold Cord, Independence, Talkeetna Mountains	Au W, As, Zn, Pb, Te Au quartz vein	Average grade of 17 to 69 g/t Au. Produced about 18.4 million g Au from 1909 to 1950.

Quartz veins with a few percent or less pyrite, chalcopyrite, magnetite, and gold; with minor arsenopyrite, sphalerite, tetrahedrite, gold tellurides, and galena. Veins average 0.3 to 1 m thick, but some up to 2 m thick. Veins occupy east-northeast and north-south-striking shear zones up to 7 m wide. Considerable alteration of wall rocks to sericite, pyrite, carbonate, and chlorite in parallel bands. Locally abundant clay-rich fault gouge along shear zones. Zone of veins in and along southern margin of Jurassic quartz diorite and younger Cretaceous and early Tertiary granitic rocks of the Talkeetna Mountains batholith, and in mica schist at the Thorpe mine. Veins interpreted as coeval with intrusion of early Tertiary adamellite pluton. District consists of several mines and many prospects, most in an area about 12.8 km long and 6.2 km wide along southern portion of batholith. Several thousand meters of underground workings. Nearly continuous mining and development from 1909 through 1942; sporadic activity from 1951 through present.

Ray, 1954; Madden-McGuire and others, 1989

P06-25 61°32'N 145°09'W	Bernard Mountain, Dust Mountain Kodiak Island and Border Ranges	Cr, PGE Podiform Cr	Four large low-grade deposits with 330,000 tonnes Cr_2O_3

Disseminations and sparse layers and lenses of chromite up to a few tens of meters long and 15 m wide in dunite tectonite. Largest deposit about 3.5 km long and 2.0 km wide, contains about 300,000 tonnes of material with 5% chromite. Sample of high-Fe chromian spinel from Dust Mountain contains up to 21 g/t PGE. Hosted in layered dunite tectonite which is part of the Early Jurassic or older, informally named Border Ranges ultramafic and mafic complex of Burns (1985); faulted at base. Local abundant serpentinite. Structural sequence from south to north composed of dunite, harzburgite, wehrlite, garnet gabbro, norite, and hornblende norite. Sporadic exploration and trenching from about 1940 to present.

Foley and others, 1984, 1985, 1992; Coleman and Burns, 1985; Burns, 1985; Newberry, 1986

P06-26 61°19'N 144°13'W	Spirit Mountain Kodiak Island and Border Ranges	Ni, Cu, Co, Ag Gabbroic Ni-Cu	At least 11,000 tonnes ranging up to 6.2 % Ni and 3.4 % Cu and 0.04 % Co. (Average 0.88 % Ni and 0.9 % Cu)

Disseminated and locally massive pyrrhotite, pyrite, chalcopyrite, pentlandite, and ullmannite (a sulphantimonide of nickel), bravoite, and minor to trace galena and sphalerite in gabbro, peridotite, and hornblendite sills and dikes that cut Mississippian Strelna Formation with an east-west trend. Ultramafic and mafic rocks may be part of the Early Jurassic or older, informally named Border Ranges ultramafic and mafic complex of Burns (1985). The sills and dikes are believed to intrude along a major thrust fault that juxtaposes a foliated quartz diorite pluton and the upper Paleozoic rocks. Deposit(s) occur as a series of lenses 1-3 m thick that extend along strike for about 2 km. Explored with trenches, pits, and two short tunnels.

Kingston and Miller, 1945; Herreid, 1970

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-27 61°12'N 146°44'W	Gold King Chugach Mountains	Au Pb, Cu, Zn, Sb Au quartz vein	Produced about 62,000 g Au. Chip samples with up to 3.4 g/t Au and 1.3 g/t Ag

Two or more quartz fissure veins up to 1.5 m thick with gold, pyrite, galena, sphalerite, chalcopyrite, and stibnite, mainly in metagraywacke of the Upper Cretaceous Valdez Group. Sulfides compose about 3% of ore. Mineralized vein cuts small granite pluton. Graywacke locally shattered and sheared near veins. About 600 m of underground workings. Production principally between 1911 to 1924.

Johnson, 1915; Jansons and others, 1984

P06-28 61°07'N 146°33'W	Cliff (Port Valdez) Chugach Mountains	Au Cu, Ag, Pb, Zn, Sb Au quartz vein	Average grade of 34 to 69 g/t Au. Produced about 1,610,000 g Au from about 25,000 tonnes ore

Quartz veins up to 3 m thick and 515 m long with gold, pyrite, galena, sphalerite, arsenopyrite, and stibnite in metagraywacke and minor phyllite of the Upper Cretaceous Valdez Group. Veins in complicated system of intersecting faults. Sulfides compose about 3 to 5% percent of ore. A few thousand meters of underground workings. Production mainly from 1906 to 1940.

Johnson, 1915; Pickthorn, 1982(?); Jansons and others, 1984

P06-29 61°12'N 146°06'W	Ramsay-Rutherford Chugach Mountains	Au As, Cu, Zn, Pb Au quartz vein	Produced about 172,000 g Au. Grab samples with up to 28g/t Au

Two main quartz fissure veins up to 2 m thick and 136 m long with sparse gold, silver, pyrrhotite, pyrite, chalcopyrite, sphalerite, galena, and arsenopyrite(?) in metagraywacke of the Upper Cretaceous Valdez Group. Gangue of quartz, carbonates, and crushed country rock. More than 450 m of underground workings. Mined from about 1914 to 1935.

Johnson, 1915; Jansons and others, 1984

P06-30 61°01'N 146°16'W	Midas Prince William Sound	Cu, Ag, Au, Zn Besshi massive sulfide(?)	Average grade of about 3.2% Cu, 13.7 g/t Ag, 2.1 g/t Au. Produced 1.54 million kg Cu, 471,000 g Ag, 79,000 g Au from 44,800 tonnes of ores. Estimated 56,200 tonnes grading 1.6% Cu ore remain

Disseminated to massive stratiform chalcopyrite, pyrite, pyrrhotite, sphalerite, and minor galena in ore body up to 7 m thick and 300 m long. Ore bodies occur in phyllite and metagraywacke of the Upper Cretaceous Valdez Group. Sulfide layering parallels bedding and is folded with the host sedimentary rocks. Weak to unmineralized quartz stockwork in footwall may be feeder system for main ore body. Extensive underground workings with production between 1911 and 1919. Estimated 44,800 tonnes ore mined. Earlier workers interpreted deposit as epigenetic replacement in shear zones.

Johnson, 1915; Moffit and Fellows, 1950; Rose, 1965b; Winkler and others, 1981; Nelson and Koski, 1987; Jansons and others, 1984; Steven W. Nelson, written commun., 1986; Crowe and others, 1992

P06-31 60°54'N 146°42'W	Ellamar Prince William Sound	Cu, Au, Ag Zn Besshi massive sulfide	Produced about 7.2 million kg Cu, 1,457,000 g Au, and 5.96 million g Ag from 274,000 tonnes ore

Pyrite, pyrrhotite, chalcopyrite, cubanite, and sphalerite in disseminations and massive sulfide lenses up to 70 m thick and 150 m long in folded and sheared argillite and graywacke of the lower Tertiary Orca Group. Local diabase dikes. Explored and mined from about 1897 to 1920. A few thousand meters of workings.

Capps and Johnson, 1915; Jansons and others, 1984; Crowe and others, 1992

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-32 60°51'N 146°33'W	Threeman, Standard Copper Prince William Sound	Cu, Au, Ag Zn Cyprus massive sulfide	About 14,500 kg Cu and byproduct Au and Ag produced at Standard Copper; 0.5 million kg Cu, 3,141 g Au, and 165,000 g Ag at Threeman

Two deposits of chalcopyrite, pyrrhotite, sphalerite, cubanite, and galena in lenticular masses and disseminations. Lenses up to about 2 m wide and 120 m long. Deposits occur in locally sheared and altered argillite, graywacke, tuff, and pillow basalt of the lower Tertiary Orca Group. Explored and mined from about 1904 to about 1918. A few thousand meters of workings.

Capps and Johnson, 1915; Jansons and others, 1984; Crowe and others, 1992

P06-33 60°46'N 146°25'W	Fidalgo-Alaska, Schlosser Prince William Sound	Cu, Zn Besshi massive sulfide(?)	Produced about 1.89 million kg Cu from 19,440 tonnes ore. Estimated 23,000 tonnes of 3.2% Cu remain

Chalcopyrite and pyrite, with rare sphalerite and pyrrhotite occur in broad shear zones up to 90 m long. Quartz and calcite gangue. Deposits occur in intensely folded and sheared graywacke, limestone, and argillite of the lower Tertiary Orca Group. Developed and mined from 1913 to about 1920. About 750 m of underground workings.

Capps and Johnson, 1915; Jansons and others, 1984; Crowe and others, 1992

P06-34 61°02'N 149°06'W	Monarch, Jewel Chugach Mountains	Au Pb, Cu, Zn, As, Mo Au quartz vein	Produced about 154,000 g Au. Chip samples range from 10.6 to 36.7 g/t Au with about 10.6 g/t Ag

Two or more quartz veins up to 0.3 m thick with calcite, and sparse galena, chalcopyrite, sphalerite, arsenopyrite, molybdenite, gold, and silver in metagraywacke and phyllite of the Upper Cretaceous Valdez Group. Few Tertiary felsic dikes and granodiorite. Over 380 m of underground workings.

Johnson, 1915; Jansons and others, 1984

P06-35 60°57'N 148°21'W	Mineral King (Herman and Eaton) Chugach Mountains	Au Zn, Pb, Cu, As Au quartz vein	Produced about 87,000 g Au. Grab samples with up to 5.1 g/t Au and 4.5 g/t Ag. Estimated 450 tonnes ore

Quartz veins up to 2 m wide form lenses up to 22 m long with calcite, sphalerite, pyrite, galena, chalcopyrite, gold, pyrrhotite, and arsenopyrite in metagraywacke and phyllite of the Upper Cretaceous Valdez Group and in Tertiary granite. About 450 m of underground workings.

Tysdal, 1978; Jansons and others, 1984

P06-36 60°58'N 148°13'W	Granite Chugach Mountains	Au As, Cu, Pb, Sb, Zn Au quartz vein	Produced about 776,000 g Au. Estimated 1,700 tonnes ore

Fissure up to 4 m wide with brecciated phyllite and metagraywacke cemented by quartz with gold, pyrite, arsenopyrite, chalcopyrite, galena, stibnite, and sphalerite in the Upper Cretaceous Valdez Group and in Tertiary granite. Extensive development from about 1914 to about 1940.

Tysdal, 1978; Jansons and others, 1984

P06-37 60°46'N 149°33'W	Lucky Strike (Palmer Creek) Chugach Mountains	Au Cu, Pb, Ag Au quartz vein	Grab sample with 7 g/t Ag and 0.15% Pb. Produced about 172,450 g Au. Estimated 1,800 tonnes ore

Quartz vein up to 1.7 m thick with sparse gold, pyrite, chalcopyrite, sphalerite, and galena in brecciated and fractured phyllite of the Upper Cretaceous Valdez Group. Fractures normal to cleavage. Extensive development; production mainly between 1916 and 1940.

Tysdal, 1978; Jansons and others, 1984

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P06-38 60°37'N 149°34'W	Alaska Oracle, Gilpatrick Chugach Mountains	Au Au quartz vein	Produced about 106,000 g Au. Estimated 1,800 tonnes ore.
Quartz veins up to 2 m thick with gold, arsenopyrite, galena, and sphalerite, and some chalcopyrite, molybdenite, and pyrrhotite. Veins in fault zones mainly in phyllite of the Upper Cretaceous Valdez Group. Wall rocks locally altered near veins, with highest grade ore in areas of most alteration. Over 200 m of underground workings. Most production from about 1933 to 1940. Tuck, 1933; Tysdal, 1978; Jansons and others, 1984			
P06-39 60°27'N 149°18'W	Crown-Point, Kenai-Alaska Chugach Mountains	Au As, Pb, Zn Au quartz vein	Produced about 97,200 g Au. Estimated 13,600 tonnes ore
Shear zone up to 900 m long and 12 cm wide in phyllite of the Upper Cretaceous Valdez Group is filled with brecciated phyllite cemented by vuggy quartz that contains gold, arsenopyrite, galena, sphalerite, and calcite. Local quartz lenses and stringers up to 0.75 m wide. Extensive development mainly from about 1909 to 1940; over 500 m of underground workings. Martin and others, 1915; Tysdal, 1978; Jansons and others, 1984			
P06-40 60°21'N 147°39'W	Copper Bullion, Rua Cove Prince William Sound	Cu Zn Besshi massive sulfide	Estimated 1.0 million tonnes of 1.25% Cu
Lens-shaped body of pyrrhotite with minor chalcopyrite and sphalerite in sheared pillow basalt of the lower Tertiary Orca Group. Lens about 200 m long. No production. Johnson, 1915, 1918; Stafansson and Moxham, 1946; Tysdal, 1978; Koski and others, 1985; Crowe and others, 1992			
P06-41 60°20'N 147°42'W	Knight Island, Pandora Prince William Sound	Cu Zn Cyprus massive sulfide	Produced up to a few thousand tonnes ore
Two major deposits and several smaller deposits with pyrite, pyrrhotite, chalcopyrite, cubanite, sphalerite, and quartz in massive sulfide lenses and disseminations. Lenses up to 9 m thick; average 1.5 m thick. Lenses mainly at sheared contacts with host rocks. Deposits occur in pillow basalt of the lower Tertiary Orca Group. A few hundred meters of underground workings; minor production. Moffit and Fellows, 1950; Tysdal, 1978; Jansons and others, 1984; Crowe and others, 1992			
P07-01 63°53'N 143°28'W	Mosquito East-Central Alaska	Cu, Mo Porphyry Cu-Mo	No data
Disseminated chalcopyrite, molybdenite, and pyrite in hydrothermally altered Late Cretaceous to early Tertiary quartz monzonite and quartz monzonite porphyry. Granitic rocks intrude mid-Paleozoic or older schist of the Yukon-Tanana terrane. Singer and others, 1976			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P07-02 63°39'N 141°19'W	Taurus East-Central Alaska	Cu, Mo Porphyry Cu-Mo	Estimated 126 million tonnes grading 0.30 % Cu, 0.03% Mo, 0.34 g/t Au

At least three areas of mineralization and locally intense potassic, propylitic, and sericitic alteration occur along a zone of hypabyssal plutons about 13 km long and 1.6 km wide. Plutons consist of early Tertiary granite porphyry, granodiorite, and quartz latite porphyry that intrudes middle Paleozoic or older quartz-sericite schist and gneiss of Yukon-Tanana terrane. Numerous faults and shears. Ore consists of chalcopyrite, molybdenite, and pyrite in disseminations and veinlets of quartz-orthoclase-sericite, quartz-magnetite-anhydrite, quartz-sericite-pyrite-clay-fluorite, quartz-orthoclase-biotite, and of solid chalcopyrite. Magnetite-rich cores of the potassic altered, granite porphyries contain sparse sulfides. Higher concentrations of Cu and Mo sulfides occur with periphery that contains phyllic alteration. Sequence of alteration, from oldest to youngest: propylitic, potassic, phyllic, and argillic. Potassic alteration in core of plutons, propylitic and sericite alteration in periphery and adjacent wall rocks. Local tourmaline, fluorite, and replacement of chalcopyrite by chalcocite.

Edward R. Chipp, written commun., 1984; Bundtzen and others, 1992b

P07-03 63°38'N 141°29'W	Bluff East-Central Alaska	Cu, Mo Porphyry Cu-Mo	No data

Disseminated pyrite, chalcopyrite, molybdenite, and magnetite in hypabyssal Cretaceous or early Tertiary porphyritic granite, granodiorite, and quartz porphyry. Intense hydrothermal alteration. Numerous faults and dikes. Granitic rocks intrude middle Paleozoic or older schist of the Yukon-Tanana terrane.

Singer and others, 1976; Eberlein and others, 1977

P07-04 63°22'N 142°30'W	Asarco East-Central Alaska	Cu, Mo Porphyry Cu-Mo	No data

Disseminated molybdenite and Cu-sulfides in silicified and leached, Tertiary, hypabyssal, quartz porphyry pluton that intrudes middle Paleozoic or older Yukon-Tanana terrane.

Singer and others, 1976; Helen L. Foster, written commun., 1977, in Eberlein and others, 1977

P07-05 62°44'N 138°49'W	Casino (Patton Hill) East-Central Alaska	Cu, Mo W, Au Porphyry Cu-Mo	Large. Reserves of 584 million tonnes (hypogene and supergene) grading 0.26% Cu, 0.025% MoS_2, 0.31 g/t Au.

Hypogene part of deposit consists of chalcopyrite and molybdenite that are associated with phyllitic alteration (quartz+sericite+sulfide) in fine breccia, porphyritic dacite, granite and tuffaceous rocks. Igneous rocks are associated with the Late Cretaceous Mount Nansen Igneous suite (with a K-Ar isotopic age 71.3 Ma ± 2.2 Ma) that is surrounded by older unmineralized quartz monzonite and granodiorite. A supergene enrichment zone with 95 million tonnes grading 0.43% Cu, 0.031% Mo, averages 80 meters thick and contains malachite, chalcocite, covellite, native Cu, pyrite and molybdenite. Consistent gold grades in the supergene zone over large areas range from 0.3 to 0.5 g/t. An additional 31 million tonnes of oxide gold ore grading 0.62 g/t occurs in a leached cap. Deposit age interpreted as Late Cretaceous.

D. Eaton and S. Main, Archer, Cathro, and Associates, written commun., 1986; EMR Canada, 1989; Mining Review, 1992; Sinclair, 1986; Northern Miner, December 6,1993.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P07-06 62°23'N 143°00'W	Nabesna, Rambler Eastern-Southern Alaska	Au Cu, Ag, Pb, Zn, Fe Fe-Au skarn	Nabesna Mine produced about 1.66 million g Au, minor Ag and Cu. Estimated 18,000 tonnes grading 34.3 g/t Au in Rambler mine.

Nabesna Mine: massive oxide-sulfide bodies, quartz-pyrite veins, and pyrite veins, all with disseminated gold in Upper Triassic Chitistone or Nizina Limestone near contact with Cretaceous monzodiorite pluton. Massive oxide-sulfide bodies chiefly pyrite and magnetite with minor chalcopyrite, galena, sphalerite, arsenopyrite, stibnite, and gold. Pyrite veins formed by replacement of limestone along pre-existing fractures and contain disseminated to small masses of chalcopyrite, galena, sphalerite, magnetite, pyrrhotite, arsenopyrite, stibnite, and gold. Large body of massive auriferous pyrrhotite and pyrite at Rambler Mine. Monzodiorite pluton has K-Ar ages of 109 and 114 Ma. Principal mining at Nabesna from about 1930 to 1941. Several hundred meters of workings. Several episodes of exploration since.

Wayland, 1943; Richter and others, 1975; Donald H. Richter, written commun., 1985; Rainer Newberry and T.K. Bundtzen, written commun., 1985

P07-07 62°12'N 142°45'W	Orange Hill, Bond Creek Eastern-Southern Alaska	Cu, Mo, Au Porphyry Cu-Mo and Cu-Au skarn	Estimated 320 million tonnes grading 0.35% Cu and 0.02% Mo at Orange Hill. 500 million tonnes grading 0.30% Cu and 0.02% Mo at Bond Creek.

Two similar deposits with pyrite, chalcopyrite, and minor molybdenite in quartz veinlets in the Cretaceous Nabesna pluton, a complex intrusion of granodiorite and quartz diorite intruded by granite porphyry. Abundant biotite-quartz, quartz-sericite, and chlorite-sericite-epidote alteration; late anhydrite veins. Altered areas about 1,000 by 3,000 m at Orange Hill, and 2,000 by 3,000 m at Bond Creek. Associated skarns with pyrite, chalcopyrite, bornite, and magnetite at Orange Hill, and sphalerite, pyrite, pyrrhotite, and chalcopyrite in adjacent areas. Pluton intrudes upper Paleozoic metavolcanic rocks and marble, and Upper Triassic limestone and Nikolai Greenstone.

Van Alstine and Black, 1946; Richter and others, 1975.

P07-08 62°07'N 142°50'W	Nabesna Glacier and adjacent areas. Southern Alaska?	Cu, Zn, Au Polymetallic vein(?)	No data.

Three contiguous areas with: (1) quartz veins and veinlets that contain pyrite, with minor chalcopyrite and sphalerite; (2) a zone of disseminated malachite and azurite; (3) a zone of intense alteration with breccia cemented by quartz, pyrite, chalcopyrite, and galena. Deposits occur in late Paleozoic metavolcanic porphyry and metabasalt flows of the Tetelna Volcanics; may be related to nearby Cretaceous and Tertiary granitic plutons and dikes.

Richter, 1975

P07-09 62°05'N 141°13'W	Baultoff, Horsfeld, Carl Creek Eastern-Southern Alaska	Cu Mo Porphyry Cu	Estimated 240 million tonnes grading 0.2% Cu and <0.01% Mo; trace Au

Three separate areas with pyrite and chalcopyrite in veinlets and disseminated in altered Cretaceous granitic plutons composed of quartz diorite, quartz diorite porphyry, or granite porphyry. Altered areas up to 1,000 by 2,000 m with chlorite, sericite, albite, and pyrite. Local actinolite veins and disseminations. Host rocks part of the Cretaceous Klein Creek batholith and associated granitic rocks which intrude Upper Jurassic and Lower Cretaceous flysch of Gravina-Nutzotin belt.

Richter and others, 1975

P07-10 61°39'N 143°43'W	Nugget Creek Wrangell Mountains	Cu, Ag Cu-Ag quartz vein	Grab sample with >200 g/t Ag, and >2% Cu. Produced 145 tonnes ore and concentrate

Quartz vein more than 1 m thick with bornite, chalcopyrite, and pyrite. Vein occurs along fault in Upper Triassic Nikolai Greenstone. Slablike copper nugget weighing several tonnes found as float in Nugget Creek. Development and production from 1916 to 1919. More than 1,200 m underground workings. Grade decreases at depth.

MacKevett, 1976

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P07-11 61°34'N 143°43'W	London and Cape Eastern-Southern Alaska	Cu, Mo, Ag Porphyry Cu-Mo	Grab samples with up to 10% Cu, 0.007% Mo, 1.5 g/t Ag. Average grade of about 0.1% Cu
Pyrite and chalcopyrite in veinlets and disseminations in locally altered Jurassic(?) granodiorite and quartz diorite. Granitic rocks intrude Lower Cretaceous sedimentary rocks. Short adit. Moffitt and Mertie, 1923; MacKevett, 1976			
P07-12 61°33'N 143°47'W	Midas (Berg Creek) Eastern-Southern Alaska	Au, Cu, Ag Cu-Au skarn	Grab samples with up to 8 g/t Au, 10 g/t Ag, and 20% Cu
Disseminated to small masses of magnetite, pyrite, and chalcopyrite in quartz veins and skarns in metamorphosed Triassic Nizina Limestone adjacent to Jurassic granodiorite to quartz monzodiorite pluton. Skarn composed of magnetite and epidote with local pyrite, chalcopyrite, and gold. Two short adits. MacKevett, 1976			
P07-13 61°31'N 142°50'W	Kennecott District Wrangell Mountains	Cu, Ag Kennecott Cu	Produced about 544 million kg Cu and 280 million g Ag from 4.3 million tonnes ore
Mainly chalcocite and covellite, with minor enargite, bornite, chalcopyrite, luzonite, and pyrite. Tennantite, sphalerite, and galena extremely rare. Local surface oxidation of sulfides to malachite and azurite. Sulfides occur mainly as large, irregular, massive, wedge-shaped bodies, mainly in dolomitic parts of the Upper Triassic Chitistone or Nizina Limestone; generally less than 100 m above the Middle and(or) Upper Triassic Nikolai Greenstone. Largest ore body (Jumbo) consists of an almost pure chalcocite and covellite mass about 110 m high, up to 18.5 m wide, and that extends 460 m along plunge. One of the most productive group of mines in Alaska from 1913 until 1938 when the ore was exhausted. More than 96 km of underground workings. Major mines in district are Jumbo, Bonanza, Erie, Mother Lode, and Green Butte. Deposits interpreted by Armstrong and MacKevett (1982) as having formed by mobilization of Cu from the underlying Nikolai Greenstone and deposited during regional metamorphism in fossil karsts of a dolomitic sabkha interface in overlying limestone. Age of deposition interpreted as Cretaceous(?). Bateman and McLaughlin, 1920; MacKevett, 1976; Armstrong and MacKevett, 1982; Edward M. MacKevett, Jr., written commun., 1986			
P07-14 61°28'N 142°41'W	Nikolai Wrangell Mountains	Cu, Ag Cu-Ag quartz vein	Grab sample with 1% Cu
Two quartz veins, each less than 1 m thick, with bornite, chalcopyrite, bornite, pyrrhotite, and secondary copper, and iron minerals. Quartz-calcite gangue. Veins in shear zone near top of the Middle and (or) Upper Triassic Nikolai Greenstone. Deposit known to natives in late 1800's. More than 100 m of underground workings. Developed in 1899 but little work since. Moffit and Capps, 1911; Miller, 1946; MacKevett and Smith, 1968			
P07-15 61°24'N 142°30'W	Westover Wrangell Mountains	Cu, Ag Kennecott Cu	Channel samples with abundant Cu, 50 g/t Ag, 0.2% As. Grab sample with >2% Cu, 50 g/t Ag, 0.2% As
Wedge-shaped pods and veins of disseminated to massive bornite-rich ore, with minor chalcocite, malachite, and chalcopyrite; in lower part of the Upper Triassic Chitistone Limestone. Largest pod 10 m long and 3 m wide. Limestone locally silicified near ore. More than 400 m of underground workings. Development and minor production from 1911 to 1920. Similar to Kennecott deposit. Moffit and Capps, 1911; Moffit, 1918; Miller, 1946; MacKevett and Smith, 1968; MacKevett, 1976			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P07-16 61°27'N 142°23'W	Nelson (Glacier Creek) Wrangell Mountains	Cu, Ag Kennecott Cu	Abundant Cu; grab samples with >2% Cu, 50 g/t Ag, 0.3% As

Stringers and discontinuous masses of disseminated to massive chalcocite and covellite with minor enargite, bornite, malachite, chalcopyrite, native copper, and pyrite in basal parts of fault block of the Upper Triassic Chitistone Limestone. Local faulting and shearing. Minor production from 1929 to 1930. Several pits, five short adits, and a few hundred meters of underground workings. Similar to Kennecott deposit.

Miller, 1946; Sainsbury, 1951; MacKevett and Smith, 1968; MacKevett, 1976; Still and others, 1991

P07-17 61°25'N 142°15'W	Erickson Wrangell Mountains	Cu Basaltic Cu	Grab samples with >2% Cu, 70 g/t Ag

Massive to disseminated native copper, tenorite, cuprite, and minor amounts of other Cu minerals in irregular masses, thin veins, and stringers in rubbly upper parts of flows, and to lesser extent, in amygdules and quartz-epidote veins in the Middle and (or) Upper Triassic Nikolai Greenstone. Most of copper fine-grained; copper masses to 27 kg. Minor production in 1917. About 100 m of underground workings.

Miller, 1946; MacKevett and Smith, 1968; MacKevett, 1976

P07-18 61°28'N 139°31'W	Wellgreen Eastern Alaska Range	Ni, Cu, PGE Gabbroic Ni-Cu	Medium. Reserves of 50 million tonnes grading 0.36% Ni, 0.35% Cu, 0.51g/t Pt, 0.34 g/t Pd.

Consists of massive pyrrhotite, pentlandite, chalcopyrite and magnetite lenses that are scattered along the footwall contact of a steeply dipping fault zone in gabbroic rocks of the Late Triassic Quill Creek Complex. Deposit occurs within a 130 km belt of Ni-Cu-Co-PGE occurrences that are hosted in the Pennsylvanian Skolai Assemblage that includes the Canalask deposit at White River. Cu-Ni sulfides are disseminated within mafic dikes and peridotite. Production in 1972-73. Deposit age interpreted as Late Triassic.

Campbell, 1976; Hulbert and others, 1988; EMR Canada, 1989; Mining Review, 1991.

P07-19 60°59'N 138°39'W	Bullion Creek Eastern Alaska Range	Gypsum Strataform gypsum	Medium (estimate).

Consists of thick gypsum beds that occur in limestone of the Upper Triassic Nizina Formation for a length of 5 km. Small veins of chalcopyrite occur in vicinity. Deposit age interpreted as Upper Triassic.

Dawson and others, 1991; Gordey and others, 1991.

P08-01 63°55'N 135°15'W	Keno Hill (Galena Hill) Tombstone	Ag, Pb, Zn, Cd Ag polymetallic vein	Medium. Production of 4.87 million tonnes grading 1412 g/t Ag , 6.8% Pb, 4.6% Zn, 0.02 g/t Au.

Consists of argentiferous galena, freibergite, and pyrargyrite with minor polybasite, stephanite, argentite and native silver that occur as fault veins, breccias and sheeted zones. Deposit hosted predominantly within the Keno Hill Quartzite of the Early Mississippian Upper Earn Group that forms part of a Devonian- Mississippian clastic wedge. Two stages of veining occur: an earlier stage of quartz-pyrite-arsenopyrite-sulphosalts and trace gold that formed prior to movement on fault veins; and a post-fault set of siderite-galena-sphalerite-pyrite-friebergite-pyrargyrite. K-Ar isotoic age of 90 Ma age interpreted as age of deposit and may be related to granitoid intrusions of similar age north and south of Keno Hill. Between 1921 and 1988 production of 6769 t of Ag, half of which came from the Elsa, Keno No. 9, Lucky Queen, Silver King, Sadie-Ladue and Husky Mines. More than 65 ore deposits and prospects occur in the area. Deposit age interpreted as mid-Cretaceous.

Watson, 1986; EMR Canada, 1989; Lynch, 1989; Murphy and Roots, 1992; Yukon Minfile, 1992.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P08-02 64°01'N 134°28'W	Marg Dempster	Zn, Pb, Cu, Ag, Au Kuroko Zn-Pb-Cu massive sulfide	Medium. Estimated 2.097 million tonnes grading 5.0% Zn , 2.7% Pb, 1.8%Cu, 65g/t Ag, 1.2 g/t Au.

Summary and References

Consists of pyrite, sphalerite, chalcopyrite and galena with minor arsenopyrite and tetrahedrite that occur in a quartz and barite gangue. Deposit hosted in altered and deformed metavolcanic and metasedimentary rocks of Devonian-Mississippian age. Host rocks are tectonically interleaved with, and overlain by the Keno Hill quartzite of the Upper Earn Group, part of a Devonian and Mississippian clastic wedge. Deposit consists of four stacked massive sulfide lenses that occur at the contact of quartz-sericite-chlorite phyllite and graphitic phyllite. Deposit is banded and zoned. Deposit age interpreted as Carboniferous.

EMR Canada, 1989; Eaton, written commun., Archer, Cathro, and Associates, 1989; Yukon Minfile, 1991.

P08-03 64°10'N 133°22'W	Craig (Tara, Nadaleen Mtn) Tombstone	Pb, Zn, Ag, Au Ag polymetallic vein	Medium. Reserves of 6.1 million tonnes grading 13.3% Zn, 8.2% Pb, 106 g/t Ag.

Consists of galena and sphalerite with accessory pyrite and tetrahedrite, and rare chalcopyrite, realgar and orpiment. Deposit hosted in silicified dolomite breccia which occurs within brown-weathering and green recessive weathering Carboniferous(?) shales. Five occurences are known over a distance of 6.5 km. Ag concentrations interpreted as secondary mineralization. Reserves range up to 0.69 g/t Au. Deposit age interpreted as Cretaceous(?).

Yukon Minfile, 1990; Mining Review, 1992.

P08-04 62°36'N 137°15'W	Minto Copper (Def) Klotassin	Cu Au, Ag Porphyry Cu-Au	Medium. Reserves of 6.55 million tonnes grading 1.87% Cu, 0.51 g/t Au.

Consists of disseminated chalcopyrite, bornite, magnetite and pyrite with minor hessite and native gold that occur in zones of moderate to strong gneissic foliation in diorite of the Triassic Klotassin Batholith. Deposit interpreted as a metamorphosed porphyry Cu deposit. Deposit age interpreted as Late Triassic.

Pearson and Clark, 1979, EMR Canada, 1989; Minto Explorations Ltd., news release, January 25, 1994.

P08-05 62°26'N 137°37'W	Cash, (Klazan, Johnny) East-Central Alaska	Cu, Mo Porphyry Cu-Mo	Medium. Resource of 40 million tonnes grading 0.17% Cu, 0.018% MoS_2, 0.2 g/t Au.

Consists of two zones of pyrite, chalcopyrite and molybdenite that occur as fracture filling, in quartz veins and as disseminations. Deposit hosted in altered Late Cretaceous Mt Nansen Group feldspar porphyry stock and adjacent Paleozoic metamorphic rocks. Reserves are for the Cash occurrence. K-Ar isotopic age of 68.2 Ma ± 1.6 Ma interpreted as age of mineralization. Deposit age interpreted as Late Cretaceous.

Sinclair, 1986; EMR Canada, 1989; Yukon Minfile, 1991.

P08-06 62°19'N 136°58'W	Granite Mountain East-Central Alaska	Cu, Mo Porphyry Cu-Mo	Medium: (estimate). Approximate grade of 1% Cu.

Consists of pyrite and chalcopyrite that occur as disseminations and in fracture veinlets, and molybdenite that occurs in quartz veinlets. Deposit hosted in hornblende diorite of the Klotassin batholith, a mid-Cretaceous granitic to dioritic stock, and along the contact between the two. Alteration varies from propylitic to argillic with potassic alteration associated with veinlet fractures. Best intersection graded 0.31% Cu for 12.2 meters. Average grade of about 1% Cu based on diamond drilling. Deposit age interpreted as Late Cretaceous.

Yukon Minfile, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P08-07 62°21'N 136°42'W	Williams Creek Klotassin	Cu Ag, Au, Mo Porphyry Cu-Au	Medium. Reserves of 10.5 million tonnes grading 1.08% Cu, 0.44 g/t Au.

Consists of chalcopyrite, bornite, pyrite and minor arsenopyrite and molybdenite that occur as interstitial grains parallel with the gneissic foliation in granodiorite of the Triassic Klotassin Batholith. Lower Jurassic regional metamorphism has destroyed much of the original features of the deposit. An oxidized zone up to 200 meters deep contains malachite and azurite replacing copper sulfides. Deposit age interpreted as Late Triassic.

Pearson and Clark, 1979; EMR Canada, 1989; Western Holdings Ltd., annual report, 1992.

P08-08 62°22'N 133°22'W	Faro (Anvil) Anvil	Zn, Pb, Ag Cu, Ba, Au Sedimentary exhalative Pb-Zn	Large. Pre-production reserves of 57.6 million tonnes grading 4.7% Zn, 3.4% Pb, 36 g/t Ag, 1 g/t Au.

Consists of massive pyrite, sphalerite, galena, pyrrhotite, chalcopyrite and marcasite with patchy barite and trace tetrahedrite, bournonite and arsenopyrite and a siliceous gangue. Deposit occurs approximately 100 meters stratigraphically below the contact between phyllite and quartzite of the Lower Cambrian Mt. Mye Formation and calcareous sedimentary rocks of the Cambrian and Ordovician Vangorda Formation . Higher grades are associated with the presence of barite. Hosted by sedimentary rocks of western Selwyn basin that are interpreted as part of a Cambrian-Devonian passive margin. Forms deposit of the Anvil district. Deposit age interprreted as Late Cambrian.

Jennings and Jilson, 1986; MacIntyre, 1991; Yukon Minfile, 1991.

P08-09 62°14'N 133°02'W	Vangorda Creek (Grum, Firth, DY) Anvil	Zn, Pb, Ag Cu, Au Sedimentary exhalative Pb-Zn	Large. Reserves of 59 million tonnes grading 5.5% Zn, 4.0% Pb, 61.4 g/t Ag, 1 g/t Au.

Consists of massive sphalerite, galena and pyrite with minor chalcopyrite and traces of tetrahedrite and arsenopyrite that occur as massive sulfide bands. Deposit hosted in the uppermost layers of the Lower Cambrian Mt. Mye Formation, immediately below the contact with carbonate-rich sedimentary rocks of the Cambrian and Ordovician Vangorda Formation interpreted as part of a Cambrian and Devonian passive margin. Deposit enclosed within an envelope of quartz-muscovite alteration. Low-grade gold values are associated with chalcopyrite in the lower part of Mt. Mye section in quartzite and siliceous phyllite. Reserves are combined data for Dy, Vangorda, Firth and Grum deposits. Deposit age interpreted as Late Cambrian.

Jennings and Jilson, 1986; MacIntyre, 1991; Yukon Minfile, 1991.

P08-10 62°13'N 133°02'W	Swim (Sea, SB) Anvil	Zn, Pb, Ag Sedimentary exhalative Pb-Zn	Medium. Reserves of 22.75 million tonnes grading 4.7% Zn, 3.8% Pb, 42 g/t Ag.

Consists of massive pyrite, pyrrhotite, sphalerite and galena with minor chalcopyrite and traces of tetrahedrite, bournonite and arsenopyrite. Deposit hosted in phyllite and quartzitie of the Lower Cambrian Mt. Mye Formation immediately below the contact with calcareous sedimentary rocks of the Cambrian and Ordovician Vangorda Formation interpreted as part of a Cambrian and Devonian passive margin. Deposit age interpreted as Late Cambrian.

Jennings and Jilson, 1986; MacIntyre, 1991; Yukon Minfile, 1991.

P08-11 61°52'N 133°23'W	Risby (Cab) Cassiar	W Cu, Mo W skarn	Large. Reserves of 3.2 million tonnes grading 0.82% WO_3.

Consists of two diopside-garnet skarns that occur in Lower Cambrian carbonates that are intruded by granitic sills of the Cassiar plutonic suite. No. 1 zone has a high pyrrhotite and low chalcopyrite content. No. 2 zone, which is intruded by a sill, has higher WO_3 mineralization and low sulfides. Reserves of 2.7 million tonnes grading 0.81% WO3 and an additional 500,000 tonnes grading 1% WO_3. Deposit age interpreted as mid-Cretaceous.

Sinclair, 1986; EMR Canada, 1989; Yukon Minfile, 1990; Mining Review, 1992.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P08-12 61°18'N 136°55'W	Hopkins (Giltana) Whitehorse	Cu Mo, Ag, Au, W, U Cu skarn	Medium. Reserves of 600,000 tonnes grading 1.65% Cu (inferred).

Consists of magnetite-pyrrhotite-bornite-chalcopyrite skarn with minor molybdenite and scheelite that occur in five or more zones. Skarns hosted in calcareous metasedimentary rocks of the early Paleozoic Nasina Assemblage near contacts with mid- -Cretaceous granodiorite stocks and feldspar porphyry dikes of the Whitehorse Plutonic Suite. Some dikes contain chalcopyrite and molybdenite. Deposit age interpreted as mid-Cretaceous.

EMR Canada, 1989; Yukon Minfile, 1990.

P08-13 60°59'N 133°44'W	Red Mountain (Bug, Fox, Boswell R.) Surprise Lake	Mo Ag, W, Cu Porphyry Mo	Large. Reserves of 187 million tonnes grading 0.167% MoS_2 (0.1% cut-off).

Consists of disseminated molybdenite that occurs in quartz stockwork. Deposit hosted in an altered Late Cretaceous quartz monzonite stock of the Surprise Lake Suite (K-Ar isotopic age of 87.3 Ma ± 2.0 Ma) and immediately adjacent contact-metamorphosed argillite of the early Paleozoic Nasina Assemblage. Stock is complex with a classical alteration pattern, and is cut by barren quartz diorite. Reserves include 21.3 million tonnes grading 0.293% MoS_2 using a 0.25% cut-off. Deposit age interpreted as Late Cretaceous.

Sinclair, 1986; EMR Canada, 1989; Dawson, and others, 1991; Yukon Minfile, 1992.

P08-14 60°37'N 135°03'W	Whitehorse Copper Belt (Little Chief, War Eagle, Whitehorse	Cu, Au, Ag Cu skarn	Medium. Production and reserves of 13.2 million tonnes grading 1.4%Cu, 0.7 g/t Au, 8.9g/t Ag (approx.).

Consists of twelve calc-silicate skarns with bornite and chalcopyrite, and minor chalcopyrite, native copper, tetrahedrite and molybdenite mineralization. Skarns occur along irregular contacts between Triassic Lewes River carbonates and Cretaceous granodiorite of the Whitehorse Batholith. Production from 1898-1982 was 142,000 tonnes Cu, 7,090 kg Au and 90,000 kg Ag. Deposit age interpreted as mid-Cretaceous.

Watson, 1984; Meinert, 1986; Dawson and others, 1991; Yukon Minfile, 1991.

P09-01 63°37'N 129°40'W	Jeff (Naomi, Baroid) MacMillan Pass	Ba Sedimentary exhalative Ba	Large. Reserves of 2.2 million tonnes with specific gravity of 3.49.

Consists of barite that occurs as discrete spheres from 1 to 5 mm in diameter with internal radial crystalline structure, and as elongated radially crystalline lenses. Deposit hosted by shale of the Middle to Late Devonian Lower Earn Group that are interpreted as part of a Devonian and Mississippian clastic wedge. Barite forms an elongate tabular stratabound body that is exposed at the southeast over a strike length of 200 meters with a thickness of approximately 25 meters. Deposit age interpreted as Middle and Late Devonian.

Dawson and Orchard, 1982; Yukon Minfile, 1983.

P09-02 63°44'N 128°52'W	Gravity (BA) MacMillan Pass	Ba Sedimentary exhalative Ba	Medium (estimate).

Consists of thin, fissile, bedded barite with pyrite nodules (avg. 1 cm diameter) that occur in Middle and Late Devonian shales of the lower Earn Group that are interpreted as part of a Devonian and Mississippian clastic. Barite zone ranges up to 16 meters thick and extends for a strike length of about 650 meters. Isoclinal folding at the north end of the deposit, where fauulted, has effectively doubled the thickness to over 35 meters. Deposit age interpreted as Middle to Late Devonian.

Yukon Minfile, 1989.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P09-03 63°49'N 127°46'W	June Creek (Baldwin, Shell) Redstone	Cu, Ag Sediment-hosted Cu	Medium. Reserves of 1.4 million tonnes grading 2.8% Cu.

Summary and References

Consists of pyrite, chalcopyrite and bornite with minor digenite, chalcocite, covellite, malachite and azurite that occur in lensoid stratiform bodies. Deposit hosted in dolomites of the Coates Lake Group of the Windermere Supergroup. Detritus from eroded copper-bearing basalt flows of the Little Dal Group, that forms part of the underlying Redstone River Formation, are postulated as the source. Deposit age interpreted as Late Proterozoic.

Brown and Chartrand, 1983; Yukon Minfile, 1984; Jefferson and Ruelle, 1986; EMR Canada, 1989.

P09-04 63°17'N 130°33'W	Cathy ((Bar, Walt, Hess)) MacMillan Pass	Ba, (Pb, Zn, Ag) Sedimentary exhalative Ba	Medium. Reserves of 453,500 tonnes grading 100% $BaSO_4$.

Consists of fve barite beds that occur within a 60 meter-thick, 2 km-long sequence of cherty argillite, chert, siltstone and partially baritic sandstone, minor limestone and conglomerate of the Givetian (Middle Devonian) basal unit of the Middle to Late Devonian lower Earn Group. Host rocks interpreted as part of a Devonian-Mississippian clastic wedge. Sphalerite, galena and tetrahedrite occur in witherite (barium carbonate) at the Hess zone. A rough zonation exists with brecciated witherite in the core grading outward to layers of massive barite and finally laminated barite. Deposit age interpreted as Middle Devonian.

Dawson and Orchard, 1982; Abbott, 1986; EMR Canada, 1989; Yukon Minfile, 1990.

P09-05 63°17'N 130°09'W	MacTung (MacMillan Tungsten) Selwyn	W, Cu Mo, Zn W skarn	Large - World Class. Reserves of 57 million tonnes grading 0.96% WO_3.

Consists of scheelite, pyrrhotite and minor chalcopyrite in several pyroxene-garnet skarns formed in Cambrian to Ordovician limestone and limestone breccia. Host rocks are part of a folded outer shelf carbonate-pelite sequence of a Cambrian and Devonian passive margin. Host rocks flanked and inferred to be underlain by the Late Cretaceous quartz monzonite Mactung stock (K-Ar isotopic age of 89 Ma ± 4 Ma) of the Selwyn Plutonic Suite. Hydrothermal alteration has produced three distinct, concentric skarn zones: peripheral garnet-pyroxene marble skarn; an intermediate pyroxene skarn; and a central pyroxene-pyrrhotite skarn. Deposit age interpreted as Late Cretaceous.

Atkinson and Baker, 1986; Sinclair, 1986; EMR Canada, 1989; Dawson and others, 1991; Mining Review, 1992.

P09-06 63°10'N 130°12'W	MacMillan Pass (Tom, Jason East, Jason Main) MacMillan Pass	Pb, Zn, Ag, Ba Sedimentary exhalative Pb-Zn	Large. Reserves of 23.4 million tonnes grading 7.3% Pb, 6.4% Zn, 75.7 g/t Ag.

Deposits occur in two or more stratigraphic intervals in the Middle to Late Devonian lower Earn Group, interpreted as part of a Devonian and Mississippian clastic wedge in the MacMillan Pass area. Deposits interpreted as spatially related to syndepositional faults bounding a rift-related trough filled with fine- to coarse-grained siliceous turbiditic clastics. Recent reserve figures are 9.3 million tonnes grading 7.5% Pb, 6.2% Zn and 69.4 g/t Ag for the Tom deposit, and 14.1 million tonnes grading 7.09% Pb, 6.57% Zn and 79.9 g/t Ag for the Jason deposits. Deposit age interpreted as Late Devonian.

Abbott, 1986; Dawson and Orchard, 1982; Bailes and others, 1986; Turner, 1990; MacIntyre, 1991; Mining Review, 1992.

P09-07 63°01'N 130°37'W	Tea (Brock) MacMillan Pass	Ba Sedimentary exhalative Ba	Large. Reserves of 250,000 tonnes grading 100% BaSO4 (S.G.= 4.24).

Consists of a barite-rich zone approximately 100 meters thick that occurs at the base of a shale member of the Early Mississippian upper Earn Group that is interpreted as part of a Devonian-Mississippian clastic wedge. Barite is of high quality and suited for use as drill mud with only screening. Reserves are for an open-pit mining with no strip ratio, which had limited production. Deposit age interpreted as Early Mississippian.

Dawson and Orchard, 1982; Yukon Minfile, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P09-08 63°04'N 130°12'W	Moose (Spartan, Racicot) MacMillan Pass	Ba Sedimentary exhalative Ba	Medium. Reserves of 3.0 million tonnes grading 84% $BaSO_4$, 12% to 14% SiO_2.

Consists of finely laminated barite that occurs in two beds from 25 to 45 meters thick and exposed for 200 to 250 meters along strike. Deposit occurs near the base of a shale member of the Middle to Late Devonian lower Earn Group, immediately above an underlying chert pebble conglomerate. Host rocks interpreted as part of a Devonian and Mississippian clastic wedge). Deposit age interpreted as Late Devonian.

Dawson and Orchard, 1982; Yukon Minfile, 1991.

P09-09 62°37'N 129°46'W	Oro (Buc, Mar, Dar, Tang) MacMillan Pass	Ba Zn, Pb Sedimentary exhalative Ba	Medium. Estimated 1 million tonnes.

Consists of thinly bedded barite with minor sphalerite and galena that occur as a lens-shaped deposit 1100 meters long, 15 to 50 meters wide and up to 50 meters thick. Hosted in Middle Devonian turbiditic siltstones of the lower Earn Group that form part of a Devonian and Mississippian clastic wedge. Deposit age interpreted as Middle Devonian.

Dawson and Orchard, 1982; Yukon Minfile, 1984.

P09-10 62°34'N 129°31'W	Anniv (OP) Howards Pass	Zn, Pb Sedimentary exhalative Pb-Zn	Large. Reserves of 61 milion tonnes grading 5.4% Zn, 2.1% Pb.

Consists of sphalerite and galena that comprise saucer-shaped stratiform and stratabound bodies in Lower Silurian cyclic, rift-related carbonaceous mudstone and chert of the Ordovician to Silurian Road River Group. Host rocks interpreted as part of a Cambrian and Devonian passive margin. Deposit averages 13 meter thick (maximum 45 meters) over a 1.5 km strike length. Anniv deposit is one of three related exhalative Zn-Pb deposits of the Howards Pass Area (refer to Howards Pass). Deposit age interpreted as Early Silurian.

Morganti, 1981; Yukon Minfile, 1984; EMR Canada, 1989; MacIntyre, 1991.

P09-11 62°42'N 126°38'W	Coates Lake (Redstone) Redstone	Cu, Ag Sediment-hosted Cu	Large. Reserves of 37 million tonnes grading 3.9% Cu, 11.3 g/t Ag.

Consists of pyrite, chalcopyrite, bornite, digenite, chalcocite and covellite with secondary malachite and azurite that occur as stratabound disseminations. Deposit hosted in Late Proterozoic Coates Lake Group shallow marine algae carbonates and evaporites along a transgressive contact with underlying continental redbeds of the Redstone River formation. Deposit age interpreted as Late Proterozoic.

EMR Canada, 1989; Ruelle, 1982; Jefferson and Ruelle, 1986; Yukon Minfile, 1987; Chartrand and others, 1989.

P09-12 62°28'N 129°10'W	Howards Pass (XY) Howards Pass	Zn, Pb Sedimentary exhalative Pb-Zn	Large - World Class. Reserves of 422 million tonnes grading 5.4% Zn, 2.1% Pb.

Consists of sphalerite and galena with pyrite as stratiform and stratabound massive bodies, up to 50 meters thick and 3 to 4 km long, that occur in carbonaceous, cyclical, limy mudstone and chert of the rift-related Lower Silurian "Active Zone" of the Ordovician to Devonian Road River Group. Host rocks are interpreted as part of a Cambrian to Devonian passive margin. The Howards Pass (XY) deposit is one of three related SEDEX Zn-Pb deposits (refer to Anniv and OP) that occupy an elongate 20 km-wide sub-basin of the eastern Selwyn Basin. Deposits are interpreted as forming at the base of the continental slope about 10 km to 20 km seaward of the carbonate platform margin. Total reserves for the XY and Anniv deposits are 125 million tonnes grading 5.4% Zn, 2.1% Pb, and estimated resource for the two is about 400 million tonnes at similar grade. Deposit age interpreted as Early Silurian.

Morganti, 1981, Placer Developments Ltd., annual report, June, 1982; Yukon Minfile, 1984; Abbott and others, 1986; MacIntyre, 1991;

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P09-13 62°23'N 128°37'W	Lened (Rudi, Godfrey) Selwyn	W, Cu Mo W skarn	Medium. Resource of 750,000 tonnes grading1.17% WO_3.

Consists of scheelite and chalcopyrite in garnet-diopside and massive pyrrhotite skarn that replace limestone of the Cambrian to Ordovician Rabbitkettle Formation. Host rocks interpreted as part of a Cambrian to Devonian passive margin and are intruded by a mid-Cretaceous (85-92 Ma) quartz monzonite stock of the Selwyn Plutonic Suite. Deposit is best developed in an imbricate fault zone. Deposit age interpreted as mid-Cretaceous.

Yukon Minfile, 1986; Glover and Burson, 1986; EMR Canada, 1989.

P09-14 61°57'N 128°15'W	Cantung (Canada Tungsten) Selwyn	W, Cu Zn, Bi W skarn	Large - World Class. Production and reserves of 5.7 million tonnes grading 1.6% WO_3, 0.2% Cu.

Consists of pyrrhotite, scheelite and chalcopyrite with minor sphalerite in diopside skarn bodies that replace two members of Lower Cambrian limestone. Host rocks are interpreted as part of a Cambrian to Devonian passive margin. Skarns related to intrusion of a Late Cretaceous quartz monzonite (K-Ar age of 94.6 Ma ± 2.6 Ma) of the Selwyn Plutonic Suite. Two deposits occur, the Pit orebody that produced 1.51 million tonnes of ore yielding 40,087 tonnes of WO_3 between 1962 and 1986, and the E-Zone orebody with reserves of 4.2 million tonnes with 1.6% WO3 and 0.23% Cu with associated bismuth. Deposit age interpreted as Late Cretaceous.

Mathieson and Clark, 1984; Sinclair, 1986; EMR Canada, 1989; Yukon Minfile, 1990; Dawson and others, 1991.

P09-15 61°29'N 129°24'W	Matt Berry Frances Lake	Pb, Zn, Ag, Cu, Sb Sedimentary exhalative Pb-Zn	Medium. Reserves of 533,434 tonnes grading 6.81% Pb, 4.8% Zn, 102.9 g/t Ag.

Consists of massive galena, sphalerite, pyrrhotite and chalcopyrite that occur with minor antimony-silver minerals in Paleozoic phyllite. Copper and antimony mineralization appears to be related to local Cretaceous intrusive activity and overprints folded Paleozoic sedimentary exhalative mineralization that formed along a Devonian and Mississippian passive margin. Deposit age interpreted as Devonian and Mississippian.

Ostler, 1979; Bremner and Ouellette, 1991.

P09-16 60°46'N 128°51'W	Bailey (Pat) Selwyn	W, Cu W skarn	Medium. Reserves of 405,454 tonnes grading 1.00% WO_3 (estimate).

Consists of scheelite with minor pyrrhotite and trace chalcopyrite in three pyroxene skarns that occur over a strike length of over 3 km. Skars formed along contact between Devonian limestone and a mid-Cretaceous granodiorite of the Selwyn Plutonic Suite. Limestone part of a Cambrian-Devonian passive margin. The bulk of the reserves are from the central (B) zone. Deposit age interpreted as mid-Cretaceous.

Dawson and Dick, 1978; EMR Canada, 1989; Yukon Minfile, 1990.

P09-17 60°30'N 130°28'W	Logan Cassiar	Zn, Ag Cu, Sn Zn-Ag polymetallic vein	Medium. Reserves of 12.3 million tonnes grading 6.17% Zn, 26 g/t Ag.

Consists of sphalerite and pyrite, lesser arsenopyrite and chalcopyrite, and rare sulfosalts and cassiterite that occur in multiple phase quartz + ankerite veins, stockworks, breccias and silicified zones that occur in highly altered granodiorite, latite and andesite dikes that intrude the Marker Lake Batholith of the Cassiar Plutonic suite. Deposit forms a tabular, fault-bounded body. Sericite, biotite and silica are the dominant alteration minerals. A high grade zone is centered over a diatreme breccia pipe. Deposit age interpreted as mid-Cretaceous.

Yukon Minfile, 1992; EMR Canada, 1989; Mining Review, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P09-18 60°31'N 128°53'W	Sa Dena Hes (Mt. Hundere) Selwyn	Pb, Zn, Ag Pb-Zn skarn and manto	Medium. Reserves of 4.8 million tonnes grading 4% Pb, 12.7% Zn, 59 g/t Ag.

Consists of massive sphalerite and galena with trace pyrite that occur in four essentially tabular replacement zones (Jewel Box Hill, Gribbler Ridge, Burnick and Attila). Zones occur in Lower Cambrian phyllite and limestone that are interpreted as part of a Cambrian to Devonian passive margin. Limestone has been altered to coarse actinolite-garnet-diopside skarn at the Jewelbox Hill zone. Elsewhere copper-iron skarn with magnetite, pyrrhotite and pyrite occur. Lead to zinc ratio is 1:2 except at the Burnick zone where the ratio is 1:30. K-Ar isotopic age of 50 Ma for deposit. Although no major intrusive bodies crop out in the mine area, the mid-Cretaceous Mount Billings batholith is interpreted to underlie the deposit. Deposit age interpreted as mid-Cretaceous.

Dawson and Dick, 1978, Abbott, 1981; Bremner and Ouellette, 1991; Northern Miner, October 7, 1991.

P09-19 60°30'N 127°57'W	McMillan (Quartz Lake) Selwyn	Pb, Zn, Ag Pb-Zn skarn and manto	Medium. Reserves of 1.5 million tonnes grading 6.6% Zn, 5.5% Pb, 102 g/t Ag.

Consists of pyrite, galena and sphalerite with minor arsenopyrite, boulangerite, tetrahedrite and chalcopyrite that occur as tabular bodies, lenses and disseminations. Deposit hosted in limy quartzite and argillite of the Upper Proterozoic to Lower Cambrian Hyland Group that are interpreted as part of a Cambrian-Devonian passive margin. Deposit occurs both concordantly and discordantly to bedding. Lead isotopes age of 100 Ma age for deposit; age similar to that for nearby intrusives of the Selwyn Plutonic suite. Deposit age interpreted as mid-Cretaceous.

Morin, 1981, Vaillancourt, 1982; EMR Canada, 1989; Yukon Minfile, 1991.

P09-20 60°21'N 127°24'W	Mel (Otter Creek) Unassigned	Pb, Zn, Ba Sedimentary exhalative Pb-Zn	Medium. Reserves of 5.24 million tonnes grading 2.09% Pb, 7.86% Zn, 49% BaSO4.

Consists of irregular blobs of sphalerite, galena and pyrite that form a stratabound body. Deposit hosted in baritic limey shale at contact between Cambrian and Ordovician limestone and overlying calcareous slate or phyllite of Rabbitkettle Formation. Highest zinc values are associated with sericite-altered mudstone. Lead isotope age of Devonian age for deposit. Reserves include 725,000 tonnes to 60 m depth with comparable grades. Deposit age interpreted as either Cambrian and Ordovician or Devonian(?).

Miller and Wright, 1986; EMR Canada, 1989; Yukon Minfile, 1991.

P09-21 60°12'N 131°42'W	JC (Viola) Cassiar	Sn Cu, Zn, Ag Sn skarn	Medium. Reserves of 1.25 million tonnes grading 0.54% Sn.

Consists of malayite, stannite, stanniferous tetrahedrite and cassiterite in hedenbergite-diopside skarn that occur along contact between Devonian and Mississippian carbonates and porphyritic quartz monzonite of the mid-Cretaceous Seagull Batholith. A pipe-like breccia of axinite-fluorite mineralization also occurs. Deposit age interpreted as mid-Cretaceous.

Layne and Spooner, 1986; EMR Canada, 1989; Yukon Minfile, 1991.

P09-22 60°01'N 131°37'W	Logtung (Logjam Creek) Cassiar	W, Mo Zn, F, Be, Cu Porphyry W-Mo	Large. Reserves of 230 million tonnes grading 0.104% WO_3, 0.05% MoS_2.

Consists of disseminated scheelite, molybdenite and powellite with minor associated fluorite and beryl in garnet-diopside skarn, quartz vein stockwork and fractures. Deposit associated with a large quartz porphyry dike related to a nearby mid-Cretaceous quartz monzonite stock (K-Ar isotopic age of109 Ma ± 2 Ma) of the Cassiar Suite. Igneous rocks intrude Pennsylvanian chert, argillite and quartzite. Reserves include 55 million tonnes grading 0.16% WO_3 and 0.062% MoS_2. Deposit age interpreted as mid-Cretaceous.

Noble and others, 1984; Sinclair, 1986; EMR Canada, 1989; Dawson and others, 1991; Yukon Minfile, 1991.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P10-01 63°10'N 123°39'W	Wrigley (Fry Group) Unassigned	Zn, Pb, Ag Ba, Cu, F Southeast Missouri Pb-Zn	Medium. Resource of 9 million tonnes grading 10% Pb-Zn, 34.3 g/t Ag (approx.).

Consists of galena and sphalerite with minor fluorite and tetrahedrite that occur as disseminations in and as fracture and breccia filling in limestone of the Devonian Nahanni Formation. Host rocks interpreted as part of a Cambrian and Devonian passive margin. Deposit age interpreted as Devonian.

Yukon Minfile, 1982; EMR Canada, 1989.

P10-02 61°34'N 124°48'W	Prairie Creek (Cadillac) Selwyn	Pb, Zn, Ag Pb-Zn skarn and manto	Large. Reserves of 6.2 million tonnes grading 13.0% Zn, 12.0% Pb, 180 g/t Ag.

Consists of galena and sphalerite with minor tetrahedrite and chalcopyrite that occur in quartz-carbonate gangue as lenticular zones 2.5 m to 15 m wide, dipping 45 degrees and vertical. Twelve zones occur along a strike length of about 10 km. Deposit hosted in shale and dolomite of the Middle Devonian Arnica Formation that is interpreted as part of a Cambrian and Devonian passive margin. Deeper drilling in 1992-94 intersected stratabound Pb-Zn-Ag deposit that occurs in four lenses over 22 m thick and two other zones, all hosted in the Ordovician Whittaker Formation. Deposit has characteristics of a manto, but no intrusion is known. Deposit age interpreted as Ordovician-Devonian?

EMR Canada, 1989; Yukon Minfile, 1991; San Andreas Resources Corp., news releases, 1992, 1993., 1994, 1995.

P53-01 63°38'N 136°38'E	Dzhalkan Sette-Daban	Cu Basaltic Cu	Small. Average grade of 0.3 to 4.5% Cu.

Consists of disseminated copper in Famennian basalt flows that have a total thickness of 180 m. Flows erupted into shallow water and subaerial environments. Deposit occurs in horizons from 0.5 to 2.0 m thick in cinders and of amygdaloidal basalt that occur at the top of flows. Ore minerals are native copper and cuprite with lesser bornite, chalcocite, and chalcopyrite. Epidosite (epidote + quartz) wallrock alteration occurs locally. Ore bodies range from 0.3 to 1.0 m thick and up to 100 m long. Areas of copper mineralization are separated by unmineralized areas of up to several kilometers. Host basalts are folded, with fold limbs dipping 40 to 60°.

Kutyrev, 1984; Kutyrev and others, 1988.

P53-02 63°31'N 137°01'E	Kurpandja Sette-Daban	Cu Sediment-hosted Cu Sediment-hosted Cu	Medium. Range of 0.45 up to 12% Cu. Resource of approximately 500,000 tonnes Cu.

Consists of more than three stratified horizons of finely disseminated to massive copper ore that is hosted in Upper Devonian to Lower Carboniferous coastal and deltaic sandstone. Main ore minerals are chalcocite, bornite, chalcopyrite, and pyrite. Ore bodies range from 0.2 up to 4 m thick and up to 1.5 km long. Host polymictic sandstone contains pyroclasts of various types of volcanic rocks. Deposit occurs in a stratigraphic interval from 50 up to 300 m thick that is underlain by Famennian basalt that also contains copper mineralization. Deposit occurs within a major syncline that has an amplitude of up to 4 km. Ore bodies and host rocks strike at 40 to 70° on syncline limbs.

Kutyrev, 1984; Ioganson, 1988.

P53-03 63°10'N 137°51'E	Segenyakh Sette-Daban	Pb, Zn, CaF_2 Mississippi Pb, Zn Southeast Missouri Pb-Zn	No data.

Consists of concordant horizons of disseminations, stringers, and breccia layers of sphalerite and fluorite that are hosted in Late Silurian (Ludlovian) dolomitized limestone that is overlied by Prjidolian marl. Ore composed of dolomite, calcite, fluorite, sphalerite, and less common galena. Ores locally associated with metasomatic quartz, microcline, hyalophane, and pyrite. Bedded breccia contains up to 20% sphalerite and 15% fluorite. In addition to concordant breccia layers are cross-cutting breccia veins, that contain up to 70% fluorite and up to 8% sphalerite. At least two ore-bearing horizons are known that trend north-south for 10 km and dipping eastward from 40 to 60°. Distribution and concentration of mineralization is irregular.

Kutyrev, 1984.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P53-04 62°23'N 137°52'E	Onello (Lider) Allakh-Yun	Au Au quartz vein	Small. Up to 264 g/t Ag. Au grade unknown
Consists of quartz veins and stringers that are hosted in Late Devonian diabase dikes. Vein minerals are quartz, bornite, and pyrite. Veins range from 0.3 to 0.5 m thick and are short. Host dikes intrude Ordovician and Cambrian carbonate rocks. Kokin, 1987.			
P53-05 61°28'N 137°19'E	Svetly Allakh-Yun	Au Au quartz vein	Small. Average grade of 0.6-3.2 g/t Au.
Veins are hosted by Late Proterozoic (Riphean) clastic and carbonate deposits. Kirusenko, written commun., 1963.			
P53-06 61°13'N 137°50'E	Bular Allakh-Yun	Au Au quartz vein	Small. Average grade of 24 g/t Au.
Consists of disseminated galena, sphalerite, arsenopyrite, and gold in a quartz vein that is 0.8-1 m thick and up to 1,200 m long. Vein strikes N30°E and dips steeply (60-80°). Vein hosted in Lower Permian sandstone. T.S. Kirusenko, written commun., 1964; Grinberg and others, 1970.			
P53-07 60°06'N 136°45'E	Sardana Sette-Daban	Pb, Zn Southeast Missouri Pb-Zn	Medium to large. Reserves of more than 1.0 million tonnes Pb+Zn. Pb:Zn ratio of 1:3-4.
Consists of disseminated, banded, massive, and breccia and ore and stringers that occur within and adjacent to a dolomite bioherm that ranges from 50-80 m thick. Bioherm hosted in the Late Proterozoic (Upper Vendian) Yudom Formation dolomite. Ore bodies are lenticular, ribbon-like, and cylindrical in form, and are mostly confined to the overturned limb of a syncline. Limb dips eastward at 75-85°. Ore bodies range up to 40 m thick and are 200 to 300 m long at depth. Drilling indicates additional ore bodies occur at a depth of 200 tp 300 m. Most ore associated with metasomatic, sugar-textured dolomite and zebra (brown and white striped) dolomite. Main ore minerals are sphalerite, galena, calcite, and dolomite. Subordinate ore minerals are pyrite, maracasite, arsenopyrite, quartz, and anthraxolite. Oxidized ore minerals include: smithsonite, cerussite, anglesite, goethite, hydrogoethite, and aragonite. Low-grade disseminations occur in Upper Proterozoic (Upper Vendian) dolomite for many kilometers in both limbs and in the axis of a north-south-trending syncline that is 3 km wide and more than 10 km long. Dolomite of Yudom Formation is 200 m thick and transgressively overlies Upper Proterozoic (Upper Riphean) quartz and quartz-feldspar sandstone and siltstone that in turn is conformably overlain by Lower Cambrian variegated clay and carbonate rocks. Deposit intruded by sparce diabase and dolerite dikes. Kuznetsov, 1979; Ruchkin and others, 1979; Kutyrev and others, 1989.			
P54-01 63°49'N 143°38'E	Pil Yana-Kolyma	Au Au quartz vein	Small. Contains up to 1.3 kg/t Au.
Consists of quartz veins from 0.2 to 1.5 m thick and 100 to 500 m long. Veins contain ankerite, calcite, pyrite, gold, chalcopyrite, and galena. Veins intrude Late Triassic to Early Jurassic sandstone and shale and diorite porphyrite dikes. Host rocks are contact metamorphosed. Korostelev, written commun. 1963; Rozhkov and others, 1971.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P54-02 63°43'N 143°53'E	Ergelyakh Yana-Kolyma	Au Granitoid-related Au	Small. Average grade of 0.1-90 g/t Au; 0.02-0.8% WO_3; Locally contains up to 1.37% Bi; up to 0.4% Te; up to 2% As.

Summary and References

Consists of variously-oriented quartz veins and stringers that occur along the contact of an Early Cretaceous granodiorite and Upper Triassic terrigenous deposits. Quartz constitutes 90% of the veins, which also include tourmaline, muscovite, wolframite, arsenopyrite, cobaltite, niccolite, bismuth, bismuthine, gold, joseite, and other Te and Bi minerals. Ore bodies are cut by crush belts that contain comb quartz, galena, sphalerite, Ag-tetrahedrite, and pyrargyrite that are part of epithermal veins with high Ag grades, up to 200 g/t Ag.

Apeltsyn and Saveliev, 1962; Korostelev, written commun., 1963; Roshkov and others, 1971; Gamyanin, N.A. Goryachev, Bakharev, and others, written commun., 1990.

P54-03 63°35'N 143°54'E	Baryllyelakh Yana-Kolyma	Sn, W Sn greisen	Small. Up to 0.74% Sn; 0.24% WO_3 .

Consists of greisen zones that occur near the contact and in the apical portion of a Late Cretaceous biotite granite intrusion. Greisen zones range up to 100 by 600 m and up to 120 m thick. Greisen composed of tourmaline, quartz, muscovite, dumortierite, andalusite, pyrophyllite with disseminated wolframite, cassiterite, molybdenite, arsenopyrite, löllingite, pyrrhotite, chalcopyrite, monazite, xenotime, and Bi minerals.

Rudich, 1958; Korostelev, written commun., 1963; Gracheva, 1974; Ganyanin and Goryachev, 1977.

P54-04 63°26'N 143°48'E	Baryllyelakh-Tsentralny Eastern Asia-Arctic: Verkhne-Kolyma	Sn, Ag Sn polymetallic vein	Small. Average grade of 0.03-11.35% Sn; 0.9% Pb; up to 2.28% Zn; up to 76 g/t Ag.

Consists of sixteen breccia zones that range from 0.3 to 20 m thick and up to 700 m long that occur in Lower Cretaceous volcanic rocks. Zones composed of quartz, chlorite, kaolinite, calcite, pyrite, cassiterite, chalcopyrite, galena, sphalerite, pyrrhotite, and other minerals. Volcanic rock exhibit chloritie and silicifica alteration. A thick oxidation zone is present.

Rudich, 1958; Korostelev, written commun. 1963.

P54-05 63°21'N 138°24'E	Senduchen Verkhoyansk-Indigirka	As, Sb Sb-As vein	Small. Average grade of 10-58% As; 2.9% Sb.

Consists of quartz-carbonate veins that contain orpiment, stibnite, realgar, arsenopyrite, sphalerite, enargite, chalcopyrite, and jamesonite. Individual orpiment concretionsrange up to 10 tons. Veins intrude dark grey Silurian limestone, range up to 3.5 m thick, and occur in a fault zone that cuts an anticline.

Korostelev, written commun., 1963.

P54-06 63°14'N 138°30'E	Stibnitovoe Verkhoyansk-Indigirka	Sb Cu, Pb, As Sb vein	Small. Up to 1.37% Sb; up to 0.81% Cu; up to 0.5% Pb; up to 0.17% As.

Consists of a vertical quartz vein that cuts Devonian limestone. Vein composed of quartz, calcite, stibnite, sphalerite, tetrahedrite, chalcostibnite, pyrite, and chalcopyrite. Vein ranges from 0.5 to 2 m thick, more than 250 m long.

Korostelev, written commun. 1963; N.A. Goryachev, written commun., 1992.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P54-07 63°01'N 140°43'E	Altaiskoe Vostochno-Verkhoyansk	Pb, Zn, Ag Sn Ag polymetallic vein	Small-to-medium. Pb:Zn ratio of 2:1.
Consists of Ag polymetallic veins, stockworks, and breccia that occur in small, steeply-dipping faults which trend northeast and occur in narrow zones in gently-dipping Permian siltstone. Fault zones and associated veins occur in the dome of a northeast-trending brachyform anticline. Late Mesozoic lamprophyre and diabase dikes are wide-spread within the deposit. Main ore minerals are sphalerite, galena, arsenopyrite, and pyrite. Lesser ore minerals are cassiterite, tetrahedrite, pyrargyrite, polybasite, and scarce owyheeite. Gangue minerals are quartz, siderite, ankerite, and calcite. Deposit formed in following stages: (1) arsenopyrite-pyrite-quartz with cassiterite and gold-bearing pyrite; (2) sphalerite-pyrite-siderite; (3) galena-ankerite-quartz; (4) galena-quartz-calcite; and (5) sphalerite (red)-jamesonite. Regional metamorphism occured between stages 2 and 3.			
Indolev and Nevoisa, 1974.			
P54-08 62°57'N 139°44'E	Imtachan Vostochno-Verkhoyansk	Pb, Zn, Sn Sn polymetallic vein	Small.
Consists of Sn polymetallic veins that occur in a linear, steeply-dippinging fault zone occurs in Upper Permian sandstone and shale. Main ore minerals are pyrrhotite, pyrite, sphalerite. Lesser ore minerals are galena, arsenopyrite, maracasite, cassiterite, and stannite. Gangue minerals are quartz, siderite, and manganankerite. Deposit occurs in the dome of a plunging brachyform anticline, within the contact metamorphic aureole of an unexposed granitoid intrusion.			
Indolev and Nevoisa, 1974.			
P54-09 62°56'N 139°27'E	Verkhnee Menkeche Vostochno-Verkhoyansk	Pb, Zn, Ag Ag polymetallic vein	Medium. Average grade of 2.7-11% Pb; 3.9-7.0% Zn; 138-332 g/t Ag.
Consists of abundant Ag polymetallic lens-like veins that occur in a linear steeply-dipping northeast-trending fault zone in Upper Permian sandstone, siltstone, and shale. Fault zone is about 10 km long and 1 km wide. Ore bodies occur mostly parallel to the fault zone and dip steeply (55-85°). Ore bodies ranges from hundred of meters to 3.5 km long and from 1 to 10 m (average 3 m) thick. Main ore minerals are galena, sphalerite, pyrrhotite, arsenopyrite, and pyrite. Lesser ore minerals are cassiterite, chalcopyrite, magnetite, owyheeite, pyargyrite, tetrahedrite, diaphorite, boulangerite, native silver, and gold. Gangue minerals are quartz, siderite, ankerite, and calcite. Three stages of mineralization consist of: (1) sphalerite-quartz-siderite; (2) sulphoantimonite-galena; and (3) sulfide-carbonate. Regional metamorphism occured between stages 2 and 3. Mineralized fault zone occurs along the dome of a plunging brachyform anticline. Part of deposit occurs within the contact metamorphic aureole of a Late Cretaceous granitoid intrusion that occurs as stocks and numerous dikes of granite-porphyry and granodiorite-porphyry. Lamprophyre and diabase dikes are wide-spread.			
Korostolev, written commun., 1963; Indolev and Nevoisa, 1974.			
P54-10 62°50'N 139°35'E	Levo-Dybin Allakh-Yun	Au, W, Bi Te Granitoid-related Au	Up to 3% As, 7-13 g/t Au, up to 2.5% WO_3, up to 1% Bi, and up to 0.6% Te.
Consists of abundant quartz stringers, from 0.2 to 0.3 m thick, that form peculiar sheet stockworks in contact metamorphosed Upper Permian sandstone beds, that range from 5 to 20 m thick. Stringers consists of quartz (90-95%), muscovite, potassium feldspar, scheelite, molybdenite, arsenopyrite, niccolite, löllingite, pyrrhotite, bismuth, gold, bismuthine, Bi tellurides and sulfotellurides, and maldonite. Deposit occurs for 800-1,000 m along the strike of the bedding, above an Early Cretaceous granitoid body and in adjacent country rocks.			
Kokin, written commun., 1978; Zubkov, 1984; N.A. Goryachev, written commun., 1993.			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P54-11 62°43'N 138°22'E	Sakyryr Sette-Daban	Zn, CaF_2 Southeast Missouri Pb-Zn	No data.

Consists of sphalerite and fluorite in beds and in crosscutting breccia zones that are hosted in Upper Silurian (Ludlovian) dolomitized limestone that is overlain by the Upper Sulirian Prjidolian Marl. Bedded breccias range in thickness from 8 to 45 m. Fluorite comprises up to 60% of one cross-cutting ore shoot. Mineralized dolomite zone is 5 km long.

Kutyrev, 1984.

P54-12 62°42'N 139°38'E	It-Yuryak Allakh-Yun	W Sn W vein, Sn (W)-quartz vein	Small. Average grade of 0.05-5% WO_3 .

Consists of quartz-wolframite and sulfide veins and stringers and stringer lodes that range up to 20 m thick. Ore bodies range up to 250 m long. Vein minerals are quartz, wolframite, scheelite, muscovite, cassiterite, beryl, arsenopyrite, galena, and sphalerite. Veins intrude contact metamorhosed Late Permian siltstone and are associated with minor greisen.

Korostelev, written commun., 1963; Silichev and Belozertseva, 1979; Shur, 1985.

P54-13 62°39'N 140°49'E	Khoron Verkhne-Yudomsky	Sn Pb Sn polymetallic vein	No data.

Consists in part of cross-cutting quartz and sulfide-quartz veins, stockworks, and shear zones, from 1 to 1.5 m thick and up to 1 km long. Also consists of conformable sub-sheet stockworks that occur in Permian sandstone, and associated greisen that occurs in Upper Cretaceous dikes and a grandiorite-porphryry stock with a K-Ar isotoopic age of 95-104 Ma. About 50 minerals occur. Main are minerals are quartz, tourmaline, chlorite, muscovite, carbonate, pyrrhotite, arsenopyrite, galena, sphalerite, cassiterite, stannite, bismuthine, and fluorite. Post-ore grandiorite porphyry bodies have K-Ar isotopic age of 83 Ma.

Andriyanov and others, 1984; Shur, 1985.

P54-14 62°34'N 139°19'E	Nezhdaninka Allakh-Yun	Au, Ag Au quartz vein	Large. Proven reserves of 475 tonnes Au. Estimated resources of more than 500 tonnes Au. Average minimum grade of 5 g/t Au with up to 6,748 g/t Au, and up to 8,300 g/t Ag.

Consists of disseminated gold that occurs in: (1) steeply-dipping shear zones up to 40 m thick and 5.4 km long; (2) related tension-gash quartz veins up to 200 m long and 1.2 m thick; and (3) quartz lenses within the shear zones. Vein minerals are quartz, carbonate, arsenopyrite, galena, sphalerite, scheelite, sericite, albite, chalcopyrite, tetrahedrite, lead and copper sulfosalts, stibnite, and gold. Wallrock alteration to silica, sulfides, and sericite. Quartz Ag polymetallic ore bodies cross-cut and post-date feathered quartz-veins. Deposit occurs along a deep fault that cuts the core of a doubly-plunging anticline in Upper Carboniferous to Lower Permian sandstone and shale. Deposit extends extends more than 1,000 m vertically. Workings include boreholes and seven levels of adits.

Korostolev, written commun., 1963; Silichev and Skobelev, 1970; Grinberg and others, 1970; Gamyanin and others, 1985; Gamyanin and others, written commun., 1990; Benevolsky and others, 1992.

P54-15 62°27'N 140°18'E	Zarnitsa, Kutinskoe Verkhne-Yudomsky	Pb, Zn, Ag Polymetallic vein	Medium. Average grade of 4.86-7.75% Pb, 4.1-5% Zn, and 44-326g/t Ag.

Consists of two deposits separated by 8 km. Zaritsa deposit consists of two polymetallic quartz-sulfide veins that contain galena, sphalerite, pyrite, chalcopyrite, and silver minerals. Larger vein is up to 500 m long and 6 m thick. Zaritsa veins intrude Late Cretaceous granite-porphyry and rhyolite and have a fringe of disseminated sulfides up to 20 m thick. Kutinskoe deposit consists of a vein about 3 m thick and 400 m long that is composed of quartz, pyrite, galena, sphalerite, and pyrrhotite. Kutinskoe vein intrudes contact metamorhosed Upper Permian sandstone and shale.

Korostolev, written commun., 1963.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P54-16 62°03'N 140°44'E	Khaardak Verkhne-Yudomsky	Sn Au, W, Zn Sn polymetallic vein	Small. Average grade of 0.3% Sn; up to 0.02% W; up to 0.04% Zn.

Consists of steeply-dipping shear zones that contain quartz-chlorite veins up to 8 m thick and stringers. Veins and stringers occur in a major 15 km by 2 km zone in dacite and adamellite porphyry of the Cretaceous Verkhne-Allak subvolcano. Ore bodies range up to several kilometers long and tens of meters thick. Vein and stringer minerals are quartz (20-30%), chlorite, cassiterite, hematite, sericite, fluorite, arsenopyrite, pyrite, chalcopyrite, galena, sphalerite, stannite, fahlore, and gold. Wallrocks exhibit chloritie and sericitie alteration.

Volkodav, 1978; Shur, 1985.

P54-17 61°49'N 140°15'E	Dzhaton Verkhne-Yudomsky	Pb, Zn, Ag Pb-Zn polymetallic vein	Small. Average grade of 8-9% Pb; 8-10% Zn; 100-200 g/t Ag.

Consists of sulfide veins with galena, sphalerite, pyrite, and quartz that occur in Late Permian sandstone and shale along the contact of a major subvolcanic quartz monzonite-porphyry body of Late Jurassic-to-Early Cretaceous age. Veins are 0.6 to 3.0 m thick and 300-400 m long.

Korostelev, written commun., 1963.

P54-18 61°42'N 138°17'E	Novinka Allakh-Yun	Au Au quartz vein	Small. Up to 90 g/t Au.

Consists of a quartz vein in Permian clastic deposits. Vein ranges up to 0.9 m thick and 100 m long. Major minerals are quartz, albite, sericite, native gold (fineness 955), galena, pyrite, sphalerite, and tetrahedrite.

Bobin, 1938; Petrusevich, 1939; Grinberg and others, 1970.

P54-19 61°33'N 142°59'E	Molybdenitovy Eastern Asia-Arctic: Koni-Yablon	Mo Porphyry Mo	Up to 3% Mo.

Consists of stockwork and quartz veins with molybdenite and sparse chalcopyrite that are hosted in biotite granodiorite of the Late Cretaceous Okhoto-Kuhtui pluton. Veins range to 0.4 m thick.

Korostolev, written commun., 1963; Gamyanin, 1976.

P54-20 61°30'N 143°51'E	Guan-Ti (Arkhimed) Eastern Asia-Arctic: Koni-Yablon	Mo, W Porphyry Mo	Average grade of 0.1-0.65% Mo; up to 1% WO_3; up to 0.01% Be, Sc, Ga, Bi .

Consists of a stockwork of quartz-molybdenite veins up to 1 m thick, and quartz-feldspar-mica alteration with molybdenite. Deposit occurs in an area of 2 km^2 within a Late Cretaceous granite pluton.

Korostolev, written commun., 1963.

P54-21 61°33'N 141°14'E	Nivandzha Verkhne-Yudomsky	Pb, Zn, Ag Polymetallic vein	Small. Up to 12% Pb; up to 14% Zn; up to 100 g/t Ag.

Consists of ten polymetallic veins composed of quartz, galena, and sphalerite. Veins are up to 3 m thick and up to 700 m long. Veins occur along a northeast-trending fault zone in Permian clastic deposits.

Korostolev, written commun., 1963.

P54-22 61°22'N 139°22'E	Voskhod Allakh-Yun	Au Au quartz vein	No data.

Consists of quartz veins up to 18 m thick and up to 1,000 m long that locally grade into stringers. Veins composed of quartz, albite, carbonate, arsenopyrite, pyrite, galena, sphalerite, chalcopyrite, and gold. Veins occur in faults that cut Permian sandstone and shale. Host sandstone exhibit quartz, sericite, albite, and carbonate alteration.

Grinberg and others, 1970.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P54-23 60°27'N 138°11'E	Zaderzhnoe Allakh-Yun	Au Au quartz vein	No data.

Consists of sort veins (100-300 m long) and contortion zones, both up to 2 m thick, that generally trend east-west. Veins are composed of quartz (96-98%), carbonate minerals (1-2%), and sulfides (1-2%) including pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, and native gold (fineness 695-815). Deposit occurs in the core of an anticline formed in Early Permian black shale, argillite, and siltstone in the Anchin fault zone. Pre-ore diorite porphyrite dikes intrude sedimentary rocks. Mineralization extends vertically about 350 m.

Barakovsky, 1993.

P54-24 60°02'N 142°36'E	Khakandzhinskoe (Khakandzha) Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Medium. Reserves of 7.23 million tonnes ore grading 7 g/t Au and 312 g/t Ag.

Consists of metasomatic rocks that contain kaolinite-quartz and hydromica-quartz assemblages. Ore veins and streaks consist of quartz, adularia, hydromica, carbonate, pyrite, argentite, galena, and native silver and gold. Ore has an anomalous high Mn content and many Mn minerals. Deposit occurs in metasomatic rocks that contain a series of veins and streaks bearing gold and silver minerals, in a large fracture zone forming the contact between hypabyssal, highly-alkaline rhyolite and Early to Late Cretaceous andesite and rhyodacite. Age of mineralization interpreted as 80 to 50 Ma.

Sidorov and others, 1970.

P55-01 63°45'N 148°45'E	Uochat Urultun and Sudar Rivers	Hg Carbonate-hosted Hg	Small.

Disseminated, cinnabar-bearing veinlets occur in brecciated Lower(?) Devonian dolomite along a major north-south trending fault that separates a Devonian carbonate sequence from a Carboniferous and Permian clastic sedimentary sequence. Ore body is about 20 m long and 4 to 7 m thick. Main ore mineral is cinnabar, which occurs with calcite in masses and irregular veinlets more than 3 mm thick. Pyrite, quartz, sphalerite, and anthraxolite are present. Mineralization consisted of several stages: (1) pre-ore silicification; (2) pre-ore calcitization; (3) deposition of cinnabar and calcite; and (4) post-ore calcite. Only magmatic rocks in vicinity are Late Paleozoic diabase bodies interlayered in Carboniferous and Permian clastic sedimentary rocks.

Babkin, 1975

P55-02 63°40'N 148°42'E	Urultun Urultun and Sudar Rivers	Pb, Zn Southeast Missouri Pb-Zn	Estimated resources 23 million tonnes with average grade about 2.85% Pb, 6.74% Zn, and 10% fluorite.

Disseminated veinlets and brecciated ore occur in Lower Devonian (upper Emsian) dolomite overlain with Middle Devonian (Givetian) marl. Ore bodies are composed of dolomite, calcite, fluorite, galena, sphalerite, and anthraxolite. Barite, pyrite, and cinnabar are present locally. Quartz is absent. Mineralization formed in two stages: (1) an early sphalerite-fluorite stage which resulted in disseminated metasomatic ore, and (2) a galena-fluorite-calcite stage which resulted in brecciated and veinlet ores. Fracturing occurred between these stages. The ore-bearing dolomite sequence is up to 240 m thick along a synclinal limb of a fold that generally trends northwesterly and dips 50-70° to the northeast. The limbs of the fold are subhorizontal south of the deposit. From two to five conformable ore horizons, varying in thicknesses from 1 to 10 m, are known within this dolomite sequence; but ore bodies are sporadic within a given horizon. Ore zone extends over an area of about 20 by 4 km.

Shpikerman, 1987

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-03 63°36'N 144°01'E	Aida Eastern Asia-Arctic: Verkhne-Kolyma	Ag, Au Au-Ag epithermal vein	Small.

Adularia-carbonate-quartz veins with pyrite, chalcopyrite, sphalerite, galena, freibergite, pyrargyrite, miargyrite, stephanite, küstelite, and native silver. Conjugate to linear zones of quartz-adularia-sericite, quartz-chlorite-kaolinite, and quartz-chlorite-carbonate altered rocks up to 30-40 m thick. Ore bodies are associated with major east-west trending faults and conjugate northeastern fissures, in hypersthene andesite of the southeastern Taryn volcanic complex.

Gamyanin, 1974

P55-04 63°33'N 148°56'E	Terrassnoe Yasachnaya River	Pb, Zn Cu, Ag Pb-Zn skarn	Probable resource of 5.2 million tonnes ore with average grade about 1% Pb, 5% Zn, and 140 g/t Ag.

Consists of skarn with sulfide occurrences along the tectonic contact between Upper Devonian (Frasnian) limestone and Upper Paleozoic aluminous-siliceous sedimentary rocks. Deposit extends for 700 m and occurs in the bottom of a late Jurassic volcanic depression intruded by hypabyssal dikes overlying a buried Late Mesozoic granitic intrusion. Skarn is composed of hedenbergite, garnet (andradite-grossular), and ilvaite, and sphalerite. Main ore minerals are sphalerite, galena, chalcopyrite, and magnetite. Silver occurs mainly in sulfide minerals, but formed subsequent to the skarn.

Shpikerman, 1987; V.I. Shpikerman and others, written commun., 1988.

P55-05 63°29'N 149°34'E	Prizovoe Urultun and Sudar Rivers	Ba Bedded barite	Medium.

Conformable, sheet-like, steeply-dipping deposit of massive white barite in siliceous argillite and siltstone of Lower to Middle Carboniferous age. Deposit is more than 300 m long and about 30 m wide. Barite exhibits a relic sedimentary structure in the middle of the deposit. Ore horizons show evidence of bed-by-bed metasomatic replacement of the host rocks. Barite-bearing, siliceous clastic sedimentary rocks are intensely deformed and contain numerous interlayers of Late Paleozoic diabase. Host rocks have an anomalously high background content of Mn, Zn, Cu, Ag, and Ba

Shpikerman, written commun., 1989

P55-06 63°30'N 149°18'E	Prolivnoe Urultun and Sudar Rivers	Pb, Zn Southeast Missouri Pb-Zn	Small.

Disseminated veinlets, brecciated and banded ores, in dark-gray, diagenetic dolomites of Lower Devonian (Emsian) age. Ore minerals are galena, sphalerite, and fluorite. Two stages of mineralization can be distinguished: (1) sphalerite, which subsequently underwent strong deformation; and (2) coarsely crystalline white dolomite, calcite, fluorite, galena, and large masses of anthraxolite. Mineralized dolomite sequence is more 200 m thick and includes two conformable mineralized horizons that trend east-west. Dolomite is overlain by black carbonaceous shales of late Emsian age.

Shpikerman, 1987

P55-07 63°25'N 149°42'E	Batko Urultun and Sudar Rivers	Cu Ag, Ba Basaltic Cu	Small. Grab samples contain up to 3.1% Cu and 13.7 g/t Ag.

Disseminated and irregular masses of sulfides occur in subalkalic, amygdaloidal basalt flows up to 200 m thick, within folded red beds of Middle Devonian (Givetian) age. Ore minerals are bournonite, chalcocite, and covellite. Mineralization is confined to the tops of the basalt flows. Adjacent trachybasalt is intensely epidotized and carbonatized. Silver and barium are associated with the copper. Upper mineralized horizon is no more than 2-3 m thick.

Shpikerman and others, 1991

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-08 63°15'N 146°14'E	Verkhne-Khakchan Yana-Kolyma	Au Au quartz vein	Small. Proven reserves of 0.1 t Au. Inferred resource of 86 t Au. Grade ranges from 0.2 to 7.8 g/t Au. Average grade less than 2 g/t Au.

Occurs as linear zones in brecciated and silicified, Upper Permian siltstone and shale. Ore zones are controlled by northwest- and approximately east-west-trending fractures, which have diverse orientation near fault intersections. Ore bodies include lenticular and stockwork-like occurrences; areas of near-total silicification; and short, narrow quartz veins. Quartz makes up 98% of the veins with albite, carbonates, chlorite, tourmaline, sericite, pyrite, arsenopyrite, sphalerite, chalcopyrite, galena, ilmenite, tetrahedrite-tennantite, and gold (700-850 fine). Deposit is located in the vicinity of the Chai-Yurya strike-slip fault. Geology and structure are similar to that in the Natalka deposit.

Panychev, written commun., 1977

P55-09 63°13'N 146°55'E	Kontrandya Yana-Kolyma	Au Au quartz vein	Small. Ranges from 1.2 to 2500 g/t Au.

Associated with a northwesterly-trending altered rhyolite dike 6 to 23 m thick. Deposit occurs in steeply folded sandstone and shale of Early Jurassic age; and is related to the Chai-Yurya strike-slip fault. Gold ore bodies occur in steeply dipping quartz veins 10-15 cm thick, which cut the dike obliquely over an area approximately 150 m long. Besides quartz, the veins contain albite, arsenopyrite, pyrite, boulangerite, and gold.

Filippov, written commun., 1944; Skornyakov, written commun., 1953

P55-10 63°03'N 144°19'E	Kuranakh-Sala Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn silicate-sulfide vein	Small.

Steeply dipping, quartz-tourmaline veins up to 1.5 m thick in a Lower Cretaceous granitic pluton are composed of cassiterite, magnetite, pyrite, arsenopyrite and chalcopyrite.

Lugov, 1986

P55-11 63°04'N 148°16'E	Taboga Yana-Kolyma	Au Au quartz vein	Small to medium. Mineralized zones contain traces to 78.9 g/t Au and quartz veins contain up to 3652 g/t Au.

About 30 mineralized zones of variable size. They are located in two en echelon structures related to the Taboga strike-slip fault zone. Quartz veinlets cement fractured Lower and Middle Jurassic shale, siltstone, and sandstone. Distinct veins are rare. Mineralized zones are several hundreds of meters long and several meters thick. They are composed of about 98% quartz with albite, carbonates, barite, arsenopyrite, pyrite, pyrrhotite, galena, bismuthite, gold and native silver. Fault which controls the deposit cuts diagonally across a northwest-trending fold structure in the sedimentary sequence, and is parallel to the western contact of a large granitic pluton.

Veldyaksov and others, written commun., 1973

P55-12 63°06'N 147°48'E	Stakhanov Yana-Kolyma	Au Au quartz vein	Small. Ranges from 0.2 to 3800 g/t Au.

Lenticular quartz veins and zones of quartz veinlets occur along the walls of gently dipping dikes of hydrothermally altered rhyolite, and are partially in the dikes themselves. The two known ore bodies extend for 400-450 m. The sandstone and shale intruded by the dikes is intensely deformed and contact metamorphosed; deformation probably related to the Burganda strike-slip fault. Folds and dikes trend northwest. Quartz veins contain albite, ankerite, chlorite and sericite. Ore minerals are arsenopyrite, pyrite and more rarely, scheelite, galena, sphalerite, pyrrhotite, and gold, with rare cassiterite and molybdenite. Gold is associated with galena and arsenopyrite. Gold nuggets up to 2 g occur.

Skiornyakov, written commun., 1953

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-13 62°56'N 148°14'E	Maldyak Yana-Kolyma	Au Au quartz vein	Small. Proven reserves of 800 kg Au. Grade ranges from traces to hundreds of g/t Au.

Summary and References

A set of gold-bearing dikes, and zones of veins and veinlets occur in sedimentary rocks near a straight section of the Burganda strike-slip fault. The Lower Jurassic sandstone and shale host rock is deformed into small steep folds that trend northwest. Thin, en echelon dikes occur in diagonal shears. Transverse, extension fractures are filled with short and morphologically complex quartz veinlets and lenses up to 10 m thick. Major dike is up to 5 km long and is composed of propylitized and albitized basalt and rhyolite. It is cut and locally offset by an oblique set of shear fractures, which host lenticular quartz veins and reticulate albite-quartz veinlets with sulfides and rich gold ore bodies. Ore bodies are composed of quartz, albite, ankerite, calcite, sericite, chlorite, apatite, pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, tetrahedrite-tennantite, and gold.

Aleinikov, written commun., 1945; Fedotov, 1960a

P55-14 62°50'N 148°02'E	Dorozhnoe Yana-Kolyma	Au Au quartz vein	Small. Ranges from 0.5 to 30,150 g/t Au.

Steeply dipping, subparallel, gold-bearing quartz veins occur for about 100-120 m in a granitic pluton which is exposed over an area about 9 km long and up to 1.5 km wide. Stock (K-Ar age of 131-134 Ma) is composed of granodiorite, biotite granite, and granite porphyry. Stock trends about east-west, across the strike of the Lower Jurassic sandstone-shale sequence it intrudes. Veins trend northeast, are complicated in form, and vary in thickness from about 0.1-2 m. Veins branch and wedge out on entering the hornfels around the granite. Ore bodies are composed of quartz, sericite (muscovite), albite, calcite, ankerite, chlorite, apatite, arsenopyrite, pyrite, galena, sphalerite, chalcopyrite, electrum; and rare high-grade gold, tetrahedrite-tennantite, and scheelite. Gold nuggets up to 800 g occur. Gold characteristically occurs with mica and galena as linear bands parallel to vein contacts.

Firsov, 1959

P55-15 62°46'N 145°29'E	Kyurbelykh Eastern Asia-Arctic: Verkhne-Kolyma	Sn Ag Sn silicate-sulfide vein and Sn polymetallic vein	Small.

Steeply dipping, tin-bearing veins, less common linear zones of veinlets, and metasomatically altered rocks, occur near the northeastern contact of the Early Cretaceous(?) Tass-Kystabyt granitic pluton that intrudes Upper Triassic sandstone and sandy shale. Mineralized fissures generally strike east-west and north-west and are several hundreds of meters long and up to 1 m thick. Ore bodies are accompanied by weak contact metamorphism, sericitization, chloritization and, more rarely, tourmalinization. Veins are composed of quartz, tourmaline, cassiterite, arsenopyrite, pyrite, marcasite, pyrrhotite, chalcopyrite, and sphalerite, with minor galena, tetrahedrite-tennantite, argentite, stannite, bismuthinite, magnetite, hematite, ankerite, and calcite. Amount of sulfides increases away from the contact of the granitic rocks. Ore bodies are widely dispersed over the area, sometimes in clusters of 10-15 veins.

Chaikovsky, 1960; Lugov, 1986

P55-16 62°47'N 149°46'E	Shturm Yana-Kolyma	Au Au quartz vein	Small to medium. Averages about 10-12 g/t Au.

Deposit consists of sets of auriferous quartz veinlets hosted by a complicated, propylitized, albitized, silicified, and sulfidized basalt-rhyolite dike averaging 4.5 m thick and extending for over 5.5 km. Gold-quartz stockworks, irregular masses, and reticulate ore bodies are best developed where the dike is crossed by shear fractures that parallel folds in the Lower and Upper Jurassic clastic sequence intruded by the dike. Dike is broken into small blocks by shear zones. Alteration and mineralization of dike are concentrated along the shear zones. Ore minerals are quartz, albite, ankerite, sericite, paragonite, actinolite, chlorite, apatite, tourmaline, arsenopyrite, pyrite, pyrrhotite, boulangerite, gold, sphalerite, galena, chalcopyrite, scheelite, and rutile. Gold is 900-940 fine and associated with arsenopyrite, sphalerite, and galena. Gold nuggets up to 300 g have been found. Deposit is located within the Srednekan-Shturm strike-slip fault zone.

Skornyakov, written commun., 1953

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-17 62°45'N 148°06'E	Daika Novaya Yana-Kolyma	Au Au quartz vein	Medium. Typically ranges 0.2 to 21 g/t Au with up to 1385 g/t Au.

Steeply dipping dike of diorite porphyry has been hydrothermally altered. Dike is sulfidized and cut by an orthogonal system of subhorizontal and subvertical quartz veinlets that contain carbonates, feldspars, disseminated arsenopyrite, pyrite, sphalerite, and gold. Dike trends northeast across a folded Jurassic sandstone-shale sequence.

Shakhtyrov, oral commun., 1991

P55-18 62°44'N 147°52'E	Svetloe, Kholodnoe Yana-Kolyma	Au Au quartz vein	Small. Proven reserves 3.6 t Au. Grade ranges from 1.0 to 100 g/t Au.

Subparallel quartz veins 600-1500 m long average 0.2-0.5 m thick, and 20-80 m apart. Veins occur as conformable bodies or in acute fractures in the limbs of an asymmetric anticline. Veins dip 70° to 85°. Ore bodies trend mainly northwest, but range from east-west to north-south. Upper Triassic and Lower Jurassic sandstone and shale is intruded by a transverse set of dikes of felsic and intermediate composition that host the auriferous quartz veinlets. Ore minerals are mainly arsenopyrite, pyrite, and galena containing gold (858 fine). Subordinate ore minerals are: sphalerite, chalcopyrite, scheelite, pyrrhotite, and native gold. Kholodnoe deposit, which occurs to the south, is made up of three sets of quartz veins and mineralized fracture zones with a northwest trend. Some veins occur within the dikes. Gold is present as very small inclusions or irregular masses.

Skornyakov, written commun., 1953; Fedotov, 1960b, 1967

P55-19 62°41'N 147°24'E	Chai-Yurya Yana-Kolyma	Au Au quartz vein	Small. Veins contain 0.4 to 425 g/t Au; mineralized zones average about 5 g/t Au.

Altered dikes of felsic to intermediate composition are cut by sets of gold-bearing quartz veins. Lenticular quartz veins occur in silicified and mineralized zones in sedimentary rocks near the dikes. Quartz veins contain albite, potassium feldspar, carbonates, and biotite. Ore minerals are pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, pyrrhotite, gold, bismuthinite, tetrahedrite, and boulangerite. Deposit occurs in Middle and Upper Triassic sandstone and shale. Ore bodies are controlled by diagonal fractures that acutely intersect the Chai-Yurya strike-slip fault zone. Veins are numerous, but they are scattered over a large area and are not large.

Skornyakov, written commun., 1953

P55-20 62°37'N 148°02'E	Chelbanya Yana-Kolyma	Au Au quartz vein	Small. Veins contain 1 to 32 g/t Au.

Steep, transverse and oblique quartz veins and veinlets occur near and in dikes of propylitized rhyolite and andesite that intrude a Lower Jurassic sandstone-shale sequence. Veins are mainly composed of quartz, albite, carbonates, and sericite; with minor arsenopyrite, pyrite, galena, gold, sphalerite, chalcopyrite, pyrrhotite, löellingite, scheelite, hematite, fluorite, ilmenite, rutile, sphene, apatite, tourmaline, cassiterite, and epidote. Gold occurs as tiny disseminations and in particles up to 5-10 mm in size. At least one vein 50 m long and 0.3 m thick, which cross cuts a dike, is economic.

Skornyakov, written commun., 1953

P55-21 62°36'N 149°45'E	Verkhne-Khatynnakh Unassigned	Sn Au, Ag Sn quartz vein	Small.

Northeast-trending steeply-dipping quartz veins and veinlets form productive zones that range in thickness from 5 cm up to 0.5 m. Mineralized area is made up of intensely contact metamorphosed Middle Jurassic shale and sandstone, but the intrusive body responsible for alteration of the host rocks is not exposed. Ore bodies are accompanied by halos of tourmalinization, sericitization, carbonatization, and abundant disseminated arsenopyrite. Gangue minerals include quartz, tourmaline, sericite, albite, apatite, fluorite, calcite, and chlorite. Ore minerals are cassiterite, scheelite, arsenopyrite, pyrite, sphalerite, chalcopyrite, galena, gold, and sulfosalts of lead and silver.

Buryanov, written commun., 1940

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-22 62°36'N 149°04'E	Burkhala Yana-Kolyma	Au Au quartz vein	Small. Proven reserves of 4.6 t Au. Grade ranges from 0.1 to 5261 g/t Au.

Mineralized fracture belts and folded zones up to 5 m thick, contain quartz and quartz-carbonate veins and veinlets with arsenopyrite, pyrite, and gold; and minor galena, sphalerite, pyrrhotite, and scheelite. Late veinlets contain cassiterite, topaz, and tremolite. Mineralized area is up to 2 km long and several tens of meters wide. Deposits are related to the Debin strike-slip fault zone. Structure of the deposit consists of en echelon fractures that cut the intensely deformed and sulfidized Lower and Middle Jurassic sedimentary rocks.

Skornyakov, written commun., 1953

P55-23 62°26'N 145°15'E	Tektonicheskoe Eastern Asia-Arctic: Verkhne-Kolyma	Pb, Zn, Ag, Sn Pb-Zn-Ag vein	Small. Contains 0.2 to 22.7% Pb, 0.2 to 8.9% Zn, 12 to 1276 g/t Ag, 0.05 to 0.3% Sn.

Quartz and ankerite-quartz veins of variable thickness are confined to steeply dipping fractured zones in Upper Triassic sedimentary rocks. Main ore body trends northwest for 900 m, and is 0.4-5 m thick. Ore minerals are mainly disseminated Ag minerals. Veins contain galena, sphalerite, cassiterite, pyrite, arsenopyrite, pyrrhotite, chalcopyrite, jamesonite, tetrahedrite-tennantite, and argentite.

Fursikov, written commun., 1952

P55-24 62°19'N 148°50'E	Djelgala-Tyellakh Yana-Kolyma	Au Au quartz vein	Small. Ranges from 1 to 100 g/t Au.

Late Jurassic silicified dikes along a set of parallel shear fractures are cut by a system of ladder and reticulate gold-bearing quartz veinlets. Deposit extends for 1-1.5 km and consists of a set of saddle-veins in the cores of anticlines composed of fine-grained sandstone. Dikes are from 100 m to 8 km long with a northwest to generally east-west trend. Individual ore bodies extend for hundreds of meters. Veins and veinlets contain albite, ankerite, tourmaline, disseminated pyrite, arsenopyrite, galena, scheelite, bismuth minerals, and gold. Area is within the hornfels zone of the Bolshoy Annachag granitic body.

Panychev, written commun., 1977

P55-25 62°18'N 145°42'E	Bulunga Eastern Asia-Arctic: Verkhne-Kolyma	Pb, Zn, Ag Pb-Zn-Ag vein or skarn	Small. Contains 2.3 to 8.9% Pb, 0.57 to 4% Zn, 30 to 780 g/t Ag.

Steeply dipping, single and branching veins up to 200 m long occur in contact-metamorphosed Middle Triassic sedimentary rocks that have been intruded by a small quartz diorite stock. Ores are composed of galena, sphalerite, chalcopyrite, pyrite, arsenopyrite, tetrahedrite-tennantite, argentite, and gold. Veins also contain anomalous tin, cadmium, indium, cobalt, and bismuth. Gangue minerals include quartz, carbonate, fluorite, and chlorite.

Rutskov, written commun., 1942; Radchenko, written commun., 1950

P55-26 62°16'N 146°31'E	Tigrets-Industriya Eastern Asia-Arctic: Verkhne-Kolyma	Sn, Ag, Pb, Zn Sn polymetallic vein	Small.

Quartz-carbonate-sulfide, quartz-sulfide, and sulfide-quartz veins, and lenticular bodies and zones of veinlets, occur in weakly metamorphosed Upper Permian sedimentary rocks that have been cut by a Late Cretaceous granite porphyry. Ore bodies are 100-200 m long and 0.1-0.8 m thick, and are localized along northeast trending fractures. Upper Cretaceous siliceous lava flows are peripheral to the mineralized area. There are several tin and silver mineral associations in the deposit. A period of deformation separated an early quartz-cassiterite and polysulfide stage of mineralization marked by cassiterite, arsenopyrite, pyrite, chalcopyrite, sphalerite, galena, canfieldite, Fe-freibergite, stannite, and pyrargyrite, from a later selenocanfieldite-quartz stage that produced quartz, pyrite, sphalerite, galena, stannite, selenocanfieldite, and manganocalcite.

Lychagin, 1967; Plyashkevich, 1990

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-27 62°01'N 146°45'E	Tokichan Yana-Kolyma	Au Au quartz vein	Proven reserves of 296 kg Au. Probable mineral resource of 369 kg Au. Up to 116 g/t Au; averages 11 g/t Au.

Quartz veins and zones of veins and veinlets contain disseminated arsenopyrite, pyrite, galena, sphalerite, scheelite, and native gold. Veins occur in Upper Permian clastic rocks near the Tenka strike-slip fault zone. There are three zones of alteration: (1) an outer carbonate-albite-chlorite zone, (2) a medial sericite-chlorite-quartz zone, and (3) an inner quartz-sericite zone. Deposit occurs along a narrow northwest-trending band and is controlled by an intricate system of longitudinal and reverse faults and augen mylonite.

Gabdrakhmanov, written commun., 1969; Zhitkov, Zhitkova, and Goryushin, 1991

P55-28 61°58'N 146°60'E	Degdekan Yana-Kolyma	Au Au quartz vein	Small. Proven reserves of 5.6 t Au. Average grade of 7.3 g/t Au. Past production of 116 kg Au. Active from 1946-47.

Banded and brecciated quartz, carbonate-quartz veins, and zones of quartz veinlets, contain disseminated arsenopyrite, sphalerite, pyrite, chalcopyrite, galena, and gold, with minor tetrahedrite-tennantite, boulangerite, and scheelite. Veins overlap the contacts between propylitized dikes of intermediate and felsic composition and Upper Permian sandstone and shale. Veins also occur in fractured belts and zones of sulfidization in the sedimentary rocks. Dikes generally trend east-west and are conformable with the sedimentary sequence. Deposit is associated with the Tenka strike-slip fault zone. Dikes formed both at the same time and later than the ore bodies. The majority of the ore bodies pre-date dike intrusion. Veins in post-ore dikes of microdiorite and lamprophyre(?) show evidences of thermal metamorphism. Mineralized zones include carbonaceous shale beds 100 to 1400 m in length. Gold is 720-800 fine.

Skornyakov, written commun., 1953; Shlyapnikov, written commun., 1956

P55-29 61°56'N 146°03'E	Kharan Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn polymetallic vein	Small. High-grade ores.

Zones of chlorite-sericite-quartz veinlets trend north, northwest and northeast. Veinlets contain crystalline and colloform cassiterite, pyrrhotite, chalcopyrite, galena, sphalerite, marcasite, and arsenopyrite. Tin is confined to country rock along the southern contact of the Early to Late Cretaceous Kharan granitoid pluton; which consists of diorite and quartz diorite intruded by granite porphyry.

Lugov, 1986

P55-30 61°49'N 146°31'E	Khenikandja Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn silicate-sulfide and Sn polymetallic vein	Small.

Steeply dipping, metasomatic veins, irregular veins and veinlets, and mineralized fracture belts, are associated with metasomatic zones and considerable feldspar. Ore bodies are 1-3 m thick and trend northwest. Tin ores are dominated by albite and cassiterite, with locally abundant adularia, anorthoclase, chlorite, quartz, calcite, tourmaline, and biotite. Metallic minerals, which were mostly deposited after the cassiterite, include galena, sphalerite, pyrite, chalcopyrite, arsenopyrite, magnetite, wolframite, stannite, bismuth, bismuthinite, and bismuth and gold tellurides. Ore bodies are hosted in Upper Cretaceous biotite porphyry, leucocratic granite, and alaskite porphyry.

Lugov, Makeev, and Potapova, 1972; Flerov, 1974

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-31 61°45'N 149°33'E	Vetrenskoe Yana-Kolyma	Au W Au quartz vein	Small. Average grade ranges from 17 to 22 g/t Au. Proven reserves of 13.3 tonnes gold. Well explored with encouraging potential. Partly mined.

Quartz, planar and saddle veins, lenses, and reticulate and ptygmatic veinlets, occur in the central portion of a major strike-slip fault, in its secondary fractures, and in hinges of anticlines and synclines near the northwest trending Chai-Urya fault zone. Host rocks consist of Upper Triassic and Lower Jurassic shale with rare siltstone and sandstone. Some interbeds are characterized by a high content of carbon, iron, and titanium. Ore bodies are identified by sampling within the vein zones. Portions of the veins subjected to plastic deformation carry the highest gold content. Veins consist of 85 to 99% quartz, with varying amounts of iron-magnesium carbonate. Ore minerals are primarily arsenopyrite and pyrite; scheelite is also important. Minor minerals include sericite, chlorite, albite, oligoclase, galena, sphalerite, marcasite, pyrrhotite, wolframite, tetradymite, graphite, apatite, and titanium oxides. Native gold (880-890 fine) is present in quartz, and also as intergrowths with arsenopyrite and galena. Small amounts of gold occur in wall rock impregnated with sulfides.

Kalinin, 1974, 1975b; Kalinin and Panychev, 1974; Novozhilov and Sher, 1974

P55-32 61°39'N 147°41'E	Natalka Yana-Kolyma	Au Au quartz vein	Medium. Total reserves of 450 t Au. Encouraging potential. Low-grade ores average 4 g/t. Mined since 1945. Produced 75 tonnes Au and 22 tonnes Ag. Annual production of 1.5 t Au and 4 t Ag.

Zones of subparallel and reticulate quartz veinlets can be grouped into two or three systems. They converge locally along strike into podiform and platy veins. Ore minerals cement schistose, brecciated, cataclastic, and graphitized Upper Permian tuffaceous sedimentary rocks. Deposit is associated with the Tenka strike-slip fault. In plan, the ore field has an S-shaped, en echelon fault structure 7 km long, trending northwest, and bifurcates to the south. Deposit forms a steeply dipping "propeller" pattern. Deformed ore-bearing sequence is complicated by synclines and anticlines near the fault zone and abundant pre-ore and post-ore dikes of felsic to intermediate composition. Overall zone of mineralized veinlets is approximately 300 m wide, consists of zones 50-300 m long and 1-15 m thick which comprise economic ore bodies. These bodies converge in a fan-like fashion. Gangue in the veinlets are mainly composed of quartz (90-95%), albite, anorthoclase, carbonate, chlorite, and sericite; with lesser kaolinite, barite, apatite, and graphite. Ore minerals are dominated by fine-grained disseminated arsenopyrite intergrown with pyrite in wall rocks. Subordinate or rare minerals include galena, sphalerite, chalcopyrite, pyrrhotite, löellingite ($FeAs_2$), cobaltite, bournonite, boulangerite, tetrahedrite-tennantite, scheelite, cassiterite, rutile, ilmenite, and stibnite. Fine-grained and microscopic, low-grade gold (about 750 fine) is commonly associated with arsenopyrite and galena in the veins and veinlets. A considerable proportion of the gold is intergrown in arsenopyrite in the wall rock adjacent to the veins.

Firsov, 1957a; Shilo, 1960; Voroshin and others, 1989; Goncharov, 1995.

P55-33 61°36'N 146°28'E	Porozhistoe Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn polymetallic vein	Small. 0.49-1.31 % Sn; up to 112 g/t Ag.

Steeply-dipping mineralized fracture zones and quartz veins in Lower Triassic clastic sedimentary rocks contain cassiterite, pyrite, arsenopyrite, and galena.

Lugov, 1986

P55-34 61°32'N 147°57'E	Pavlik Yana-Kolyma	Au Au quartz vein	Medium Proven reserves of 57.6 t Au. Low-grade ore.

Lenticular zones of reticulate quartz veinlets and mineralized zones up to 2 km long and 3-15 m thick occur in Upper Permian sandstone, shale, and tuff. Ore field is an S-shaped, en echelon fault structure associated with the Tenka strike-slip fault zone. Few dikes are present. Veins and veinlets are composed mainly of quartz, with albite, ankerite, sericite, and chlorite. Ore minerals are arsenopyrite, pyrite, sphalerite, galena, chalcopyrite, pyrrhotite, and gold (790-805 fine). Gold is commonly associated with arsenopyrite.

Eremenko, written commun., 1956

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-35 61°28'N 148°48'E	Shkolnoe Eastern Asia-Arctic: Verkhne-Kolyma	Au Bi, Te, Ag Granitoid-related Au	Medium Total reserves 32 tonnes Au. Averages 29 g/t Au and 45 g/t Ag. Has produced 17 t Au and 17 t Ag since start of mining in 1991. Annual production of 3 t Au and 3 t Ag.

Summary and References

An en echelon system of quartz veins trending generally east-west. Veins occur in a multiphase granitoid stock about 4 km^2 in size composed mainly of granodiorite and adamellite; that is intruded by dikes of granite-porphyry, rhyolite, pegmatite, aplite, and lamprophyre. Quartz veins are surrounded by zones of beresitic and argillic alteration; skarn- and greisen-like alteration is present locally. Mineralization occurred in two stages separated by intrusion of lamprophyre dikes: (1) gold-polymetallic stage marked by molybdenite, arsenopyrite, löellingite, native bismuth, bismuth tellurides, and native gold; (2) the most economically important stage, marked by arsenopyrite, pyrite, polymetallic sulfides, gold, electrum, freibergite, tetrahedrite, lead-antimony and silver sulfosalts, argentite, and stibnite. Gold ore bodies extend to great depth, into a large zone of complicated mineralogy, geochemistry, and structure.

Orlov and Epifanova, 1988; Voroshin and others, written commun., 1990; Palymsky and Palymskaya, 1990; Banin, 1993, written commun; Goncharov, 1995.

P55-36 61°21'N 147°56'E	Tankist Eastern Asia-Arctic: Verkhne-Kolyma	Mo Porphyry Mo	Small to medium.

Sets of reticulate and subparallel, molybdenite-quartz, molybdenite-feldspar-quartz, and quartz-molybdenite-arsenopyrite veinlets and veins, several millimeters to 30 cm thick, occur in a hypabyssal granite porphyry intrusion and contact-metamorphosed Upper Permian sedimentary rocks. Deposit occurs near the northern contact of the Early Cretaceous Sevastopol granitic body. Disseminated molybdenite also occurs with quartz as magmatic segregations within the pluton. Associated minerals are sericite, chlorite, carbonates, epidote, fluorite, magnetite, hematite, pyrite, chalcopyrite, pyrrhotite, löellingite, sphalerite, galena, and cassiterite.

Bubnov, written commun.,1949; Tyukova, 1989

P55-37 61°25'N 148°21'E	Igumen Yana-Kolyma	Au Au quartz vein	Small. Proven reserves of 5.8 t Au. Produced about 11.5 tonnes Au. Grade ranging 1 to 50 g/t Au, and up to several kg/t Ag. Almost completely mined out.

Steeply-dipping extensive and persistent quartz veins occur in Upper Permian sandstone, shale, and tuff along the Tenka strike-slip fault zone. Veins form a northwest-trending zone about 4 km long and 2.5 km wide, oblique to an anticline axis. Main ore bodies occur in quartz-cordierite-biotite hornfels in the gently-dipping roof of an Early Cretaceous granitic pluton. Southeastern flank of the mineralized zone is truncated by this intrusive. Both the hornfels and quartz veins contain local, post-ore skarn. Gold-bearing quartz veins are dominated by quartz, albite, iron-bearing carbonate, arsenopyrite, pyrrhotite, chalcopyrite, galena, sphalerite, and gold (765-896 fine). Near the intrusion, vein quartz was recrystallized and the native gold becomes coarser and more abundant. Some late-stage bodies have silver values.

Firsov, 1958; Bolotova, Nikolaeva and Filippov, 1982; Tyukova, 1989.

P55-38 61°15'N 149°05'E	Butugychag Yana-Kolyma	Sn U Sn quartz vein	Medium. Averages about 2.5% Sn. Almost completely mined out.

Feldspar-quartz veinlets and veins up to 1.5 m thick, and linear stockwork zones 0.2-5 m or more thick and several hundreds meters long, contain abundant cassiterite. Ore bodies trend northeast and occur in the western dome of Butugychag pluton; a Late Jurassic or Early Cretaceous(?) leucocratic porphyritic granite. Economic tin veins extend for no more than 40-85 m into the hornfels over the granite dome. Dominant minerals are quartz, albite, potassium feldspar, muscovite, cassiterite, fluorite, and ankerite. Topaz, biotite, tourmaline, arsenopyrite, pyrite, and calcite are less common. Sericite, chlorite, sphalerite, galena, wolframite, and molybdenite occur as minor intergrowths with other minerals. Carbonates and sulfides increase with depth.

Chaikovsky, 1960; Lugov, Makeev, and Potapova, 1972

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-39 61°16'N 148°37'E	Rodionov Yana-Kolyma	Au Au quartz vein	Small. Proven reserves of 1.5 t Au. Produced about 4 tonnes Au during 1947-54. Grab samples with1 to 2000 g/t Au.

A major gold-bearing quartz vein located on an overthrust structure, which deforms the limb of an anticline composed of Permian tuff and sedimentary rock. Thrust and fold structures are similar in strike. Upper portion of the vein dips gently, but it is steep at depth. Gently-dipping portion has numerous small, steeply dipping veinlets radiating from the hanging wall, which form a "tail" with a vertical extent of 5-8 m. Vein about 550 m along strike and varies from 5 cm to 9 m thick. Hanging wall composed of banded quartz with carbonaceous shale interbeds. Foot wall composed of sedimentary rock breccia cemented by massive quartz. Gangue minerals are feldspars, ankerite, sericite, paragonite, chlorite, and apatite. Ore minerals are pyrite, arsenopyrite, pyrrhotite, galena, sphalerite, chalcopyrite, scheelite, and native gold. Electrum, tetrahedrite-tennantite, and silver sulfosalts are also present. Weak contact metamorphism occurs with formation of diopside, hedenbergite, and actinolite. Deposit is located near the Tenka strike-slip fault zone.

Firsov, 1957b; Tyukova, 1989

P55-40 61°02'N 145°55'E	Bogatyr Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn silicate-sulfide vein	Small. 0.06-56% Sn.

Cassiterite-bearing veins and mineralized zones of quartz-chlorite-sulfide composition in Upper Permian marine clastic rocks occur at the contact with a Late Cretaceous granite intrusion.

Lugov, 1986

P55-41 60°54'N 147°10'E	Khuren Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn polymetallic vein	Small. 0.03-1.2% Sn.

Feldspar-quartz, chlorite-quartz, and sulfide veins occur in mineralized fracture zone in contact-metamorphosed Upper Permian shale, siltstone and sandstone. Sulfides also cement the matrix of the fractured zone. Ore occurs in massive and disseminated form, and less commonly in brecciated or banded form. Main ore minerals are arsenopyrite and pyrite; subordinate minerals are quartz, chlorite, cassiterite, sphalerite, galena, stannite, native bismuth, and cobaltite. Ore zones strike northwest and northeast for 70 m to 900 m, with the average thickness 0.7-2.8 m. Host rocks are intruded by a small stock of greisenized granodiorite, and numerous dikes of felsic and intermediate composition.

Zakandyrin, written commun., 1952

P55-42 60°40'N 148°05'E	Senon, Utro, Serebryanoe Eastern Asia-Arctic: Okhotsk	Ag, Au, Sb Epithermal vein and volcanic-hosted Sb vein	Small. Ranges 0.2 to 10.6 g/t Au and 20 to 900 g/t Ag. Utro deposit contains 6.7 to 58% Sb.

Senon deposit consists of sets of subparallel, quartz and feldspar-carbonate-quartz veins with disseminated pyrite, arsenopyrite, argentite, pyrargyrite, stephanite, chalcopyrite, sphalerite, galena, hessite, bismuthinite, and marcasite along a generally east-west zone of propylitization in Upper Cretaceous andesite. Utro deposit consists of disseminated veinlets of stibnite accompanied by pyrite, marcasite, arsenopyrite, and, less common miargyrite, berthierite, dyscrasite, plagionite, sphalerite, cinnabar, native silver, and antimony; in silicified and sericitized ignimbrite. Serebryanoe deposit consists of kaolinite-sericite-quartz altered rock in a hypabyssal dacite body. Altered zone contains east-west trending veins and reticulate systems of veinlets with irregularly disseminated pyrargyrite, miargyrite, polybasite, tetrahedrite-tennantite, arsenopyrite, pyrite, sphalerite, argentite, native silver, and gold.

Markova, written commun., 1978; Zhuravlev and Garifulin, written commun., 1979; Manafov and others, written commun., 1979

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P55-43 60°38'N 146°45'E	Burgagylkan Eastern Asia-Arctic: Okhotsk	Au, Ag Bi Au-Ag epithermal vein	Small to medium. Averages about 7.4 g/t Au, 800 g/t Ag, and up to 1% Bi.

Quartz, adularia-quartz, and sulfide-quartz veins and stockwork zones contain disseminated pyrite, sphalerite, galena, chalcopyrite, tetradymite, tetrahedrite, sulfosalts of silver, electrum, tellurides of gold and silver, and stibnite. Gold-silver ore bodies are confined to Upper Cretaceous propylitized andesite and agglomerate of the hypabyssal and vent facies in the margin of a caldera structure. Veins are several hundreds of meters to 2 km long and up to 15 m wide. Massive, brecciated, colloform-banded, framework-platy, and cockade ore structures are typical. Au:Ag ratio ranges from 1:30 to 1:130.

Pavlov, written commun., 1977

P55-44 60°44'N 149°22'E	Sentyabr Eastern Asia-Arctic: Okhotsk	Ag, Au Co, Bi, Te Au-Ag epithermal vein	Medium. Ranges from 2 to 6273 g/t Ag and 1.4 to 787 g/t Au.

Quartz stockworks, hydrothermal breccias, and veins; with precious metals, and polymetallic and silver minerals, occur around the periphery of an intrusive dome. Host rocks are Lower Triassic siltstone and shale. Intrusive core of the dome is a Late Cretaceous multiphase stock of gabbro, granite porphyry, and porphyritic granite. Ore bodies are controlled by arcuate faults and the granite porphyry dikes which radiate from the stock. Polymetallic stage of mineralization includes quartz, fluorite, arsenopyrite, löellingite ($FeAs_2$), glaucodot [(Co,Fe)AsS], chalcopyrite, pyrrhotite, pyrite, sphalerite, galena, joseite B, and nagyagite (with low Au and Ag); all of which typically occur in hornfels near the stock. Silver stage of mineralization, characterized by argentite, stromeyerite, tetrahedrite, aguilarite, stephanite, polybasite, pyrargyrite, electrum, and küstelite, is typical of ore zones in low-grade metamorphic rocks further away from the stock. Both types of mineralization occur together in an intermediate zone.

Umitbaev, 1986

P55-45 60°09'N 149°45'E	Oira Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Small. Averages about 37 g/t Au and 51 g/t Ag. Produced 300 kg Au.

Sets of adularia-chlorite-quartz veins with disseminated pyrite, argentite, pyrargyrite, miargyrite, electrum, and nagyagite occur in three ore zones up to several hundred meters long and 0.2 to 12 m wide. Zone of ore bodies trends about east-west for 3 to 4 km, and is 1 to 2 km wide. Ore is confined to the margin of a small volcanotectonic structure resulting from a subsidence of the volcanic roof over an Upper Cretaceous granite-granodiorite pluton. Upper Cretaceous andesite and dacite that host the deposit are intensely propylitized to epidote-prehnite-chlorite and chlorite-carbonate facies. Au/Ag ratio is 1:1. Main stage of mineralization was followed by high-temperature contact-metasomatism related to the emplacement of the granitic complex. Metasomatic stage is marked by a garnet-prehnite-wollastonite-epidote assemblage containing galena, sphalerite, and chalcopyrite. Age of adularia in the Au-Ag veins is 76.0 Ma (Ar-Ar).

Skibina, written commun., 1977, Naiborodin, 1980; P.Layer, V.Ivanov, and T.Bundtzen, written commun., 1994.

P56-01 63°54'N 152°33'E	Opyt Shamanikha	Cu, Au, Pb, Zn, Ag, Au Cu-Ag quartz vein?	Probable mineral resource of 14 million tonnes grading 1.5% Cu, 1.2% Pb, 0.5% Zn, 180 g/t Ag, and up to 1 g/t Au.

Occurs as veins and zones of massive, disseminated, and brecciated veinlets. Gangue composed of quartz, calcite, dolomite, graphite, and chlorite. Ore minerals include pyrite, chalcopyrite, bornite, galena, sphalerite, cuprite, native copper, chalcocite, arsenopyrite, and electrum. Wall rock is copper-bearing, graphitic, sericite-chlorite-quartz schist of Upper Proterozoic age. Silver-bearing copper-polymetallic veins also occur in Upper Jurassic siltstone and sandstone. Deposit is located at the intersection of a Late Jurassic depression and a block of old metamorphic rocks near a barely eroded granite body. Tin content of ore increases toward the granite. Main ore body is about 2 km long; entire deposit extends northwesterly for about 3 km.

Lyaski, written commun., 1937; Erzin, written commun., 1946; Ruchkin and Tsykarev, written commun., 1984

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-02 63°29'N 151°01'E	Datsytovoe Yasachnaya River	Cu, Ag, Bi Porphyry Cu	Small.

Consists of a stockwork of disseminated quartz-carbonate-sulfide veinlets with silver-copper-bismuth minerals that occur in a subvolcanic trachyrhyolite in the middle of a circular volcanic structure. Stockwork extends over an area of about 0.2 km^2. Pyrite is the dominate ore mineral; chalcopyrite, sphalerite, marcasite, galena, silver-lead-bismuth sulfosalts, acanthite, polybasite, and native bismuth are also present. Trachyrhyolite, which hosts the ore bodies, is silicified and sericitized. Skarn is present locally, possibly as xenoliths.

V.I. Shpikerman and Savva, written commun., 1988.

P56-03 63°27'N 154°55'E	Egorlyk Eastern Asia-Arctic: Omsukchan	Sn Sn silicate-sulfide vein	Small to medium. Partly mined out.

Approximately 200 veins form 17 ore fields with varying economic potential that occur over an area of about 60 km^2. Veins hosted in porphyritic biotite granite and hybrid granodiorite of the Upper Cretaceous Egorlyk pluton. Tin minerals are confined to steeply dipping fractures that trend northwest. Veins are up to several hundreds meters long and average about 1.5 m thick. Ore is composed predominantly of quartz and tourmaline, with cassiterite and muscovite. Cassiterite occurs in masses up to 10 cm in diameter. Variable quantities of pyrite, apatite, rutile, sphene, fluorite, calcite, arsenopyrite, magnetite, hematite, wolframite, scheelite, molybdenite, pyrrhotite, chalcopyrite, galena, sphalerite, native bismuth, and marcasite are present. Wall rocks are tourmalinized and kaolinized, and less commonly chloritized and greisenized. Total vertical extent of the ore bodies is at least 400-500 m; the highest tin content is at the tops and bottoms of this interval.

Matveenko, 1957; Erilov, 1970

P56-04 63°24'N 150°55'E	Kunarev Yasachnaya River	Pb, Zn, Cu, Ag Pb-Zn-Cu-Ag skarn	Probable mineral resource of 50 million tonnes with average grade of about 0.6% Pb, 3.8% Zn, 70 g/t Ag.

Consists of numerous lead-zinc occurrences of varying morphology. Largest skarn occurrence is in a Middle Jurassic calcareous conglomerate overlain by Middle and Upper Jurassic argillite and siltstone. Skarn is composed of hedenbergite, garnet (grossular-andradite), epidote, chlorite, quartz, calcite, galena, sphalerite, chalcopyrite, galenobismutite, matildite, stannite, bornite, cobaltite, hematite, and tetrahedrite. Disseminated metasomatic veinlet and brecciated silver ores occur in Devonian carbonate rocks in the outer part of the ore district. These ores are mainly composed of quartz, calcite, pyrite, galena, boulangerite, freibergite, owyheeite, sphalerite, pyrargyrite, acanthite, sulfoantimonides of lead, betekhtinite [$Cu_{10}(Fe,Pb)S_6$], and native silver. Disseminated silver-copper porphyry-type mineralization occurs in rhyolite and diorite in the middle of the volcanic structure. This zoning is typical of porphyry copper deposits, but mineralization at Kunarev is dominated by skarn-polymetallic ore bodies.

Shpikerman, 1987; Shpikerman and Savva, written commun., 1988

P56-05 63°20'N 151°05'E	Cherninskoe Yasachnaya River	Fe Cu, Pb, Zn Fe (Cu, Pb, Zn) skarn	Estimated resources 1 million tonnes with grade about 50% Fe and 10 million tonnes with grade about 0.5% Pb and 5% Zn.

Metasomatic skarn-magnetite bodies 1 to 15 m thick occur in Upper Permian limestone and siltstone along the northern contact of the Late Jurassic Bolshoy Kanyon granite body. Ores are composed of hedenbergite, ilvaite, epidote, garnet, axinite, magnetite, pyrrhotite, and chalcopyrite. Small inclusions of cobaltite and glaucodot are also present. Magnetite skarn is locally overprinted by sulfide minerals such as pyrrhotite, galena, and sphalerite.

Ruchkin and others, written commun., 1984

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-06 63°15'N 151°05'E	Bolshoy Kanyon Darpir	Sn Sn skarn	Proven reserves 6300 tonnes Sn. Average grade 0.35% Sn.

Numerous skarn bodies occur at contacts of Permian limestone and aluminous clastic sedimentary rocks with the Late Jurassic Bolshoy Kanyon granite. Tin minerals are associated with the ultrafelsic, subalkalic granite phase of the pluton. Skarns are dominated by a pyroxene-vesuvianite-garnet association; axinite skarns are also present. Skarns are overprinted by ore stage mineralization characterized by quartz, calcite, fluorite, tourmaline, micas, sulfides, and cassiterite. Sheets and podiform ore bodies predominate. Skarn and related mineralization may be as much as 30 m thick near the apex of the granite's roof. Saddle-like occurrences of skarn up to 70 m thick are developed over low points in the roof of the granite.

Politov, 1983

P56-07 63°12'N 152°13'E	Lazo Darpir	Sn Sn silicate-sulfide vein	Active in 1940s but now mined out. Past production 13,500 tonnes Sn from ore with grade of 1.15% Sn.

Numerous veins 0.4-0.6 m thick occur in contact metamorphosed Middle Jurassic clastic sedimentary rocks that occur at the western contact of the Deryas-Yuryagin granite body. Ore bodies are related to northeast-trending fractures. Veins extend for several hundred meters along strike. Rich ores are banded or irregular in form, often with an oblique or vertical pitch. Veins are dominated by a quartz-tourmaline-pyrrhotite-calcite assemblage. Cassiterite, chlorite, pyrite, arsenopyrite, sphalerite are subordinate. Amount of scheelite increases toward the intrusion. Three major mineral associations are distinguished that correspond to three successive stages of mineralization. First stage is marked by tourmaline, quartz and cassiterite. Second stage is characterized by sulfides of iron, zinc, tin, and other minerals. Third stage is dominated by calcite. Sulfides contain gold and silver.

Vasetsky, 1966; Politov, 1986

P56-08 63°17'N 151°23'E	Verkhne-Seimchan Darpir	Co, Bi Co-As vein	744.4 tonnes Co produced from 1950 to 1956. Average grade 0.12% Co, 0.036% Bi, 0.001% Se, up to 1 g/t Au, and up to 480 g/t Ag.

A set of veins composed mainly of quartz, iron chlorite, and tourmaline in contact metamorphosed Middle Jurassic siltstone south of the Late Jurassic Bolshoy Kanyon granite pluton. Sparse calcite, fluorite, and adularia occur in the veins. Main ore minerals are arsenopyrite, pyrite, cobaltite, and bismuthinite. Subordinate ore minerals are: pyrrhotite, chalcopyrite, galena, native bismuth, skutterudite, chloanthite, smaltite, selenides and tellurides of silver, lead, and bismuth; and native gold. Veins are steeply-dipping, 250-1500 m long, 0.1-6 m thick, and are altered to a depth of 350 m. Co content decreases at depth, and the quartz-chlorite gangue is replaced by quartz and tourmaline. Ore bodies occur along a northwest-trending fault and are confined to splays of fault.

Ruchkin and others, written commun., 1984

P56-09 63°17'N 153°13'E	Bastion Darpir	Sn Sn greisen	Small. High grade portion mined out. Average grade 2.2% Sn.

Lenticular and vein-like bodies of tin-bearing, quartz-tourmaline and quartz-muscovite greisens are several tens of centimeters to 5 m thick and 100-200 m long. Bodies occur in northeast-trending fractures in Late Cretaceous porphyritic granite and granite porphyry.

Aksenova, written commun., 1957; Avdeev and Sadovsky, written commun., 1970

P56-10 63°08'N 154°58'E	Arylakh Eastern Asia-Arctic: Omsukchan	Ag, Au Sn, Co, Bi Au-Ag epithermal vein	Medium. Grade up to 556 g/t Ag and 1 g/t Au. Reserves of 3.2 tonnes Au, 9,100 tonnes Ag.

Quartz, adularia-quartz, and quartz-sulfide veins, from several hundreds of meters to 1 km long, grade into zones of veinlets. They contain disseminated pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, argentite, pyrargyrite, freibergite, and native silver. Gold-silver minerals are locally associated with tin and cobalt-bismuth minerals. Ore bodies occur in Upper Cretaceous rhyolite and ignimbrite, in a band of subvolcanic rocks about 5-6 km wide that rims a caldera.

Grigoriev, 1978

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-11 63°05'N 152°45'E	Chepak Darpir	Au, W, Bi Granitoid-related Au	Medium. Ranges 5 to 50 g/t Au, with values as high as 200 g/t Au. Proven reserves 30 tonnes Au averaging 7-8 g/t.

Consists of steeply dipping, quartz-sulfide veinlets, veins, and associated alteration zones that cut intensely contact-metamorphosed Upper Triassic sandstone and shale overlying a buried granitic pluton. Gold ore bodies are grouped into zones of northeast-trending veins. Host rocks are intruded by dikes of diorite porphyry, lamprophyre, and dolerite; and by small intrusive bodies of Late Jurassic-Early Cretaceous granite porphyry, granodiorite porphyry, dacite, and quartz syenite. Disseminated veinlets are also present in the magmatic rocks and in hornfels. Wall rocks are silicified, chloritized, and sericitized. Veins are composed mainly of quartz (30-40%), sericite, feldspars, chlorite, carbonate, apatite, arsenopyrite, löellingite, scheelite, pyrrhotite, and pyrite. Less common or rare minerals include chalcopyrite, sphalerite, galena, bismuth, bismuthinite, marcasite, wolframite, tetrahedrite-tennantite, magnetite, ilmenite, rutile, sphene, tourmaline, epidote, and fluorite. Arsenopyrite and löellingite comprise up to 20-40% of the veins. Most gold is finely dispersed in arsenopyrite, löellingite, and pyrrhotite.

Skornyakov, written commun., 1951.

P56-12 62°59'N 151°20'E	Lyglykhtakh Urultun and Sudar Rivers	Mn Sedimentary Mn	Small. Up to 65% MnO.

Manganese minerals occur in the lower part of an Upper Permian clastic-carbonate sequence 400-750 m thick, which is generally characterized by a high geochemical background for Mn, Ba, Zn, Cu, and Ag. Ore-bearing member is up to 150-200 m thick and composed of variegated crimson, green, and black shale and siliceous shale intercalating with siltstone, tuffaceous sandstone, and organic limestone. Ore bodies are commonly podiform and conformable to bedding. Individual lenses are 0.02 to 1.5 m thick and 0.3 to 6.9 m long. Several ore horizons are present. Ore is generally stratified; but concretionary, oolitic, and spherulitic textures are sometimes present. About two-thirds of the manganese is in rhodochrosite; but pyrolusite, rhodonite, ankerite, and barite are also present. Manganese-bearing units have been metamorphosed near Late Mesozoic granitic intrusions; as a result piedmontite, apatite, and quartz occur there. Pyrolusite, psilomelane, vernadite, and limonite are present in the oxidation zone. Manganese oxide content of primary ore reaches 65%; and supergene ore reaches 57%.

Merzlyakov and Shpikerman, 1985

P56-13 62°51'N 155°11'E	Tidit Eastern Asia-Arctic: Omsukchan	Ag, Pb, Zn Ag-Pb-Zn vein, Polymetallic vein(?)	Small. Average about 3.4% Pb, 7.6% Zn, and up to 650 g/t Ag. Has been mined. Low-grade reserves remain.

Altered veins, lenses, and zones of veinlets of quartz-sulfide, chlorite-sericite-quartz, and quartz-rhodochrosite composition, locally highly altered, contain silver-bearing galena, sphalerite, chalcopyrite, pyrite, marcasite, arsenopyrite, pyrargyrite (Ag_3SbS_3), stephanite, freibergite, argentite, polybasite, proustite, famatinite, owyheeite, diaphorite, gudmundite, stannite, cassiterite, native silver, and adularia. Ore bodies are richest along the tectonic contact between a Lower Cretaceous sedimentary sequence and Upper Cretaceous ignimbrites. Mineralized fissures generally strike northeast and dip gently. Mineralized area extends for 1-3.5 km and is 10-20 m wide.

Kopytin, written commun., 1987

P56-14 62°48'N 155°25'E	Novy Djagyn Eastern Asia-Arctic: Omsukchan	Sn Porphyry Sn	Small. High grade portion mined out. Average grade 0.8% Sn.

A metasomatized zone up to 130 m wide, marked by a quartz-chlorite-tourmaline alteration, extends for 5 km. It includes sheets, pipe-like bodies, and veined occurrences composed mainly of cassiterite, magnetite, pyrite, hematite, chalcopyrite, arsenopyrite, muscovite, biotite, actinolite, garnet, topaz, dumortierite, and apatite. Native gold, bismuth, stannite, tetradymite, pyrrhotite, pyrophyllite, kaolinite, rutile, and orthite are minor or rare. The tourmaline-cassiterite-chlorite-quartz association is the most productive. Deposit overlies buried granitic intrusion. Lower Cretaceous conglomerate-shale-sandstone sequence that hosts the deposits is intruded by dikes of Late Cretaceous to Paleogene quartz diorite and granodiorite porphyry. Sequence is overlain by Upper Cretaceous volcanic rocks near the deposits. Host rocks are preferentially metasomatized along strike.

Bocharnikov, written commun., 1968; Flerov, 1976

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-15 62°48'N 155°05'E	Mechta Eastern Asia-Arctic: Omsukchan	Ag, Pb, Zn As, Cu Ag-Pb-Zn vein , Polymetallic vein(?)	Medium. Average grade about 1% Pb, and 0.74% Zn, with up to 310 g/t Ag and 0.3 g/t Au.

A set of en echelon, generally north-south, arcuate fracture zones 3.5-4 km wide and 10 km long host quartz-chlorite-sulfide veins and veinlets. Area of mineralization extends south to the Maloken district. Ore bodies form a fan-like structure that branch at the upper levels. They are hosted by Upper Cretaceous, propylitized, and argillized ignimbrites. Explosion breccia and tuff is wide-spread. Main vein minerals are: silver-bearing galena, sphalerite, chalcopyrite, pyrite, arsenopyrite, freibergite, pyrargyrite, stephanite, famatinite, tennantite, argentite, quartz, chlorite, and hydromica. Subordinate minerals are: pyrrhotite, stannite, native gold and silver, feldspar, kaolinite, and carbonate. Ores are dominated by galena-sphalerite and chalcopyrite-freibergite associations.

Tkachenko and others, written commun., 1976-1979; Plyashkevich, 1986; Kopytin, written commun., 1987

P56-16 62°44'N 154°60'E	Maly Ken Eastern Asia-Arctic: Omsukchan	Sn, Ag Sn polymetallic vein	Small. Partly Mined out.

Deposit consists of metasomatic zones, mainly of quartz-chlorite-hydromica-sulfide composition, with fan-like systems of veins, veinlets, and fracture fillings. Ore body occurs in Upper Cretaceous volcanic rocks (ignimbrite, rhyolite, andesite, and tuff), that trend north-south and northwest, with a thickness of 60-80 m. Ore bodies are composed of quartz, chlorite, cassiterite, pyrite, arsenopyrite, löellingite, pyrrhotite, marcasite, stannite, wolframite, galena, sphalerite, chalcopyrite, tetrahedrite-tennantite, argentite, proustite, and native silver and bismuth. Silver-bearing galena and sphalerite, and tetrahedrite-tennantite and silver sulfosalts, are especially important in the upper levels.

Pridatko and others, written commun., 1973; Lugov and others, 1974a, b; Shnaider and others, 1977

P56-17 62°40'N 150°07'E	Goletsov (Golets) Yana-Kolyma	Au Au quartz vein	Small. Average grade 20 g/t Au.

Numerous steeply-dipping quartz veins and zones of small veinlets occur in folded Lower Jurassic fine-grained sandstone, graywacke, and shale, and less commonly in folded, propylitized, mafic dikes. Veins average 5-20 cm thick, but some reach 3.5 m thick in the noses of folds. Veins extend farther down dip than along strike. Quartz veins contain small amounts of albite, ankerite, mica, chlorite, and rare disseminated arsenopyrite, galena, sphalerite, chalcopyrite, gold, and rutile. Veins are banded; sulfide accumulations are confined to carbonaceous interbeds. Deposit is located on a right-lateral, en echelon segment of the Srednekan-Shturm strike-slip fault zone.

Kuznetsov, written commun., 1937; Trushkov, written commun., 1937; Skornyakov, written commun., 1953

P56-18 62°36'N 155°11'E	Dukat Eastern Asia-Arctic: Omsukchan	Ag, Au Au-Ag epithermal vein	Large. Proven reserves of 10,000 tonnes Ag and 20 tonnes Au. Hypothetical reserves 40,000 tonnes Ag. Average grade 1 g/t Au and 300 g/t Ag. Annual production 0.9 t Au and 900 t Ag.

Silver occurs in quartz-chlorite-sulfide, adularia-quartz, and rhodonite-rhodochrosite-quartz veins and zones of diverse orientation. Hydrothermally altered zones and cryptovolcanic breccia bodies also occur. Ore bodies occur in a sequence of ultrapotassic rhyolites, no older than 93 Ma (K-Ar), in the core of a volcanic dome. Top of an extensive biotite leucogranite pluton (K-Ar age 80±2 Ma) is known at depth of more than 1200 m. Ore zones are up to 1.5 km long and 100 m or more thick. Silver minerals in the ore include intermetallic compounds, simple and complex two-metal sulfides, sulfoantimonides, sulfostannites, and selenides. Acanthite, pyrargyrite, stephanite, native silver, and küstelite predominate. Galena, sphalerite, pyrite, and chalcopyrite are abundant; arsenopyrite, pyrrhotite, magnetite, tetrahedrite, boulangerite, stannite, and other minerals are less common. Mineralization occurred in three stages: (1) quartz-chlorite-sulfide, (2) quartz-adularia, and (3) quartz-rhodochrosite-rhodonite. Ore bodies of the first two stages are bordered by quartz-hydromica alteration. The third stage consists of replacement of rhodochrosite by rhodonite, and the formation of skarn with garnet, helvite, epidote, albite, as a result of the intrusion of the granite pluton. K-Ar ages of 77 Ms for ore stages. Cassiterite ore bodies are related to late tourmalinization.

Brostovskay and others, 1974; Savva and Raevskaya, 1974; Kalinin, 1975a, 1986; Raevskaya, Kalinin, and Natalenko, 1977; Sidorov, 1978; Natalenko and others, 1980; Sakharova and Bryzgalov, 1981; Sidorov and Rozenblum, 1989; Shergina and others, 1990; Pilyasov and Yadryshnikov, 1994; Goncharov, 1995.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-19 62°37'N 155°48'E	Podgornoe Eastern Asia-Arctic: Omsukchan	Au, Co, Bi, Te, (As) Au-Co-As vein	Small. Ranges 2.5 to 139 g/t Au and 0.2 up to 2.6% Co.

Conformable and cross-cutting podiform bodies and veins are associated with sulfidization, silicification, tourmalinization, and chloritization. Ores are composed of quartz, tourmaline, chlorite, biotite, and Co-löellingite; with subordinate arsenopyrite, native bismuth, bismuthinite, gold, calaverite, tetradymite, molybdenite, pyrite, chalcopyrite, sphalerite, galena, tennantite, chalcocite, fluorite, and aragonite. District is located in contact-metamorphosed, Lower Cretaceous sandstone and siltstone at the contact of the Late Cretaceous Omsukchan leucocratic biotite granite and hybrid granodiorite.

Osipov, and Sidorov, 1973; Savva, written commun., 1980

P56-20 62°33'N 155°34'E	Khataren-Industrial Eastern Asia-Arctic: Omsukchan	Sn Sn silicate-sulfide vein	Small. Almost completely worked out at average grade of 1% Sn.

Several tens of banded veins, predominantly of quartz-tourmaline-cassiterite composition, occur in medium-grained biotite granite of the Late Cretaceous Omsukchan pluton. Veins are nearly vertical and trend northeast. Veins are thin, but range from several hundreds of meters to 1 km or more in length. Mineralization occurred in five stages: (1) quartz-tourmaline alteration; (2) quartz-tourmaline-cassiterite, with apatite, magnetite, hematite, muscovite, siderophyllite, albite, epidote, allanite, and gadolinite (REE); (3) quartz-chlorite-cassiterite, with hematite, magnetite, xenotime, arsenopyrite, and fluorite; (4) a local sulfide stage, with pyrite, marcasite, pyrrhotite, chalcopyrite, and molybdenite; and (5) fluorite, with calcite, adularia, kaolinite minerals, and quartz. Cassiterite is commonly present as isometric and prismatic crystals of dipyramidal habit.

Lugov, Makeev, and Potapova, 1972; Lugov, 1986

P56-21 62°31'N 151°04'E	Utinka Yana-Kolyma	Au Au quartz vein	Small. Discovered in 1929. Partly mined out. Ranges 0.1 to 3,923 g/t Au; ore shoots range 5 to 3,923 g/t Au. Produced 12 tonnes Au.

A Late Jurassic suite of ore-bearing dikes that extend for about 35 km cuts a Middle Jurassic sedimentary sequence at an acute angle to bedding. Sedimentary rocks are isoclinally folded into west-northwest trending structures. Main ore body extends 12 km and occurs in a steeply dipping dike, 0.4 to 1.3 m thick, of hydrothermally altered andesite porphyry. Dike intensely crushed and tectonized. Gold-bearing quartz veins form complicated, often diagonally cross-cutting, systems within the dike. Some quartz veins also cut the dikes obliquely, and continue out into the surrounding sedimentary rocks. Arsenopyrite, pyrite, and pyrrhotite make up several per cent of the veins; gold, galena, sphalerite, chalcopyrite, jamesonite, Bi-boulangerite, tetrahedrite, scheelite, marcasite, and stibnite also occur. Gold distribution is quite irregular; individual ore shoots are 5 to 30 m in strike and several hundreds of meters in width.

Yakushev, written commun., 1950; Skornyakov, written commun., 1953

P56-22 62°23'N 150°05'E	Nadezhda Yana-Kolyma	Au Au quartz vein	Small. Ranges 10.2 to 660 g/t Au.

Short, lenticular quartz veins, reticulate veinlets, and silicified dikes of quartz-albite porphyry occur within elongate fracture zones up to 15 m wide. Quartz veins and veinlets contain arsenopyrite, pyrite, galena, gold, and stibnite. Deposit is located near the Debin strike-slip fault zone, in an anticlinal fold with Lower to Middle Jurassic (Toarcian and Aalenian) siltstone and shale exposed in the core, and Middle Jurassic (Bajocian-Bathonian) siltstone and sandstone in the limbs.

Amelchenko, written commun., 1964; Zenkov and others, written commun., 1966

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-23 62°21'N 155°49'E	Galimoe Eastern Asia-Arctic: Omsukchan	Sn, Ag Sn silicate-sulfide vein	Small. Most of reserves mined out. Average grade 0.26% Sn.

Consists of Sn in conformable and cross-cutting ore bodies that are formed in conformable, gently-dipping ore bodies that replace Lower Cretaceous argillite and conglomerate at the contact with Early Cretaceous diorite porphyry and felsite sills. Ore is banded or massive quartz-tourmaline altered rocks with veinlets and disseminations of cassiterite, chlorite, pyrite, marcasite, arsenopyrite, wolframite stannite, chalcopyrite, sphalerite, and galena. Silver occurs native and with sulfides, tetrahedrite-tennantite, and sulfosalts. Paired mineralized layers occur at the roof and floor of the sills, connected by transverse, cross-cutting veins of similar composition; which contain the main bulk of metal. Ore bodies persist along dip.

Chaikovsky, 1960; Lugov, 1986

P56-24 62°16'N 155°26'E	Nevskoe Eastern Asia-Arctic: Omsukchan	Sn, W, Se Porphyry Sn	Small to Medium. Most of reserves mined out.

District extends north-northwest along a belt of intensely fractured Lower Cretaceous clastic sedimentary rocks. Belt is 180 to 350 m wide and separates granite of the Upper Cretaceous Nevsky pluton from extrusive late Cretaceous rhyolite to the west. Granite contact is tectonic in character. Rocks along the belt are replaced by quartz, tourmaline, pyrophyllite, kaolinite, and locally, by dumortierite and topaz. Ore bodies coincide with the most altered rocks; they are pipe-like, and strike for hundreds of meters. Ores are fine-grained, complexly intergrown, and are composed mainly of pyrophyllite, topaz, quartz, muscovite, and cassiterite. Tourmaline, chlorite, wolframite, arsenopyrite, chalcopyrite, galena, sphalerite, pyrite, pyrrhotite, marcasite, tetrahedrite-tennantite, stannite, rutile, and scheelite are wide-spread; semseyite, guanajuatite, laitakarite, silver, zunyite, apatite, fluorite and other minerals are rare. Sn content decreases with depth, as do topaz and pyrophyllite; but quartz increases.

Lugov, Makeev, and Potapova, 1972; Lugov, 1986

P56-25 62°22'N 152°01'E	Krokhalin Yana-Kolyma	Sb, Au Sb-Au vein (simple Sb)	Small. Ranges 0.5 to 33% Sb (average grade of 11.4% Sb). Ranges 0.5 to 93 g/t Au (average grade of 3.9 g/t Au).

A set of beresitized porphyry dikes with gold-antimony minerals occurs in Lower Jurassic flysch. Main ore-bearing dike can be traced for 3.5 km; it is usually about 0.7 to 1.5 m thick but some reach 15 m thick. Dike is cut by ladder veins and veinlets composed of albite, carbonate, and quartz with lenses of massive stibnite up to 2.5 m long and 1.5 m thick. Stibnite is also disseminated and in veinlets in the dike. Stibnite is associated with fine, disseminated gold, pyrite, arsenopyrite, chalcopyrite, and bournonite.

Panychev, and Fedotov, written commun., 1973

P56-26 62°20'N 152°22'E	Srednekan Yana-Kolyma	Au Au quartz vein	Medium. Low-grade ores. Sulfide concentrates from pilot mill contained up to 1736 g/t Au and 213 g/t Ag.

A suite of Late Jurassic diorite porphyry and granite porphyry dikes is cut by transverse and oblique sets of steeply-dipping to sometimes gently-dipping quartz veinlets. Dikes are broken into boudins, and are intensely fractured, altered, and tectonized. The necks between boudins are intensely sulfidized. Ore bodies are composed of quartz, albite, calcite, chlorite, sericite, siderite, arsenopyrite, pyrite, pyrrhotite, sphalerite, galena, chalcopyrite, gold, magnetite, and rutile. Gold is present in discrete masses, in dendrites, and in veinlets; masses of gold up to 3 g have been found. Deposit is located along the Srenekan-Shturm strike-slip fault zone. Suite of gold-bearing dikes obliquely cut the Lower and Middle Jurassic clastic sedimentary rock sequence, which has been deformed into steep east-west and northwest folds.

Skornyakov, written commun., 1953

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-27 62°18'N 152°39'E	Kuzmichan Yana-Kolyma	Hg Clastic sediment-hosted Hg or hot-spring Hg?	Small.

Consists of Hg in Upper Triassic sandstone and shale that are intruded by porphyritic biotite granite and related dikes of the deposit. The sedimentary and intrusive rocks are cut by northwest-, east-west-, and northeast-trending faults. Disseminated veinlets of cinnabar occur in deformed and fractured zones which trend northwest; the zones are 4-5 m thick and about 70-80 m long. Cinnabar also occurs as stockworks in fractured wall rocks. Gangue minerals are quartz, carbonate, and chalcedony. Ore minerals are cinnabar, metacinnabarite, pyrite, and marcasite.

Babkin, 1969

P56-28 62°17'N 151°58'E	Kinzhal Eastern Asia-Arctic: Okhotsk	Sn As, Zn Sn silicate-sulfide vein	Small. Sulfide-tin concentrates contain up to 14.3 g/t gold and 112.4 g/t silver.

Approximately sixty ore bodies include typical fracture-filling veins, altered veins, and mineralized breccias that occur in hornfels and spotted cordierite-mica schist at the contact of the late Cretaceous Verkhne-Orotukan granite. Veins trend northeast with dips of 30° to 80°. They are several hundreds of meters to 1 km long, average 0.1-0.3 m thick, and locally reach 4 m thick. Tourmalitization is prominent in deformed belts and adjacent rocks. Quartz and tourmaline are the main gangue minerals. Main ore minerals are crystalline and colloform cassiterite, arsenopyrite, pyrite, sphalerite, and marcasite. Calcite, chlorite, sericite, apatite, fluorite, rutile, sphene, pyrrhotite, chalcopyrite, galena, and stannite are less common.

Matveenko, 1959

P56-29 62°16'N 151°44'E	Kamenistoe Yana-Kolyma	Au Au quartz vein	Small. Ranges 0.1 to 190 g/t Au.

Quartz veins are confined to mineralized and fractured belts in sedimentary rocks. Fractured belts average 300 m long and are 0.2-3.5 m thick. Quartz veins are 20 to 25 m long and 0.6-1 m thick. Most productive quartz vein is 140 m long and varies in thickness from 0.3 to 3.6 m. It contains disseminated arsenopyrite, pyrite, and gold. Two ore bodies have been defined.

Skornyakov, written commun., 1953

P56-30 62°10'N 150°37'E	Yugler Yana-Kolyma	Au Au quartz vein	Small. Ore body partly mined out in 1940-50's. Produced about 1.1 tonnes Au from ore containing 12.2 g/t Au (about 90,160 tonnes of ore).

Deposit is associated with an en echelon, granite porphyry dike that intrudes Upper Triassic volcaniclastic rocks and Lower and Middle Jurassic shale and siltstone. Quartz veins with intergrown carbonates and disseminated pyrite, arsenopyrite, galena, boulangerite, and gold are confined to a one or both contacts of the dike. Veins cut the dike at an acute angle and extend some distance from dike. Veins are 100-250 m long and usually are about 0.1 to 1 m thick, but may range up to 3.8 m thick. Deposit is located near the Debin-Umar strike-slip fault.

Novoselov, written commun., 1964

P56-31 62°06'N 151°52'E	Laryukov Yana-Kolyma	Au As Au quartz vein	Small. Ranges trace to 371 g/t Au

A set of mineralized fracture zones with quartz veins, one of which is economic. Vein is 160 m long, up to 1.4 m thick, and is known to a depth of 40 m. Gold is concentrated in the footwall with arsenopyrite and pyrite. Ore bodies are controlled by bedding dislocations related to reverse and thrust faults. Host Lower and Middle Triassic clastic rocks have been deformed into linear and branching folding that trends northeast and east-west.

Skornyakov, written commun., 1953

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-32 62°07'N 152°08'E	Vetvisty Eastern Asia-Arctic: Okhotsk	Ag, Au Au-Ag epithermal vein	Small.

A set of silver-bearing zones with numerous veins and veinlets extends up to 2.2 km that average 2-2.8 m thick. These occur in quartz-sericite-chlorite altered rocks developed from contact-metamorphosed Middle Triassic shale. Main ore mineral is argentite; arsenopyrite, pyrite, and anglesite are common; and chalcopyrite, stephanite, proustite, and electrum also occur. Au:Ag ratio ranges from 1:1000 to 1:5000. Mineralization occurs over the southeastern portion of the Late Cretaceous Verkhne-Orotukan granite pluton within a circular structure about 5 km in diameter. Hypabyssal bodies and dikes of Late Cretaceous granite porphyry occur along arcuate faults bounding the south side of the structure. Bodies of Late Cretaceous and Paleogene rhyolite occur along a north-south fracture cutting the structure. Ore bodies are controlled by northwest faults and are associated with the rhyolite dikes.

Rozenblyum, oral commun., 1991

P56-33 62°04'N 155°14'E	Okhotnichie Eastern Asia-Arctic: Omsukchan	Sn W, Bi, Co Sn silicate-sulfide vein	Small. Partly mined out. Up to 59 g/t Ag and 0.4 g/t Au.

Cassiterite-quartz-chlorite veins contain small amounts of tourmaline, sericite, carbonates, and sulfides (arsenopyrite, pyrite, chalcopyrite, galena, and sphalerite). Most veins are in weakly contact-metamorphosed, Upper Triassic sandstone, siltstone, and shale; but some are in Albian-Cenomanian andesite and tuff; especially the upper portions of the veins. Subordinate minerals are wolframite, scheelite, bismuthinite, native bismuth, tetradymite, cobaltite, safflorite, tetrahedrite-tennantite, stannite, xenotime, and orthite. Veins are structurally complex. Ore bodies occur around the periphery of a circular volcanotectonic structure and show no relationship to the intrusive rocks. Veins generally occur in north-south fractures and their northwest splays are associated with the Omsukchan fault zone.

Lugov, 1986

P56-34 62°04'N 155°42'E	Trood Eastern Asia-Arctic: Omsukchan	Sn, Pb Zn, Ag Sn polymetallic vein	Small to medium. Ranges 0.1 to 46% Sn, 50 to 4000 g/t Ag, and up to 1.6 g/t Au, 1.9% Pb, and 1.5% Zn.

Cassiterite-quartz-sulfide, sulfide-quartz, and quartz-tourmaline veins and mineralized zones extend for hundreds of meters. They are confined to steeply-dipping northwest-trending fractures along a deep fault. Host rocks are mainly Upper Cretaceous andesite flows, tuff, and tuffaceous flows that are underlain by Upper Triassic clastic deposits. Granite and diorite are less significant. Area consists of a volcanic dome broken by a complex fracture pattern. Volcaniclastic rocks are interlayered with Late Cretaceous hypabyssal intrusive bodies. Sequence is intruded and metamorphosed by tin-bearing granite of the Omsukchan complex. Ore bodies are composed of pyrite, marcasite, quartz, cassiterite, arsenopyrite, hydromicas, galena, sphalerite, chlorite, siderite, chalcopyrite, calcite, tetrahedrite-tennantite, stannite, tourmaline, anatase, fluorite, pyrrhotite, brookite, and apatite. Deposits are characterized by high content of Ag, Id, and Cd.

Lugov and others, 1974a, b; Pridatko and Ananyin, 1980

P56-35 61°52'N 152°35'E	Zatessnoe Yana-Kolyma	Au Au quartz vein	Small. High-grade ore.

Consists of a set of quartz veins that occur in a northeast-trending fractured belt. Veins are up to 700 m long and dip to the south at 40°-70°. Veins cut a gently-folded Triassic sedimentary sequence. Veins are usually no more than 20-30 cm thick and are composed of quartz, calcite, arsenopyrite, and gold. Individual gold grains may range up to 8 mm. Gold values are high, but erratically distributed.

Gutt, written commun., 1949; Baranov, written commun., 1960

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-36 61°51'N 155°39'E	Ircha Eastern Asia-Arctic: Omsukchan	Sn, Ag Cu Porphyry Sn	Medium. Considerable potential.

This stockwork-like deposit trends northwest in Upper Cretaceous andesite which is underlain by Jurassic tuff and sedimentary rocks. Ore zone extends for many hundreds of meters and varies in thickness from tens to hundreds of meters. Ore body is near the contact of a heterogeneous Late Cretaceous pluton composed of gabbro, diorite, and rhyolite. Jurassic rocks are weakly contact-metamorphosed; the Upper Cretaceous andesite is propylitized. Ore bodies are en echelon systems of podiform veins, veinlets, and oblique-to-vertical pipe-like bodies. Gangue is mainly quartz, with intergrown tourmaline, chlorite, sericite, adularia, calcite, and fluorite. Ore minerals are cassiterite, arsenopyrite, chalcopyrite, pyrite, pyrrhotite; and less common wolframite, scheelite, molybdenite, bismuthinite, bismuth, stannite, teallite, marcasite, galena, sphalerite, sternbergite, freibergite, pyrargyrite, acanthite, and native silver. Cassiterite deposition was preceded by fracturing of the earlier quartz-tourmaline and quartz-chlorite altered rocks.

Ananyin, Pridatko, and Terentiev, 1980; Kuleshov, Kopytin, and Pristavko, 1984; Lugov, 1986; Plyashkevich, 1986

P56-37 61°42'N 151°32'E	Netchen-Khaya Eastern Asia-Arctic: Verkhne-Kolyma	Au, Mo, Bi Granitoid-related Au	Small to medium. Approximate resource of 70 tonnes Au.

Zones of en echelon quartz and quartz-tourmaline-sulfide veins, trend northeast in the apical portion of a Cretaceous multiphase intrusion composed of gabbro, diorite, granodiorite, porphyritic granite, and aplite. Pluton is somewhat elongated to the north, and extends over an area of about 6 by 4.5 km. Ore bodies are 100-150 m long and 1.5-2 m thick. Veins are associated with zones of greisenization. Ore minerals are arsenopyrite (which comprises up to 30% of the vein), löellingite, pyrite, scheelite, molybdenite, tetradymite, bismuthinite, and gold. Fluorite occurs in the veins; and anomalous values of Ag, Sn, and W are detected.

Aksenova, 1990

P56-38 61°43'N 153°19'E	Ossolonyn Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn greisen	Small.

Greisenized granite porphyry bodies, with zoned quartz-topaz greisen and sericitic alteration, host quartz-topaz-fluorite and quartz-fluorite-sericite veinlets containing cassiterite, arsenopyrite, pyrite, and small amounts of tourmaline, chlorite, apatite, and rutile. Ores contain notable tungsten and bismuth. Seven ore bodies trend northwest in contact-metamorphosed Triassic sandstone and shale near the Upper Cretaceous Sredne-Buyund granite.

Matveenko, 1959

P56-39 61°45'N 150°44'E	Bokhapcha Yana-Kolyma	W W vein and greisen	Medium. Ranges from 0.15 to 4.27% WO_3, with minor Au, Sn, Bi.

A linear stockwork composed of variably oriented quartz, carbonate-quartz, and feldspar-quartz veins and veinlets; quartz-muscovite, quartz-topaz, quartz-tourmaline greisens; and greisenized aplites that contain wolframite and some scheelite. Stockwork extends over an area of about 1600 m by 250 m. Wolframite occurs as thick tabular crystals and masses up to 30 cm in size. Minor or rare ore minerals include arsenopyrite, pyrite, molybdenite, cubanite, bismuthinite, and cassiterite. Ore-bearing stockwork is elongated to the northeast and occurs in contact-metamorphosed Upper Triassic sandstone and shale at a steeply dipping contact with the northwest portion of the Lower Cretaceous Bokhapcha granite.

Chicherin, written commun., 1970, 1978; Kolesnichenko, Pristavko, and Sobolev, 1985

P56-40 61°41'N 150°33'E	Ekspeditsionnoe Yana-Kolyma	Au Au quartz vein	Small. Ranges from trace to tens of g/t Au.

Quartz veins, veinlets, and mineralized fracture zones trend east-west and northeast in Upper Triassic shale, siltstone, and sandstone. Ore bodies generally extend east-west over an area about 1.8 km long and 200-300 m wide. In addition to quartz, the veins contain calcite, arsenopyrite, pyrite, and gold. Veins and mineralized zones are up to 160 m long and 1.5 thick. Ore bodies cut porphyritic dikes, which themselves intrude folds at an acute angle.

Baranov, written commun., 1949

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-41 61°28'N 150°52'E	Maltan Stock Eastern Asia-Arctic: Okhotsk	Au, Bi, Te Mo Granitoid-related Au	Small. Au and Ag contents variable. Samples with up to 242 g/t Au, minor Bi, W, and Co.

Deposit is associated with en echelon fracture zones in Cretaceous biotite gabbro, quartz diorite, granodiorite porphyry, and porphyritic granite; that intrude Middle and Upper Triassic sedimentary rocks. En echelon structures are 2.5 to 3 km long. Ore bodies are controlled by northeast fractures that are transverse to the fractures that control the intrusions. Mineralization consists of quartz, quartz-carbonate, and sulfide-quartz veins that range from tens to hundreds meters long and from 10-20 cm thick. Ore minerals are arsenopyrite, löellingite, molybdenite, galena, sphalerite, pyrrhotite, pentlandite, scheelite, boulangerite, native bismuth, bismuthinite, bismuth sulfotellurides, silver tellurides, and native gold (450-1000 fine).

Kamenikhin and Shtokolova, written commun., 1986; Malinovsky, written commun., 1970; Osipov and Savva, written commun., 1975; Voroshin and others, written commun., 1990

P56-42 61°20'N 151°36'E	Dneprov Eastern Asia-Arctic: Verkhne-Kolyma	Sn W, Mo, Bi, Au, Ag Sn silicate-sulfide vein and Sn greisen	Medium. Produced 5,000 tonnes Sn.

Tourmaline-quartz, fluorite-tourmaline, and sulfide-tourmaline veins; most of which trend approximately north-south, but some trend east-west. Veins occur with quartz-tourmaline, tourmaline-topaz, and muscovite-topaz-quartz tin-bearing greisens. Veins average about 70 m long, with a maximum length of 600 m, and range from 0.5-3 m thick. Main gangue minerals are quartz, tourmaline, topaz, fluorite, muscovite, chlorite, calcite, and albite. Main ore minerals are arsenopyrite, löellingite, cassiterite, ferberite, marmatite, chalcopyrite, pyrite, pyrrhotite, and magnetite. Minor minerals are beryl, zircon, xenotime, monazite, yttrium-bearing fluorite, apatite, siderite, stannite, galena, marcasite, jamesonite, tetrahedrite, tennantite, bismuthite, molybdenite, native bismuth, gold, silver, and colloform cassiterite. Ore bodies occur in 12 separate areas along contacts of subalkalic porphyry granite, granite porphyry, and microgranite of the Upper Cretaceous Dneprov pluton; both within and adjacent to pluton. Main part of the Sn reserves occur along granite margin in a northeastern-trending band. Some mineralization occurs in contact-metamorphosed Triassic tuff and sedimentary rocks. Freibergite and sulfides increase with depth.

Lugov and others, 1974a, b

P56-43 61°06'N 151°47'E	Kheta Eastern Asia-Arctic: Verkhne-Kolyma	Sn, Zn, Pb, Cu, Bi, Ag Sn polymetallic vein	Small. Moderate Sn content. Ag values up to 80 g/t or more.

Three pipe-like, steeply dipping, explosion breccia bodies in a volcanic neck cover about 1400 m^2. Breccia bodies occur in sericitized, kaolinized, chloritized, and silicified Upper Cretaceous rhyolite and associated tuff. Volcanic rocks are intruded by trachyrhyolite and basalt dikes. Disseminated veinlets, stockworks, and some massive cassiterite-sulfide and sulfide-stannite ores, occur within intensely fractured and hydrothermally altered pipe-like bodies, separated by weakly mineralized rock. Ore is composed of quartz, iron chlorite, siderite, fluorite, sphalerite, cassiterite, pyrite, stannite, galena, and chalcopyrite; with subordinate sericite, kaolinite, alunite, pyrrhotite, arsenopyrite, marcasite, native bismuth, native lead, tetrahedrite-tennantite, pyrargyrite, polybasite, argyrodite, canfieldite, famatinite, and argentite. Mineralization consisted of metasomatism superimposed on repeated igneous events.

Chaikovsky, 1960; Lugov, Makeev, and Potapova, 1972; Lygov and others, 1974a, b

P56-44 61°00'N 152°09'E	Suvorov Eastern Asia-Arctic: Verkhne-Kolyma	Sn Rhyolite-hosted Sn	Small.

Colloform cassiterite nodules (wood tin) are present in intensely silicified and kaolinized, fluidal rhyolite, agglomeratic vitric tuff flows, and tuff- and lava-breccia. The volcanic rocks, of Upper Cretaceous age, are associated with vent facies volcanism. Cassiterite is associated with fine-grained quartz, hematite, chlorite, kaolinite, pyrite, and arsenopyrite. Ore is characterized by high iron and indium.

Lugov and others, 1974a, b; Flerov, 1974

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-45 60°58'N 151°10'E	Zerkalnoe Eastern Asia-Arctic: Verkhne-Kolyma	Au, Ag, Bi, Te Au-Ag epithermal vein	Small. Ranges 0.4 to 39 g/t Au and 18 to 349 g/t Ag.
Zones of disseminated veinlets occur in a granite porphyry dike 400 m long and 60 m thick that intrudes a Late Cretaceous diorite pluton. Deposit consists of quartz and quartz-carbonate veinlets containing silver sulfosalts, tetradymite, petzite, hessite, electrum, arsenopyrite, galena, and sphalerite. Ponomarev and Ivanyuk, 1988			
P56-46 60°58'N 150°53'E	Agat Eastern Asia-Arctic: Okhotsk	Au, Ag Pb, Zn, Cu Au-Ag epithermal vein	Small. Reserves of 3.8 tonnes Au and 70 tonnes Ag. Considerable potential. Average contents 6.5 to 11.8 g/t Au and 65 to 174 g/t Ag. Bonanza ores contain up to 30 kg/t Au.
Several tens of quartz, carbonate-quartz, and sulfide-quartz veins occur in sheets of propylitized Cretaceous andesite. Veins are generally simple in form; they are controlled by fissures trending northwest to north-south. Ore bodies are usually tens to hundreds of meters long, but sometimes up to 2 km in length. The ore bodies average 0.2-1 m thick, but some reach 50 m. Hydromicatization, chloritization, and silicification are typically associated with the veins, but less eroded veins are accompanied by weak adularization. Symmetrical crustification-banding and complex deformation structures are characteristic of the veins. Main gangue minerals are quartz and carbonates, including calcite, dolomite, siderite, manganese-rich siderite, rhodochrosite, and kutnahorite. Barite, chalcedony, and opal occur near the periphery of the deposit. Main ore minerals are: galena, sphalerite, chalcopyrite, marcasite, and pyrite. Arsenopyrite, pyrrhotite, tetrahedrite-tennantite, tellurides, sulfosalts of silver and other minerals are present locally. Gold occurs in the form of electrum (550-500 fine). Average sulfide content of veins is 5-10%, but locally ranges to 20-30%. A gold-sphalerite-galena-quartz assemblage is the most productive, and is present in most veins. This assemblage also contains chalcopyrite, tetrahedrite-tennantite, tellurides of gold and silver, pyrargyrite, stephanite, and argentite. The Au:Ag ratio varies from 5:1 to 1:100, and averages about 1:2-1:5. Naborodin, written commun., 1971, 1977			
P56-47 60°49'N 153°32'E	Khakandya Eastern Asia-Arctic: Koni-Yablon	Mo Porphyry Mo	Small. Ranges 0.1 to 6.7% Mo, up to 589 g/t Ag, and up to 6.8 g/t Au.
Deposit consists of quartz veins containing molybdenite, arsenopyrite, sphalerite, and galena, and vein-like bodies of quartz-muscovite greisens cut by molybdenite veinlets. More than 20 ore bodies are known; they are about 120-180 m long and occur in greisenized Late Cretaceous granodiorite and subalkalic granite. Molybdenum is associated with polymetallic veins containing galena, sphalerite, chalcopyrite, and pyrite; and up to 589 g/t silver and 6.8 g/t gold. Kobylyansky, written commun., 1970			
P56-48 60°46'N 150°16'E	Svetloe Eastern Asia-Arctic: Verkhne-Kolyma	Sn Sn polymetallic vein	Small.
Deposit consists of a set of steeply dipping, quartz-chlorite veins, up to 1 to 2 m thick, that cut contact-metamorphosed Permian sandstone, shale, and tuffaceous shale. Veins contain fine-grained pyrite, chalcopyrite, and pyrrhotite. Deposit occurs in the marginal portion of a domal structure related to the intrusion of a Late Cretaceous leucogranite. Umitbaev, 1986			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-49 60°44'N 153°28'E	Nyavlenga Eastern Asia-Arctic: Koni-Yablon	Au, Ag Au-Ag epithermal vein	Small. Reserves of 8.4 tonnes Au and 475 tonnes Ag. Considerable potential. Ranges 6.4 to 14.5 g/t Au and 241.5 to 431 g/t Ag.

Summary and References

Altered chlorite-quartz, adularia-chlorite-quartz, and quartz veins and veinlets occur in the middle of a volcanotectonic depression that occurs at the intersection of north-south, northeast and east-west faults. Approximately 20 ore bodies, each about 10-20 m thick, occur in three zones. Two of the zones are in Lower Cretaceous propylitized andesite; and the third one is in an altered quartz-sericite-pyrophyllite rock developed from rhyolite fragmental flows. Ore textures are colloform to indistinctly banded, massive, and brecciated. Ore minerals are pyrite, sphalerite, galena, chalcopyrite, arsenopyrite, pyrrhotite, bornite, jamesonite, wittichenite, native silver, küstelite, freibergite, acanthite, stephanite, polybasite, stromeyerite, canfieldite, molybdenite, and hematite. A gold-silver-chlorite-quartz phase of mineralization is locally superimposed on a later garnet-epidote-quartz association with hematite and magnetite. Native silver in pyrite is common, and becomes coarser grained with increased thermal metamorphism. Molybdenum and polymetallic mineralization are associated with the later granitic rocks. Ar-Ar age dating of adularia in the Au-Ag vein yields an isotopic age of 94 Ma.

Bocharnikov, written commun., 1977; Bocharnikov and Ichetovkin, 1980; Savva, written commun., 1981; Demin, 1990; P.Layer, V.Ivanov, and T.Bundtzen, written commun., 1994.

P56-50 60°46'N 150°38'E	Skarnovoe Eastern Asia-Arctic: Okhotsk	Zn, Pb, Ag Pb-Zn-Ag skarn	Small.

Podiform sulfide-polymetallic ore bodies extend for several tens or hundreds of meters and are several meters thick. They are controlled by weak fractures in a Upper Triassic (Norian) limestone that has been altered to skarn. Amount of skarn decreases away from a granite pluton. Pyrrhotite skarn bodies contain varying amounts of magnetite, wollastonite, tremolite, epidote, zoisite, garnet, and carbonate. Main ore minerals are sphalerite, accompanied by galena. Silver is mainly in the galena. Skarn also contains gold and rare earth elements.

Umitbaev, 1986

P56-51 60°36'N 150°20'E	Kandychan Eastern Asia-Arctic: Verkhne-Kolyma	Sn, Ag Sn polymetallic vein	Small. Partly mined out. Produced 2,000 tonnes Sn.

Consists of groups of veins and veinlets occur in a generally north-south band, more than 2 km long and 500 to 600 m wide, in Upper Cretaceous subvolcanic and flow rocks of moderately felsic to felsic composition. Volcanic rocks are propylitized, silicified, and argillized. Ore bodies consist of quartz-chlorite-cassiterite-sulfide veins with various carbonates (calcite, siderite, dolomite), sericite, hydromica, kaolinite, dickite, pyrophyllite, fluorite, and tourmaline. Sulfide minerals include stannite, pyrargyrite, hessite, and argentite; as well as pyrite, chalcopyrite, arsenopyrite, marcasite, pyrrhotite, sphalerite, galena, bornite, and covellite. Deposits are characterized by high silver, bismuth, cobalt, and gold. Sulfide veins with colloform cassiterite give way at depth to low-sulfide chlorite-quartz veins with crystalline cassiterite.

Firsov, 1972; Lugov and others, 1974a, b; Savva, written commun., 1980

P56-52 60°37'N 151°27'E	Kolkhida Eastern Asia-Arctic: Okhotsk	Ag, Au, Sn Au-Ag epithermal vein	Small.

Quartz-carbonate vein with adularia, chlorite, manganocalcite, kaolinite, pyrite, chalcopyrite, tetrahedrite-tennantite, polybasite, native silver, küstelite, argentite, stephanite, galena, sphalerite, marcasite, and cassiterite. Vein cuts hydrothermally altered Upper Cretaceous brecciated flows and tuff, mainly of rhyolite-dacite, near the contact with a granite porphyry dike. Au:Ag ratio is about 1:1000. Vein occurs at the southern end of a small volcanotectonic structure.

Umitbaev, 1986

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P56-53 60°31'N 149°60'E	Verkhne-Seimkan Eastern Asia-Arctic: Verkhne-Kolyma	Co, Bi Co-Bi-As vein	Small.

Sets of quartz, quartz-chlorite, and quartz-tourmaline veins in hornfelsed contact-metamorphosed sedimentary rocks near the contact of the Late Cretaceous Seimkan multiphase granitic pluton. Main ore minerals are cobaltite and cobalt-bearing arsenopyrite. Subordinate minerals are chalcopyrite, galena, sphalerite, pyrite, marcasite, pyrrhotite, boulangerite, löellingite, glaucodot, bismuthinite, native bismuth, and molybdenite.

Demin, written commun., 1945; Umitbaev, 1986.

P56-54 60°26'N 150°41'E	Utessnoe Eastern Asia-Arctic: Okhotsk	Ag, Au, Hg Au-Ag epithermal vein	Small. Typical ore contains up to 5.8 g/t Au and 680 g/t Ag.

A set of discontinuous adularia-quartz veins and veinlets, with associated alteration zones, occur in a subvolcanic body of Late Cretaceous fluidal rhyolite and associated breccia. Subvolcanic intrusion is controlled by a northeast fault of the Arman volcanic collapse structure. Veins are grouped in three zones, which tend to converge at the root of a lopolith-like body. Dominant ore minerals are: pyrargyrite and stephanite; freibergite, polybasite, miargyrite, native silver, electrum, pyrite, and sulfides of copper, lead, and zinc are minor or rare. Au:Ag ratio is 1:100 or less. There is a distinct vertical metasomatic zoning. Gold-silver ore bodies occur in a quartz-adularia-hydromica zone about 300 m thick; beneath it is a zone of andesite marked by low-temperature propylitization; above the ore zone is a sharp change to quartz-kaolinite and quartz-kaolinite-alunite alternation, with quartz containing disseminated stibnite and cinnabar. Deposit is barely eroded and formed near the surface; as indicated by the wide occurrence of ultrafelsic metasomatism and the preservation of a layer of subaerial ignimbrite.

Eremin, 1974

P56-55 60°14'N 150°60'E	Karamken Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Medium. Discovered in 1964. Being mined. Produced 40 tonnes Au from 1978 to 1992. Average grade of 100 to 129 g/t Au in 1978 and 16-18 g/t Au in 1992.

Deposit consists of numerous adularia-quartz and adularia-carbonate-quartz veins more than 200 m long and more than 0.2 m thick. Veins are controlled by arcuate and linear faults which define and crosscut a caldera filled with Upper Cretaceous dacite, andesite-basalt, and rhyolite. Main deposit, which contains about 80-90% of the reserves, is confined to few major veins that are spatially related to a hypabyssal body cut by circular faults and composed of andesite, andesitic dacite, volcanic breccia of andesite-dacite composition, and rhyolite. Most productive veins are associated with an altered zone comprised of adularia-hydromica and quartz; and explosion and hydrothermal breccia bodies. A zone of kaolinite, alunite, and quartz alteration occurs in higher parts of the ore deposit. Ore minerals are pyrite, sphalerite, chalcopyrite, canfieldite, freibergite, tennantite, naumannite (Ag_2Se), polybasite, electrum, küstelite, native silver, and other less common sulfides, selenides, sulfostannates, and sulfosalts of silver. Au:Ag ratio is 1:3 to 1:4 in the richest portions of Glavnaya vein. Veins form in clusters, which converge at depth. Gold-canfieldite-freibergite-chalcopyrite and gold-pyrite-sphalerite zones are the most productive; at depth they are succeeded by a galena-canfieldite zone with tin-silver minerals. Ar-Ar age isotopic study of adularia in Au-Ag vein yields an age of 79 Ma.

Krasilnikov and others, 1971; Nekrasova, 1972; Goldfrid, Demin, and Krasilnikov, 1974; Nekrasova and Demin, 1977; Sidorov, 1978; P.Layer, V.Ivanov, and T.Bundtzen, 1994, written commun.

P56-56 61°10'N 153°59'E	Julietta Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Medium. Average grade of 29 g/t Au, 325 g/t Ag. Proven reserves of 18 t Au, 200 t Ag. Estimated resources of 40 t Au and about 1,000 t Ag.

Deposit consists of Au-Ag sulfide-carbonate-quartz veins located inside a large Late Cretaceous caldera. Volcanic rocks in caldera and associated subvolcanic intrusive rocks comprised of andesite, andesite-basalt, and andesite-dacite. Veins dip steeply and vary from 200 to 500 m length and from 1 to 4 m wide. Major ore minerals are native gold and silver, freibergite, polybasite, galena, sphalerite, chalcopyrite, hessite, acantite, cubanite, pyrrhotite, and naumannite. Associated minerals in adjacent metasomatically-altered volcanic rocks are ankerite, calcite, chlorite, epidote, and hydromica. Ore minerals formed in two stages, an older gold-polymetallic stage, and a younger gold-silver-sulphosalt stage.

S.F. Struzhkov, O.B. Ryzhov, and V.V. Aristov, written commun., 1994.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P57-01 63°48'N 159°28'E	Grisha Kedon	Au, Ag Au-Ag epithermal vein	Small.

Summary and References

Rare, thin veins and zones of quartz veinlets that extend for several tens or hundreds of meters and range up to several meters thick. Disseminated native gold, galena, sphalerite, chalcopyrite, and high molybdenum values are present. Au:Ag ratio is 1:2 to 1:3. Ore bodies are confined to a zone just inside the northern contact of the Early Paleozoic Anmandykan pluton. The pluton is composed of alkalic syenite and nordmarkite, and lies along a northeast trending fault zone. Early Paleozoic and Late Mesozoic stages of mineralization have been identified; the latter involves the remobilization of the earlier.

Korobeinikov, oral commun., 1991

P57-02 63°49'N 158°25'E	Sedoi Eastern Asia-Arctic: Korkodon-Nayakhan	Ag, Co Ag-Co arsenide vein and Fe-Pb-Cu-Ag-Au skarn	Small. Veins contain up to 8 g/t Au and 196 g/t Ag.

Polysulfide-carbonate veins occur in conformable and cross-cutting bodies of garnet-epidote-sulfide and pyrrhotite-garnet skarn hosted in Ordovician limestone and dolomite. Some limestone layers replaced by hematite. Wall rocks are intruded by Late Devonian biotite granite and subsequently by hypabyssal rhyolite emplaced along the granite-limestone contact, locally forming sheets. Skarn mineralization is marked by tellurides of silver, lead, and bismuth, with rare inclusions of native gold. Fracture veins related to volcanogenic mineralization are composed of calcite, manganocalcite, galena, sphalerite, and fine-grained intergrowths of proustite, stephanite, pyrargyrite, sternbergite, argentopyrite, and silver-bearing löellingite, glaucodot, and arsenopyrite. Karst development is widespread, often associated with areas notable for crustification banding that contains native silver.

Savva and Vedernikov, 1989

P57-03 63°44'N 160°01'E	Kubaka Kedon	Au, Ag Au-Ag epithermal vein	Medium. Proven reserves about 100 tonnes Au. Average about 17 g/t Au and 15.7 g/t Ag.

Veins and zones of adularia-quartz and adularia-chalcedony-hydromica-quartz veinlets containing fluorite, barite, and carbonate, occur in a northwest-trending elongate caldera 4 km in diameter. The caldera lies transverse to the northeast trend of the main regional structural elements. The caldera is rimmed by Middle to Upper Devonian volcanic rocks and volcanogenic sediments and is filled with Upper Devonian to Lower Carboniferous volcanic rocks. Gold-bearing veins occur within the caldera, localized in subvolcanic trachydacite in a stratified volcaniclastic sequence of Middle to Upper Devonian ignimbrite, pumiceous rhyolite to dacite, trachyandesite and rhyolite-dacite sills, and tephra and agglomerate tuff of various compositions. Deposits die out in the overlying Lower Carboniferous carbonaceous shale and siltstone. The most intensely mineralized veins trend about east-west and west-northwest. Cretaceous rhyolite and alkalic basalt dikes occur within and beyond the mineralized tectonic block. Basalt dikes cross the mineralized veins and are themselves cut by later, gold-poor quartz-carbonate veins and veinlets. Host rocks are intensely silicified, adularized, and sericitized; with the development of much hydromica. Initial stage of mineralization is marked by a gold-chalcedony association with colloidal gold (+electrum and küstelite). Later adularia-quartz stage involves coarser, recrystallized native gold and scattered, disseminated pyrite, arsenopyrite, galena, freibergite, acanthite, aguilarite, naumannite, argentopyrite, and sulfides of gold and silver in fine-grained aggregates. Native gold predominates markedly over sulfide-bound gold. Au:Ag ratio is 1:1 to 1:2. Rb-Sr isochron ages of stratified volcanic rocks and subvolcanic caldera rocks are 332-344 Ma. Post-ore alkalic basalt dikes yielded 124-155 Ma ages by K-Ar. Ar-Ar ages on adularia from ore veins range from 110 to 175 Ma, with plateau ages ranging from 110-130 Ma. Most geologists consider the age of mineralization to be Late Devonian-Early Carboniferous because fragments of gold-bearing calcedonic quartz are found in the adjacent conglomerates which contain Lower-Middle Carboniferous fossils.

Yarantseva and Boldyrev, 1988; Savva and Vortsepnev, 1990; Stepanov and others, 1991; Banin, 1993, (oral commun.); I.N. Kotlar, 1986, (written commun.); V.V. Ivanov and P.W. Layer, 1994, (written commun.)

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P57-04 63°33'N 159°38'E	Yolochka Kedon	Au, Ag Au-Ag epithermal vein	Small.

Zone of veinlets and veins of quartz and carbonate-quartz composition that visually appear unmineralized, are accompanied by haloes of altered aplite-like rock. Ore bodies are up to 16 m thick, but the gold values are erratic. Au:Ag ratio is 1:1 to 1:3. Deposit occurs in Devonian volcanic rocks that form a volcanic dome in the Omolon massif. Archean schist underlies the volcanic rocks in the western part of the district. A large, linear body of Devonian diorite porphyry occurs along an east-west fault. Hypabyssal porphyritic dacite and dacitic brecciated flows are exposed in the middle of the dome. Deposit is related to the hypabyssal dacite.

Rozenblyum, oral commun., 1991

P57-05 63°29'N 158°50'E	Vechernee Kedon	Mo, Cu Porphyry Mo-Cu	Large. Averages 0.2% Mo, 0.2% Cu, 0.1 to 0.6 g/t Au, 2 to 10 g/t Ag.

Molybdenite-chalcopyrite quartz stockwork zone of altered pyritized, and silicified rocks with illite, occurs in mid-Paleozoic subalkalic granite that forms the core of an intrusive dome in Archean and Upper Proterozoic rocks. Richest ore bodies are confined to zones along the contacts of the granite; both within and adjacent to the pluton. Minor tungsten.

Rozenblyum, oral commun., 1991

P57-06 63°29'N 158°32'E	Skarn Eastern Asia-Arctic: Korkodon-Nayakhan	Fe W, Au, Ag Fe (±Au, Cu, W, Sn) skarn	Medium. Estimated 130 million tonnes containing 56% Fe, 2.96% MnO, 0.16% TiO_2, and minor Au and Ag.

Garnet, garnet-pyroxene, and pyroxene-clinohumite skarns contain numerous steeply-dipping, magnetite ore bodies about 300-800 m by 10-100 m in size. Massive ores are common and the ore bodies are controlled by faults. Skarn and associated deposits form a zone up to 150 m wide and about 2.2 km long around a Lower Paleozoic quartz monzonite intrusion. Skarns are succeeded by tremolite-wollastonite marble farther from the intrusion. District is mainly composed of a Riphean carbonate terrain that includes Archean migmatite with small jaspilite bodies. Magnetite skarns characteristically contain tungsten in scheelite, and gold and silver values.

Fadeev, 1975

P57-07 63°24'N 157°04'E	Khetagchan Eastern Asia-Arctic: Korkodon-Nayakhan	Au, W, Bi Granitoid-related Au	Small. Up to 20 g/t Au and up to 50-60 g/t Ag.

Zones of sulfide-quartz and sulfide-chlorite-quartz veins and veinlets up to 150 m long and 10-15 m thick occur along the contacts of an Upper Cretaceous granodiorite body; both within and adjacent to the intrusion. Ore minerals are galena, sphalerite, chalcopyrite, wolframite, pyrite, arsenopyrite, bismuthinite, native bismuth, gold, electrum, tetrahedrite-tennantite, silver sulfosalts, and argentite.

A.A. Sidorov, written commun., 1990

P57-08 63°23'N 161°42'E	Kegali Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Medium. Considerable potential.

Thick and extensive quartz, adularia-quartz, and carbonate-adularia-quartz veins and zones of veinlets in an area 2 km or more long contain disseminated pyrite, chalcopyrite, argentite, polybasite, stromeyerite, galena, sphalerite, native gold, and native silver. Veins occur in a large Lower to Upper Cretaceous, hypabyssal dacite body and in volcanic flows of intermediate to basic composition. Veins are accompanied by the haloes of illite-quartz alteration. Orientation of the ore bodies is related to sets of arcuate faults between an extrusive dome and an area of local volcanic subsidence. Au/Ag ratio is 1:3 to 1:10. Ar-Ar isotiopic studies yield an age of 79.0 Ma for the Au-Ag veins.

Peskov, written commun., 1975; P.Layer, V.Ivanov, and T.Bundtzen, written commun., 1994.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P57-09 63°21'N 158°22'E	Verkhny-Omolon Omolon	Fe Ironstone	Large. Estimated to contain 960 million tonnes grading 33 to 51% Fe (average grade 40.5% Fe) and up to 0.3 g/t Au.

Sheet-like and podiform bodies of banded iron formation occur in Archean migmatite, amphibole and biotite-amphibole plagiogneiss, amphibolite, and mafic schist. Banded iron ore is composed of magnetite (45-65%), and quartz (35-55%) intergrown, with apatite and actinolite. Sulfur is absent. Ores are variously medium to coarse grained, massive, or banded. Main deposit extends for 3.5 km and averages 250 m thick in the thickest, central portion. It locally includes alternating, nearly conformable ore bodies and mineralized horizons of the country rock. The original quartzite and possibly the ironstone deposits may be derived from marine sedimentary rocks that originally contained ironstone (Superior Fe) deposits. The host rocks are extensively granitized. Rb-Sr isotopic data reveal multiple metamorphisms of the Archean basement. Granulite facies metamorphism occurred at 3.4 to 3.8 Ga; regional granitization occurred approximately at 2.0 Ga; and low grade metamorphism and deformation occurred approximately at 1.0 Ga (Zhulanova, 1990; Milov, 1991).

Gelman, Titov, and Fadeev, 1974; Fadeev, 1975; Zhulanova, 1990; Milov, 1991.

P57-10 63°07'N 159°19'E	Verkhny-Koargychan Eastern Asia-Arctic: Korkodon-Nayakhan	Au, Ag, Pb, Zn Au-Ag Polymetallic vein	Small. Samples contain up to 84.9 g/t Au, 538 g/t Ag, 15.8% Pb, 19% Zn, and 0.7% Cu.

Quartz-sulfide and quartz-carbonate-sulfide veins and sulfidized fractured zones contain massive galena, sphalerite, and pyrite, with Au and Ag. Host rock is Upper Permian limestone, and less commonly, siltstone. Ore zones strike predominantly about north-south and extend for several tens or sometimes several hundred of meters.

Vasetsky and Dorogoy, written commun., 1978

P57-11 62°60'N 160°03'E	Druchak Eastern Asia-Arctic: Okhotsk	Ag, Au Pb, Zn Au-Ag epithermal vein	Small. Samples contain 0.1 to 5.8 g/t Au, 112 to 3613 g/t Ag, and up to 1% Pb, Zn, Mo.

Steeply-dipping quartz, adularia-quartz, carbonate-quartz, and sulfide-carbonate veins, from 20 to 350 m long, grade along strike into zones of sulfide-carbonate-quartz veinlets. Ore bodies occur in Upper Cretaceous extrusive rocks and strike northwest and north-northeast. Ore minerals are argentite, pyrargyrite, polybasite, pyrostilpnite, owyheeite, electrum, galena, sphalerite, chalcopyrite, tetrahedrite-tennantite, and arsenopyrite.

Lyaschenko and others, written commun., 1990

P57-12 62°41'N 159°55'E	Irbychan Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Small. Up to 12 g/t Au and 220 g/t Ag.

Gently dipping veins, lenses, and zones of veins formed in three stages: (1) an adularia-quartz stage with gold and silver values, marked by pyrite, argentite, pyrargyrite, sternbergite, and gold, (Au:Ag = 1:10); (2) a quartz stage carrying high silver values marked by pyrite, argentite, and native silver (Au/Ag = 1:300-1:500), and (3) a carbonate-quartz silver-polymetallic stage with pyrite, galena, sphalerite, and chalcopyrite. Main ore bodies occur in a hypabyssal rhyolite body along approximately east-west-trending faults. Ore bodies are several hundreds meters long. Deposit is in the margin of a circular structure dominated by Upper Cretaceous ignimbrite and subject to resurgent doming. Underlying rocks are Devonian volcanic rocks, and carbonates and clastic rocks of Permian, Triassic and Upper Jurassic age. Adularia from ore veins yeilded an Ar-Ar age of 82.8 Ma.

Zhivotnev and Litovchenko, 1977; V.V. Ivanov and P.W.Layer, written commun.,1994.

P57-13 62°35'N 157°16'E	Orlinoe Eastern Asia-Arctic: Korkodon-Nayakhan	Mo W Porphyry Mo	Small. Mo averages 0.01 to 0.03% but ranges up to 8.5%.

Steeply-dipping stockwork extending for tens of meters. It is composed of thin quartz veins and veinlets with disseminated and masses of molybdenite. Subordinate minerals are pyrite, chalcopyrite, wolframite, powellite, muscovite, fluorite, calcite, chlorite, and garnet. Molybdenum mineralization occurs in contact-metamorphosed Upper Triassic sedimentary rocks and in intruding Late Cretaceous granite.

Okhotkin, written commun., 1957

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P57-14 62°32'N 159°45'E	Evenskoe Eastern Asia-Arctic: Okhotsk	Au, Ag Te, Bi Au-Ag epithermal vein	Medium. Reserves of 2.5 million tonnes grading 10 g/t Au, 250 g/t Ag. Considerable potential.

Summary and References

Complicated veins, altered zones with veinlets, and linear explosion-hydrothermal breccias. They occur in ignimbrite and andesite flows; and in sheets, fissured bodies, and extrusive domes of Late Cretaceous rhyolite, trachyrhyolite, rhyodacite, and dacite. Hydrothermal alteration ranges from low- and middle-temperature propylitization to highly-altered quartz-adularia-illite metasomatite. Mineralized zones are several hundred meters to 4 km long, and 5-10 m thick. Several mineral associations are recognized: (1) a gold-sulfide polymetallic association with gold and silver tellurides in epidote-quartz and quartz veins; (2) a gold-argentite association with selenides and locally stibnite in adularia-carbonate-quartz and quartz veins; (3) a gold-sulfide-sulfoantimonide association with selenides and pyrite in veins of the same composition as the previous association; and (4) a gold-sulfide-sulfoantimonide association in quartz and barite-quartz veins. Main ore minerals are gold, electrum, küstelite, native silver, argentite, polybasite-pearceite, proustite, pyrargyrite, stromeyerite, tetrahedrite-tennantite, naumannite, aguilarite, and hessite; native bismuth, iron, zinc, and copper; several polymetallic minerals are also known. Au:Ag ratio is generally about 1:20-1:30. More than ten independent ore zones occur in a circular hypabyssal complex along the northwest fault that bounds the Turomcha volcanic structure, which extends for 50 km and is approximately 7 km wide. Ar-Ar isotopic studies of adularia from vein yields an age of 78.0 Ma.

Kostyrko, Plyashkevich, and Boldyrev, 1974; Kostyrko, 1977; Kostyrko and Romanenko, 1978, 1980; Sidorov, 1978; P.Layer, V.Ivanov, and T.Bundtzen, written commun.,1994.

P57-15 62°26'N 157°35'E	Olyndja Eastern Asia-Arctic: Okhotsk	Ag, Au Au-Ag epithermal vein	Small. Ranges up to 4 g/t Au and 3 to 1079 g/t Ag.

Sets of closely spaced, approximately north-south, quartz, quartz-carbonate, and adularia-quartz veins and veinlets occur over a zone about 1 km long in silicified, kaolinized, and sulfidized Upper Cretaceous volcanic rocks. Main ore minerals are silver sulfosalts, argentite, xanthoconite, and native silver. Pyrite, chalcopyrite, and galena are minor. Zone occurs at the south side of a volcanotectonic depression formed at the intersection of northwest and nearly east-west faults.

Kuzyukov, written commun., 1977

P57-16 62°19'N 159°58'E	Aldigych Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Small. Up to 14.5 g/t Au and 98 g/t Ag.

Stockwork zones 200 to 300 m long, include short en echelon and subparallel, quartz and barite-quartz veins and veinlets containing electrum, galena, sphalerite, chalcopyrite, silver-bearing tetrahedrite, sulfosalts of silver, and stibnite. Upper Cretaceous porphyritic ignimbrite wall rock is locally altered to quartz-kaolinite and siliceous metasomatite. Some veins are confined to propylitized andesite and hypabyssal gabbro-diorite porphyry.

Kostyrko, Plyashkevich and, Boldyrev, 1974

P57-17 62°14'N 159°11'E	Nevenrekan Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Small. Ore ranges 0.5 to 23 g/t Au and 22 to 746 g/t Ag.

Steeply-dipping quartz, adularia-quartz, carbonate-quartz, and sulfide-quartz veins and zones of veinlets up to several hundreds of meters long occur in weakly altered Upper Cretaceous ignimbrite, felsite, rhyolite, and subordinate andesite. Ore minerals are argentite, pyrargyrite, native gold, native silver, pyrite, arsenopyrite, chalcopyrite, coarse-grained disseminated galena, sphalerite, magnetite, and supergene copper minerals. Minor gangue minerals include chlorite, tourmaline, kaolinite, and amphibole. Deposits are localized at the intersection of a deep, northwest to approximately north-south-trending fault, and a system of northeast to nearly east-west fractures.

Politov, written commun., 1981

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P57-18 61°40'N 161°21'E	Tikas Eastern Asia-Arctic: Koni-Yablon	Mo Porphyry Mo	Small. Veinlets and sulfidized rocks contain 1-5 g/t Ag

Irregularly disseminated molybdenite, pyrite, arsenopyrite, and galena occur in quartz and feldspar-quartz veins and veinlets in silicified, sericitized, and sulfidized sedimentary rocks near the contact of an Early Cretaceous granodiorite which is cut by thin aplite dikes. Disseminated sulfide minerals also occur in the granodiorite. Weakly contact-metamorphosed Middle Jurassic sandstone and shale host the pluton and are also cut by sheets of gabbro and granite porphyry. Veinlets and sulfidized rocks contain 1-5 g/t silver.

Ivanov, Leonenko, and Livshits, written commun., 1966

P57-19 61°20'N 156°17'E	Spiridonych, Teply Eastern Asia-Arctic: Okhotsk	Au, Ag Au-Ag epithermal vein	Medium Samples contain from 0.7 to 16.9 g/t Au, 348.3 to 1630 g/t Au, and >1% Pb, Zn, Cu, Mn.

Bands of closely-spaced subparallel, mineralized fracture zones with veins and veinlets of quartz, epidote-chlorite-quartz, quartz-chlorite-sulfide, quartz-pyrolusite-rhodonite, and quartz-carbonate composition. Ore minerals are argentite, stromeyerite, native silver, electrum, pyrargyrite, galena, sphalerite, chalcopyrite, and bornite. Host rocks are Upper Cretaceous ignimbrite and andesite. Ore occurs in the centers of volcanic depressions and is spatially related to stocks and dikes of diorite, granodiorite, granite, andesite-bassalt and andesite. Northwest-striking veins predominate. Altered wall rock containing quartz, adularia, and illite reflects widespread mid- and low-temperature propylitization.

Kopytin, written commun., 1987; Konstantinov, 1989

P58-01 63°52'N 165°41'E	Sergeev Eastern Asia-Arctic: Koni-Yablon	Au, Ag Au-Ag epithermal vein	Medium. Ranges up to 1387 g/t Au, up to 8200 g/t Ag.

Steeply-dipping quartz, adularia-quartz, and carbonate-quartz veins, altered rocks, and mineralized fracture zones occur in an area of approximately 15 km^2 on the tops and limbs of an intrusive dome composed of Upper Cretaceous andesite-basalt and basalt flows that have been intruded by a central laccolith-like body composed of granodiorite and quartz monzonite porphyry cut by numerous dikes and stocks of intermediate to felsic composition. En-echelon, linear and arcuate ore bodies are controlled by the intersection of a major northeast fault, a set of radial and concentric fractures, and the contacts of the hypabyssal plutons. Domal structure coincides with an aureole of intense epidote-chlorite propylitization, local areas of actinolite-epidote propylitization, and illite-quartz alteration near the veins. Mineral assemblages consist of: (1) an early, high-temperature garnet-epidote-quartz assemblage with hematite; (2) a productive adularia-quartz assemblage with pyrargyrite, acanthite, electrum, native silver, canfieldite, galena, sphalerite, chalcopyrite, bornite, pyrite, and magnetite; and (3) a later pyrite-quartz and prehnite-zeolite-carbonate assemblage. Deposits are characterized by increase in sulfides as mineralization progressed, and by the presence of tellurides. In upper horizons selenium dominates over tellurium; in the lower horizons the reverse. Alteration consists of propylitization, with local adularization, argillization, and silicification. Deposit classified as a gold-silver association, gold-selenide-tellride mineral type.

Vasilenko, Rozhkov, and Shepitsyn, 1977; V.P. Khvorostov, written commun., 1978.

P58-02 63°33'N 165°07'E	Tsirkovy Eastern Asia-Arctic: Koni-Yablon	Au, Ag, Cu, W, Bi Granitoid-related Au	Small.

Gold-silver-polymetallic veins are associated with Late Cretaceous intrusions of granodiorite porphyry, syenite-diorite, and diorite. Deposit has affinities with copper-molybdenum porphyry deposits.

V.P. Vasilenko, written commun., 1973

P58-03 61°49'N 165°49'E	Talov Kuyul	Cr Podiform Cr	Small.

Podiform and disseminated chromite occurs in serpentinite veins in serpentinized peridotite. Large boulders and pebbles of massive chromite are scattered in residual and alluvial deposits derived from the peridotite.

Mikhailov, 1961

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P58-04 61°37'N 164°50'E	Tikhorechen Kuyul	Cr PGE, Ni Podiform Cr	Small. Ranges 34% to 52% Cr_2O_3.
A band of rock debris in a serpentinite melange zone contains massive and finely disseminated chromite. Melange is 1.5-2 km wide and about 7 km long. Peridotite outcrops occur in residual deposits and contain chromite masses and lenses up to 5 m wide and 25-30 m long. Platinum and nickel are present. Pokhialainen, written commun., 1965; Gryaznov, 1970			
P58-05 61°19'N 164°49'E	Ametistovoe Central Koryak	Au, Ag Au-Ag epithermal vein	Medium. Proven reserves 96 tonnes Au. Average grade 16 g/t Au. Considerable potential and prospecting.
Deposit contains two types of ore bodies: (1) ore pipes with small subparallel veins and veinlets, and (2) steeply dipping veins and zones. The veins are hundreds of meters long and several meters thick; the zones are several tens of meters thick. The veins are composed of quartz, kaolinite-quartz, and sulfide-quartz types. Main ore minerals are gold, argentite, and küstelite. Subordinate minerals are stephanite, stibiopearceite, aguilarite, pyrargyrite, miargyrite, freibergite, naumannite, and native silver. Pyrite, galena, sphalerite, and chalcopyrite are widespread and comprise up to 20 to 30 percent of some veins. Gangue minerals are quartz, kaolinite, adularia, and chlorite. Au:Ag ratio averages 1:3. The richest ore bodies are confined to altered rocks that contain a alteration of kaolinite, illite, and quartz superimposed on widespread epidote-chlorite-carbonate propylitic alteration. Deposit is centered on a magmatic structure that is about 5 to 6 km deep. Host volcanic rocks are Eocene and Oligocene flows with K-Ar ages of 18-24 Ma that consist mainly of andesite, andesite-basalt, andesite-dacite, and dacite. Associated are local abundant extrusive-vent and hypabyssal rocks of similar compositions. Deposit is controlled by: (1) a northwest- and nearly north-south-trending faults; (2) radial and concentric fractures; and (3) extrusive and hypabyssal bodies. Khvorostov, 1983; V.P. Khvorostov, written commun., 1986; Benevolskyi and others, 1992			
P58-06 61°21'N 165°07'E	Sprut Central Koryak	Ag, Au Au-Ag epithermal vein	Small.
Veins and zones of veinlets are confined to a system of subparallel fractures trending northwest. Veins are of kaolinite-adularia-quartz composition and contain proustite, pyrargyrite, electrum, native silver, polybasite, freibergite, and mercury-bearing tetrahedrite. Au:Ag ratio is 1:500. Host rocks are Paleogene andesite-dacite and dacite porphyry related to extrusive vents and volcanic domes. Khvorostov and others, written commun., 1982			
P58-07 61°31'N 166°07'E	Unnei Central Koryak	Sn, Ag, Au Sn polymetallic vein	Small.
Quartz-chlorite and quartz-sulfide veins trend about north-south and northwest. They occur in zones of silicification, chloritization, and kaolinization in intricately deformed Upper Cretaceous sandstone, siltstone, and argillite. Veins contain disseminated cassiterite, stannite, pyrite, arsenopyrite, sphalerite, stibnite, proustite, pyrargyrite, and small amounts of gold. Sedimentary rocks are intruded by Paleogene granite porphyry stocks and dikes. Rozhkov, 1969			
P58-08 61°16'N 165°21'E	Ivolga Central Koryak	Ag, Sn As, Sb Epithermal vein	Small.
Consisits of quartz veins and sets of parallel veinlets that generally trend north-south and contain arsenopyrite, pyrite, marcasite, proustite, pyrargyrite, miargyrite, famatinite, argentite, stannite, and stibnite. Veins and veinlets occur in fracture zones, zones of silicification, pyritization, and kaolinization of Paleogene felsic extrusive rocks and Upper Cretaceous marine clastic rocks. Au:Ag ratio is 1:1000 or less. Deposits are associated with a small granite porphyry stock which forms an elongate band trending north-northeast. Rozhkov, 1969; Khvorostov and others, written commun., 1982			

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P58-09 61°28'N 167°10'E	Khrustal (Khrustalnoe) Central Koryak	Sn Sn polymetallic vein	Small. Average grade of 0.7%Sn.

Occurs in fracture zones up to 400 m long and 1.5 to 5 m thick in a contact-metamorphic zone subsequently altered to combinations of quartz, carbonate, sericite, chlorite, sulfide, and tourmaline. Major ore assemblage is cassiterite-quartz-chlorite. Deposit similar to Ainavetkinsky deposit, except that in the Khrustalnoe deposit, the central silicified vein zone is less distinct. Limonitie alteration is very common. Deposit hosted in Late Cretaceous stratified clastic rocks that occur in northeast-trending, complex folds and are cut by numerous faults. Stratified rocks are intruded by a small stock and dikes of diorite porphyry and granodiorite porphyry. K-Ar isotoic studies indicate an age of 30-27 Ma for the granodiorite porphyry and diorite.

Lugov, 1986.

P58-10 60°50'N 164°39'E	Reznikov Central Koryak	Sn, Ag, Au Sn polymetallic vein	Small to medium.

Tin-bearing quartz, and chlorite-quartz veins and mineralized fracture zones extend for hundreds of meters and contain cassiterite, stannite, and sulfides of iron, copper, zinc, silver, and lead. Paleogene felsic dikes and intrusions along fractures trend northwest, forming a ladder system that trends northeast. Tin-bearing bodies often occur along the contacts of diorite porphyry and granite porphyry dikes with Upper Cretaceous clastic sedimentary rocks. Ore bodies are similar to the Ainavetkin ore district in composition and structure.

Lugov and others, 1974a, b

P58-11 60°58'N 165°17'E	Ainatvetkin Central Koryak	Sn, Ag Sn polymetallic vein	Medium. Average grade of 0.6 %Sn.

Consists of sulfide-chlorite-quartz veins and fracture zones with cassiterite that are a few hundred m long and range from 1.0 to 6.0 m thick. Ore minerals are cassiterite, magnetite, pyrrhotite, chalcopyrite, galena, sphalerite, arsenopyrite, wolframite, scheelite, pyrite, stannite, canfieldite, pyrargyrite, gold, and native copper. Cassiterite-chlorite-quartz assemblage, containing up to 10% sulfides, predominates. Breccia zones with fragments of metasomatic rocks and quartz-chlorite cement with sulfides contain highest Sn content. Deposit hosted in complexly-folded Upper Cretaceous (Santonian-Campanian) sandstone and shale that is overlain by Late Eocene-Oligocene rhyolite, rhyodacite, rhyodacite tuff, and ignimbrite. Late Cretaceous clastic rocks are cut by numerous stocks, dikes, and hypabyssal granitoids of Late Paleogene age. Biotite-quartz, cordierite, and quartz-biotite-cordierite hornfels zones occur at the contacts. Hornfels subsequently altered to quartz, chlorite, and sericite.

Lugov and others, 1974; Lugov and others, 1979b; Lugov, 1986.

P58-12 60°35'N 167°49'E	Olyutor Olyutor	Hg, Sb, As Clastic sediment-hosted Hg or hot-spring Hg?	Medium. Average grade of 1.4% Hg, and ranging up to 0.4% Sb and 4 g/t Au. Estimated 700 tonnes Hg.

Occurs in steeply-dipping fracture zones, which radiate from a large, northeast trending fault. Host volcaniclastic rocks are of Paleogene and Neogene age and are deformed into small linear folds. Ore bodies strike for tens of meters to 600 m. Veins have numerous apophyses in the form of typical mineralized breccias, which often grade into zones of veinlets. Most productive ores occur in tuff. Quartz and kaolinite, and less commonly dolomite, are the main gangue minerals. Main ore mineral is cinnabar accompanied by stibnite and sometimes realgar, cementing quartz and quartz-kaolinite breccia fragments. Wall rock alteration includes weak silicification, kaolinization, and carbonatization.

Babkin, 1975; Vlasov, 1977

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P58-13 60°26'N 164°23'E	Maletoivayam Olyutor	S Sulfur-sulfide	Large. Contains up to 30% S.

Consists of lower and upper occurrences that are separated by a 10 to 50 m thick bed of kaolinite-montmorillonite and quartz-kaolinite rock. Both occurrences are inclined 5 to 10° with respect to bedding in host rock. Upper ore body occurs for 1,800 m along strike, ranges from 80 to 700 m wide, and is 3 to 115 m thick. Deposit consists of sulfide-sulfur-alunite silicified rock and sulfuric silicified rock. Latter contains major native sulfur tonnage. Sulfide-sulfur-alunite silicified rock contains 18% S, 30-40% alunite, and 10% Fe sulfides. Ore zone contains up to 30% native sulfur. Native sulfur of 96-99% purity is separated by thermal reduction. About 60% potassium sulfate is also separated. Deposit occurs at the southern end of the Olyutorka volcanic belt in the Miocene Korfovsky Formation.

Vlasov, 1977.

P59-01 64°00'N 168°34'E	Orlovka Central Koryak	Au, Zn, Cu, Hg Epithermal vein	Small.

Linear zones of quartz and quartz-carbonate veins and veinlets up to 1 m thick and 100-150 m long contain native gold, pyrite, magnetite, pyrrhotite, sphalerite, chalcopyrite, arsenopyrite, and cinnabar. Zones occur in areas quartz-sericite and propylitic rock. Deposits occur in the middle of a volcanic dome consisting of Cenozoic andesite and andesite-basalt. High gold values are associated with geochemical aureoles of silver, copper, and molybdenum.

Rozenblyum, oral commun., 1991

P59-02 63°60'N 173°52'E	Berezovaya Central Koryak	Sn Sn polymetallic vein	Small.

Quartz-tourmaline-chlorite veins and lenticular breccias with fine-grained and colloform cassiterite that occur in extensive altered zones of sulfidized tourmaline-chlorite-quartz altered rock. Main ore bodies are related to northeast-trending fractures. Host rocks are intensely deformed Cretaceous volcaniclastic and clastic sedimentary rocks that are overlain by Cenozoic extrusive rocks of intermediate to felsic composition. Sedimentary and volcanic rocks are intruded by stocks and dikes of granite porphyry and diabase, and hypabyssal bodies of Paleogene dacite and rhyolite.

Lugov and others, 1974a, b

P59-03 63°53'N 173°10'E	Agranai Central Koryak	Hg As, Sb Volcanic-hosted Hg	Small.

Sheets and lenticular zones with disseminated veinlets containing cinnabar occur in Late Paleogene rhyolite and dacite. Main minerals are quartz, kaolinite, and cinnabar. Minor minerals are opal, pyrite, stibnite, realgar, and metacinnabar.

Rozenblyum, Zincevich, and Nevretdinov, 1975

P59-04 63°33'N 171°09'E	Vaegi Anadyr	Au Au quartz vein	Small.

Consists of thin quartz and carbonate-quartz veins and veinlets that contain disseminated gold, hematite, pyrite, and chalcopyrite with spare arsenopyrite. Deposit is hosted in Paleozoic and supposed Proterozoic intermediate metavolcanic rocks. Gold-cinnabar intergrowths occur in nearby heavy mineral placers which have been mined. Deposit occurs in a nappe of early Paleozoic and possibly older metavolcanic rocks that display both greenschist facies metamorphism and extensive host rock replacement by sulfide minerals and quartz, and that may have potential for vein-disseminated gold deposits

Zakharov and V.P. Vasilenko, written commun., 1977

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P59-05 63°28'N 173°51'E	Pervenets Central Koryak	Hg, As, Sb Silica-carbonate Hg	Small.

Scattered cinnabar occurs as disseminations, veinlets, and masses in a northwest trending block of fractured, silicified, and kaolinized, sandstone, siltstone, and conglomerate of Lower Cretaceous (Aptian-Albian) age. Masses and veinlets of realgar occur with the cinnabar and separately. Orpiment, metacinnabar, guadalcazarite, and stibnite also occur.

Kim, 1978

P59-06 62°43'N 170°06'E	Kuibiveen Central Koryak	Mo, Cu, Au Porphyry Cu-Mo	Small to medium.

Quartz-tourmaline breccias, altered rocks, veins, and zones of linear and stockwork quartz-sulfide veinlets, are present in a nearly east-west zone about 25 km long and about 4 km wide. Deposits are associated with a Neogene complex of small intrusions and dikes of intermediate and felsic composition. Deposits occur along a fault that thrusts Upper Cretaceous siliceous sedimentary rocks over Oligocene-Miocene sandstone and conglomerate. Deposit consists of disseminated molybdenite, arsenopyrite, chalcopyrite, galena, and native gold, in zones from tens of meters up to hundreds of meters thick.

Zakharov and V.P. Vasilenko, written commun., 1977; I.S. Rozenblyum, written commun., 1991

P59-07 62°09'N 173°11'E	Lalankytap Central Koryak	Mo, Cu Porphyry Cu-Mo	Small to medium.

An oval stockwork about 1.2 by 0.6 km in area contains randomly oriented quartz veinlets which contain irregularly disseminated pyrite, molybdenite, and chalcopyrite, with minor pyrrhotite, sphalerite, galena, magnetite, martite, rutile, anatase, and sphene. Ore minerals occur both in the veinlets and as disseminations between veins. Cu and Mo minerals are related to a zone of quartz-biotite (with sericite and pyrite) alteration in both a Paleogene quartz diorite and monzodiorite pluton and in Late Cretaceous flysch which both host the deposit. Pluton is bounded by a nearly east-west zone of pyritized altered rocks more than 11 km long and 1 to 4 km wide. Small amounts of gold occur in Quaternary, goethite-cemented, alluvial conglomerate near the deposit. Deposit is controlled by a nearly-east-west suture at the juncture of two major structural boundaries.

Brazhnik and Kolyasnikov, 1989; Brazhnik and Morozov, 1989

P59-08 61°54'N 168°48'E	Krassnaya Gorka Central Koryak	Hg Clastic sediment-hosted Hg or hot-spring Hg?	Small. Average grade 0.1% Hg, but ranges up to 1.4% Hg.

Saddle-shaped mercury deposits are confined to beds of Upper Cretaceous sandstone where cross-cutting fracture zones intersect the cores of gentle anticlinal folds. Cinnabar is disseminated in quartz-dickite-dolomite vein material. In addition to cinnabar, marcasite, pyrite and native arsenic are present.

Babkin, 1969

P59-09 61°40'N 168°16'E	Neptun Central Koryak	Hg, Sb, As Clastic sediment-hosted Hg or hot-spring Hg?	Small. Estimated to contain about 330 tonnes Hg grading 0.6% Hg.

Conformable, mineralized, northwest-trending fracture zones occur in Upper Cretaceous sandstone, siltstone, and shale. Cinnabar is associated with stibnite, and minor amounts of pyrite, marcasite, realgar, galena, sphalerite, and chalcopyrite. Ore minerals are scattered in quartz-dickite-dolomite material that cements breccia; or occur in sets of thin branching veinlets associated with quartz and carbonate.

Babkin, 1969; Tarasenko and Titov, 1970

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P59-10 61°37'N 171°39'E	Snezhnoe Koryak Highlands	Cr, PGE Zoned mafic-ultramafic Cr-PGE	Small.

Natural alloys of iron and platinum occur in chromite bodies within dunite of a zoned ultramafic complex that intrudes gabbro, clinopyroxenite, wehrlite, and dunite that in turn intrude Upper Cretaceous siliceous volcanic rocks.

Kutyev and others, 1988a, b

P59-11 61°34'N 168°01'E	Lyapganai Central Koryak	Hg, Sb Clastic sediment-hosted Hg or hot-spring Hg?	Medium. Estimated to contain 1400 tonnes Hg grading 0.5 to 2.4% Hg.

Mineralized fracture zone in Upper Cretaceous sandstone and mudstone is cemented by quartz and dolomite with subordinate kaolinite and calcite. Cinnabar is disseminated in the vein material or coats breccia clasts as thin rims. Stibnite and pyrite are minor. Ores are disseminated to massive, brecciated, in veinlets, and in banded disseminations. Ore bodies vary in size from 0.1 to 4.2 m in width by 110 m to 420 m in length. The most promising ore bodies occur in faults trending northeast parallel to fold axes. Deposit has a peculiar high germanium content. This deposit is similar to many other Hg deposits in the Koryak Upland.

Tarasenko and Titov, 1970; Babkin, 1975; Vlasov, 1977

P59-12 61°24'N 172°20'E	Itchayvayam Vatyn	Mn Volcanogenic Mn	Medium. Ranges 11 to 47.4% Mn.

Mn mineralization is confined to the Albian-Campanian basalt-siliceous Vatyn Formation. Massive, patchy, and brecciated manganese ores form concordant, lens-like bodies 1 to 30 m long and 0.3 to 10 m thick in siliceous rocks. Main ore mineral is braunite, but pyrolusite is present locally. Manganese also occurs in veins of metamorphic origin 2 to 10 m long.

Egiazarov and others, 1965

P60-01 63°27'N 175°44'E	Chirynai Tamvatney-Mainits	Cr, PGE Podiform Cr	Medium.

Thirty chromite ore occurrences are known in the Chirynai alpine-type ultramafic body. Ore bodies occur in chains 100 to 150 m long which consist of thin lenses (up to 20-40 cm thick), masses, and schlieren of nearly massive to massive chromite. Banded zones of disseminated chromite 5 to 7 m thick and more than 50 m long occur. Chromite occurs in dunite, commonly at the contact zone between dunite and intergrown pyroxenite, dunite, and harzburgite. Accessory platinum-group minerals occur as Os, Ir, and Ru sulfides; and also as hexagonal solid solutions of ruthenium, osmium and iridium with iron, copper, and nickel. Most common PGE mineral is an iron-ruthenium solid solution.

Silkin, 1983; Dmitrenko and Mochalov, 1986; Dmitrenko and others, 1987

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
P60-02 63°29'N 174°13'E	Tamvatney Central Koryak	Hg, W, As Silica-carbonate Hg	Large. Reserves estimated at 30,000 tonnes Hg in ore averaging 0.81% Hg.

Cinnabar, tungstenite, wolframite, and sulfides of iron and arsenic occur in mylonitized, carbonatized, silicified, and argillized serpentinite, serpentinized peridotite, conglomerate, and coarse-grained sandstone, and argillite. Deposits occur along northern tectonic contact of the Tamvatney lherzolite ophiolite body that overlays a clastic rock sequence of Lower Cretaceous (Aptian-Albian) and Oligocene-Miocene ages. Ultramafic rocks are intruded by bodies of Early Cretaceous gabbronorite, Late Cretaceous plagiogranite, and Neogene andesite-basalt. Age of the deposits is assumed as Lower Pleistocene. Main ore minerals are cinnabar, tungstenite, wolframite, huebnerite, scheelite, marcasite and pyrite. Minor minerals include metacinnabar, stibnite, realgar, orpiment, arsenopyrite, sphalerite, chalcopyrite, millerite, bravoite, chalcocite, pyrrhotite, and hematite. Relic ilmenite, chromite, magnetite, niccolite, and pentlandite are present in the serpentinite and silica-carbonate metasomatite. Gangue minerals in the veins are mainly quartz, chalcedony, magnesite, dolomite, kaolinite, dickite associated with peculiar hard and liquid bitumens, and native sulfur. Middle portion of the ore-bearing zone is made up of stockworks, masses of ore minerals, veins, and a dense network of sulfide veinlets. Zone extends for about 20 km with an average thickness of about 20-30 m.

Rozenblum and others, 1973; Babkin, 1975; Voevodin and others 1979, 1980

P60-03 63°25'N 176°52'E	Nutekin Anadyr	Au, Hg Au quartz vein	Small.

Consists of steeply-dipping quartz and quartz-carbonate veins which grade into zones of silicified and sulfidized veinlets along strike. Deposits trend northwest and are up to 500 m long. Gold-bearing veins occur in Early Mesozoic, and less frequently Early Cretaceous, clastic sedimentary rocks. Highest gold contents are in veins within Paleogene dolerite dikes. Gold associated with rare disseminated pyrite and arsenopyrite, and is marked by high mercury content. Deposit occurs in the axial portion of a horst-anticlinorium structure.

V.P. Vasilenko, written commun., 1977

P60-04 63°16'N 175°24'E	Krassnaya Gora Tamvatney-Mainits	Cr, PGE Podiform Cr	Small to medium.

Two horizons with numerous chromite bodies occur within the Krassnaya Gora alpine-type ultramafic body. Upper horizon occurs at the contact of dunite and an overlying intergrown pyroxenite-dunite-harzburgite assemblage. Chromite occurs in dunite bands. Podiform and schlieren occurrences of nearly massive to massive chromite extend for 35-70 m with a thickness of up to several meters. Several large podiform bodies at the base of dunite layers contain massive and concentrated chromite for 60-100 m along strike and are more than 1 m thick. A zone of disseminated chromite 22 m thick occurs. Platinum-group metals associated with chromite occur as solid solution in the sulfides with Os, Ir, and Ru in hexagonal sites, and Ir, Os, Pt, Ru, and Rh in cubic sites. Some secondary, rare, platinum, rhodium, and palladium arsenites and sulfoarsenides are also present.

Silkin, written commun., 1983, Dmitrenko and Mochalov, 1986; Dmitrenko and others, 1987

P60-05 63°16'N 176°39'E	Ugryumoe Mainits	Cu, Zn, Pb, Au Kuroko Cu-Zn-Ag massive sulfide(?)	Small.

Massive sulfides contain high concentrations of Cu, Zn, Pb, and Au and occur along a silicified zone up to 3 km long. Sulfides hosted in a Mesozoic sequence of interbedded basalt, plagiorhyolite, tuff, and siliceous tuffaceous siltstone. Sulfide horizons consists of massive pyrite, and chalcopyrite, pyrite, and quartz. Intrusive rocks include granite, plagiogranite, and gabbro. Deposit occurs in the Hettangian and Sinemurian Lazov sequence that consists of interbedded basalt, plagiorhyolite, tuffs, and tuffaceous siltstone.

Oparin and Sushentsov, 1988

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q01-01 67°52'N 179°25'W	Chaantal Chukotka	Sn, W As Sn quartz vein and Sn greisen	Small to medium.

Sets of branching, erratic quartz veins, veinlets, and zones of greisenized rock occur within and near the West Iultin biotite granite pluton. Ore bodies trend easterly and are several tens to hundreds of meters long. Ore minerals are arsenopyrite, wolframite and cassiterite; chalcopyrite, scheelite, molybdenite, and beryl are less common. Arsenopyrite and wolframite commonly occur in the middle portions of the quartz veins; cassiterite is confined to greisenized selvages.

Slavtsov, written commun., 1951; Tarakanov, written commun., 1958

Q01-02 67°51'N 178°44'W	Iultin Chukotka	Sn, W Sn-W polymetallic vein and greisen	Large. Discovered in 1937, mined since 1959. Average grade 0.43% Sn, 1.29% WO_3.

The deposit occurs as quartz veins, mineralized stockwork zones, and disseminated veinlets in greisen. Deposit occurs along the contact of the mid-Cretaceous Iultin granite (K-Ar age of 90-110 Ma), and is hosted by Lower and Upper Triassic sandstone and shale that has been successively subjected to contact metamorphism and metasomatism. Mineralized quartz veins with east-west and north-south trends are the most productive, but some trend northeast and northwest as well. Veins range from steeply-dipping to gently-dipping. Some ore bodies wedge out vertically. Ore bodies occur both as tungsten ore over the top of a leucogranite pluton which is about 300 m below the surface; and as tin ore in the marginal zone of the leucogranite. Approximately 65 minerals are known, the most common are quartz (95%), muscovite, fluorite, albite, cassiterite, wolframite, arsenopyrite, and löellingite. Topaz, pyrite, pyrrhotite, bismuthinite, stannite, chalcopyrite, sphalerite, galena, molybdenite, scheelite, hematite, and native silver and bismuth, are less common. Cassiterite is commonly associated with wolframite, arsenopyrite, and muscovite. Cassiterite occurs as short, columnar crystals up to 10 cm across. Large (up to 4-9 cm) and gigantic (up to 0.5 m) wolframite crystals and crystal intergrowths are present. The vertical extent of economic tin-tungsten ore bodies exceeds 900 m.

Zilbermints, 1966; Lugov, Makeev, and Potapova, 1972; Lugov, 1986

Q01-03 67°47'N 178°47'W	Lenotap Chukotka	Au Au quartz vein	Small. Ranges 0.6 to 98 g/t Au, 0.7 to 18.9 g/t Ag, and up to 1.53% WO_3.

Zones of cross-cutting and conformable quartz veins, veinlets, and silicified breccia occur in Upper Permian and Lower to Middle Triassic sandstone and shale at the contacts of Triassic gabbro-diabase sills. Ore bodies vary in length from 30 to 220 m and in thickness from 0.5 to 2 m; but locally are up to 28 m thick. Gold is associated with arsenopyrite, pyrite, galena, sphalerite, and tetrahedrite-tennanite. Quartz veins have been metamorphosed by the Iultin tin-bearing granite.

Panychev, written commun., 1977

Q01-04 67°40'N 178°06'W	Tumannoe Eastern Asia-Arctic: Chaun	Au, As, Sb Disseminated Au-sulfide	Medium. Ranges 1.4 to 76.1 g/t Au, 0.4 to 15.6 g/t Ag, up to 1% Sb.

Auriferous, fractured belts and folded zones trend about northwest and east-west in an Upper Triassic sandstone-siltsone-shale sequence. Mineralized zones are marked by a clay-mica matrix with fine disseminated sulfides; cut by thin quartz veinlets. Linear mineralized zones are often associated spatially with quartz-stibnite veins. Ore structure is associated with an intricate dome-like uplift developed where a fault intersects a syncline. Early-stage veins and veinlets with rare-earth metal minerals occur within a central granodiorite porphyry stock and the surrounding hornfels.

V.P. Vasilenko and R.A. Eremin, written commun., 1977

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q01-05 67°34'N 178°04'W	Ekug Eastern Asia-Arctic: Chaun	Sn, W As, Cu Porphyry Sn or Sn greisen	Medium. Sn ore contains 0.2 g/t Au and up to 32.7 g/t Ag. No data on reserves.
Stocks and dikes of late Cretaceous quartz porphyry are altered to tSn-bearing quartz-topaz greisen in association with abundant fluorite and sericite. Subordinate mineralization consists of fractured zones and cassiterite-quartz stockworks in Upper Triassic sandstone and shale. Highly altered quartz-topaz rocks with abundant disseminated fluorite, arsenopyrite, and lesser cassiterite and wolframite, also occur in contact-metamorphosed sedimentary rocks near the central porphyry stock; especially near radial fractures. Cassiterite is finely disseminated in greisen; larger crystals are present in quartz-sulfide veinlets. Cassiterite is typically associated with arsenopyrite, pyrite, and chalcopyrite; and less commonly with galena, sphalerite, and stannite. By-product Au and Ag occur in sulfides. Greshilov and Kozlov, 1969; Lugov, Makeev, and Potapova, 1972; Lugov, 1986			
Q01-06 67°12'N 179°09'W	Granatnoe Eastern Asia-Arctic: Chaun	Mo Porphyry Mo	Small.
Quartz veins with feldspar, muscovite, tourmaline, and chlorite up to 130 m long and up to 0.6 m thick are confined to a Cretaceous granite body. Molybdenite is present as disseminations and masses up to 3-5 cm in size. Minor chalcopyrite, arsenopyrite, pyrite, pyrrhotite, and wolframite. Rokhlin, written commun., 1961			
Q01-07 66°25'N 179°22'W	Matachingai Eastern Asia-Arctic: Chukotka	Hg Silica-carbonate Hg	Small.
Small lenses, masses, and irregular occurrences of cinnabar occur in thin monominerallic or quartz- and carbonate-bearing veinlets in serpentinite, silica-carbonate metasomatites, and less commonly in propylitized extrusive volcanic rocks. Mineralized area is in a mass of serpentinized peridotite in tectonic contact with Upper Cretaceous brecciated basalt and andesite tuff. Sheet-like bodies of ore-bearing silica-carbonate rocks are mostly steeply dipping, locally gently inclined, and are fault bounded. They form chain-like strings tens to hundreds of meters long. Altered rocks are mainly carbonate varieties and are broken by northeast-trending faults. Cinnabar ore shoots occur at these altered-zone/fault intersections. Cinnabar is mainly associated with magnesite, dolomite, and quartz; talc, chlorite, kaolinite, pyrite, chalcopyrite, arsenopyrite, marcasite and millerite are less common. Babkin, 1975; Kim, 1978; Kopytin, 1978			
Q01-08 66°24'N 178°55'W	Eruttin Eastern Asia-Arctic: Chaun	Sn Sn silicate-sulfide vein	Small to medium.
Consists of a dense network of thin, quartz and quartz-tourmaline veinlets which contain fine-grained cassiterite and sulfides. Deposit occurs in a zone of intense silicification, sericitization, tourmalinization, sulfidization, and locally kaolinization, up to 2.5 km long; which is controlled by northeast fractures. High-grade tin-bearing zones are several tens to hundreds of meters long. Deposit occurs above a Late Cretaceous granitic pluton in a Lower Cretaceous andesite-dacite sequence intruded by numerous stocks and dikes of granodiorite porphyry, granite, andesite-basalt, and dolerite of Early Cretaceous to Paleogene age. Zilbermints and Kolesnichenko, 1973; Lugov and others, 1974a, b			
Q01-09 66°19'N 179°46'W	Elmaun Eastern Asia-Arctic: Chaun	Sn Sn silicate-sulfide vein	Small to medium.
Tourmaline, chlorite, and arsenopyrite-quartz veins and veinlets with cassiterite, occur in zones of chlorite and sericite-quartz alteration. Mineralized area occurs in the periphery of a caldera-like structure composed of Lower and Upper Cretaceous volcanic rocks of intermediate and felsic composition, which are intruded by Cretaceous and Paleogene hypabyssal rocks. A deeply buried intrusion is suspected. Sulfide-polymetallic bodies containing sphalerite, galena, chalcopyrite, and other minerals are prevalent in the upper portions of the deposit. Lugov and others, 1974a, b			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q01-10 65°52'N 175°37'W	Pepenveem Eastern Asia-Arctic: Chaun	Au, Ag Cu, Pb, Zn Au-Ag epithermal vein	Medium. Ranges 0.2 to 112.3 g/t Au and 20 to 5430 g/t Ag.

Summary and References

Adularia-quartz and adularia-carbonate-quartz veins and veinlets occur in an altered zone up to 1 km long. Most veins are hosted in an Upper Cretaceous rhyolite-ignimbrite sequence near the periphery of a large volcanic subsidence structure. Ore bodies are controlled by widespread northwest and northeast fracturing and are associated with widespread hydrothermal alteration of Paleogene volcanic layers. Alteration includes regional propylitization and local silicification, adularization, sericitization, and kaolinization. Ore mineral associations are: (1) pyrite-arsenopyrite (Au:Ag 30:1 to 1:25); (2) chalcopyrite-galena-sphalerite with tetrahedrite-tennantite, gold, and silver (Au:Ag 1:30 to 1:50); (3) gold-pyrargyrite with argentite, polybasite, stromeyerite, and native silver (Au:Ag 1:1.5 to 1:3000); and (4) hematite. Chalcopyrite-galena-sphalerite and gold-pyrargyrite associations are the most wide-spread.

Berman and Naiborodin, 1967; Sidorov, 1978

Q01-11 65°40'N 174°06'W	Dioritovoe Eastern Asia-Arctic: Chaun	Sn Ag, Cu, Pb, Bi Sn polymetallic vein	Medium.

Ore bodies are confined to zones of fractured and hydrothermally altered Lower Triassic shale, sandstone, and siltstone. Ore zones vary in thickness from several meters to 150-200 m, and extends 100 m to 2.5 km along strike. The central zone consists of banded bodies up to 2-3 m thick with abundant quartz-sulfide and sulfide veinlets which contain cassiterite as cryptocrystalline aggregates, wolframite, pyrite, arsenopyrite, galena, tetrahedrite-tennantite, chalcopyrite, and sphalerite. The outer zone, a band 4-5 m wide, consists of quartz-sericite-chlorite altered rocks and a dense network of cassiterite-bearing quartz-sericite-chlorite, quartz-sulfide, and sulfide veinlets; with pyrite, arsenopyrite, chalcopyrite, and cubanite. Silver and bismuth values are high. Magmatic rocks occur within 0.5-2 km; including Early Cretaceous gabbro and gabbro-diorite dikes, hypabyssal bodies of diorite porphyry and granodiorite, Late Cretaceous rhyolite and diorite porphyry dikes, and Paleogene gabbroic dikes. Tin is assumed to be related to Late Cretaceous volcanism.

Nedomolkin, 1974; Lugov and others, 1974a, b

Q01-12 65°20'N 174°16'W	Enpylkhkan Eastern Asia-Arctic: Chaun	Pb, Zn, Cu, Ag Pb-Zn skarn	Small. Contains up to 140 g/t silver.

Disseminated, massive, and banded galena-sphalerite-chalcopyrite ore bodies occur in skarn in Paleozoic limestone above a Late Cretaceous granite porphyry. Banded pyroxene skarn is at least 40 m thick and extends for 350-400 m to the northeast.

Spirov, written commun., 1954

Q02-01 66°50'N 171°44'W	Serdtse-Kamen Eastern Asia-Arctic: Chaun	Pb, Zn, Cu, Sn, Ag Pb-Zn skarn	Small.

A set of quartz-sulfide and quartz-carbonate-sulfide veins occurs in skarn developed in Paleozoic limestone at the contact of a satellite of a Cretaceous granitic pluton. Ore is composed of pyrrhotite (25-35%), sphalerite (15-25%), galena (5-15%), and chalcopyrite (5-10%) with subordinate arsenopyrite, pyrite, cassiterite, stannite, scheelite, proustite, pyrargyrite, and gold.

Chaikovsky, 1960

Q02-02 66°22'N 172°04'W	Barin Eastern Asia-Arctic: Chaun	Ag, Zn Ag polymetallic vein and replacement	Medium. Contains up to 754 to 2148 g/t Ag.

Ore zone at contact between a Late Cretaceous granite-porphry dike and mid-Paleozoic limestone. Dike trends northeast; it is about 8-10 m thick and 1 km long. Limestone is cemented by quartz with disseminated sphalerite and small amounts of copper minerals over an area 10-12 m long and 2-3 m wide.

Kryukov, written commun., 1974

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Summary and References			
Q02-03 66°16'N 172°04'W	Melyul Eastern Asia-Arctic: Chaun	Pb, Zn, Ag, (Cu) Pb-Zn-(Cu)-Ag skarn	Small. Up to 165 g/t Ag.
Polymetallic occurrence composed of pyrite, galena, sphalerite, and chalcopyrite in epidote-garnet and vesuvianite-pyroxene-garnet skarn at the contact between an Early Cretaceous granitic body and Proterozoic(?) marble. Kryukov, written commun., 1974			
Q02-04 66°09'N 173°17'W	Erulen Eastern Asia-Arctic: Chaun	Sn Sn silicate-sulfide vein	Small to medium.
Quartz-tourmaline and sulfide-quartz-tourmaline veins and veinlets 2 to 20 cm thick with disseminated cassiterite and masses of sulfides, are found in the middle of a zone of tourmaline alteration replacing brecciated granitic rocks. Also contains muscovite, fluorite, calcite, scheelite, arsenopyrite, pyrite, chalcopyrite, galena, and sphalerite. Zone of mineralization is about 3.5 km long and up to 500 m wide. Deposit occurs at the margin of a Late Cretaceous tourmaline two-mica granite pluton that intrudes Permian to Triassic clastic sedimentary rocks and Triassic gabbro. Nedomolkin, 1974			
Q02-05 64°57'N 172°29'W	Reechen Eastern Asia-Arctic: Chaun	Fe, Pb, Zn, Sn Fe-Pb-Zn-Sn skarn	Small.
Garnet-magnetite-epidote-vesuvianite skarn bodies occur for 250-400 m at the contact between Middle Devonian limestone and phyllite, and Early Cretaceous granite. Skarn contains lenses and bands up to 2 m thick of pyrite, arsenopyrite, galena, and sphalerite. Sulfide bodies exhibit high Sn concentrations. Nedomolkin, 1974			
Q02-06 64°36'N 172°45'W	Chechekuyum Eastern Asia-Arctic: Chaun	Pb, Zn, Cu, Ni Pb-Zn skarn	Small.
Gently dipping deposit, about 18 m thick and 30 m along strike, composed of pyrrhotite, sphalerite, galena, chalcopyrite, magnetite, pyrite, niccolite, marcasite, calcite, garnet, diopside, and quartz. Ore bodies confined to a fracture zone in skarn developed in Middle Devonian limestone, that is overlain by Upper Cretaceous felsic extrusive rocks and cut by granite porphyry and spessartite dikes. Massive and disseminated pyrrhotite ore occurs in the hanging wall. Massive galena, and less common sphalerite-galena ore, are present in the middle part of the ore body. Sparse massive sphalerite ore is prominent in the hanging wall. Ore minerals are sparsely disseminated. Anomalous Sn, Cd, cobalt, Bi, and Ag occur. Zhukov and others, written commun., 1953			
Q03-01 67°54'N 163°40'W	Iyikrok Mountain Kobuk	Cr Podiform Cr	Grab samples with up to 33% Cr, and 0.2 g/t PGE. Estimated 130,000 to 350,000 tonnes chromite
Disseminated fine- to medium-grained chromite in Jurassic or older dunite and peridotite tectonite that has been locally serpentinized. Platinum observed in one sample. Zones with chromite up to 90 m wide and 305 m long in dunite. Host rocks part of the Misheguk igneous sequence. Mafic and ultramafic rocks floored by major thrust fault. Mayfield and others, 1983; Foley and others, 1985, 1992; Foley, 1988			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q03-02 65°56'N 166°12'W	Ear Mountain area, (Winfield) Seward Peninsula	Sn, Cu, Ag, Pb, Zn Sn skarn	Produced several hundred tonnes Sn

Summary and References

Cassiterite, stannite, and chalcopyrite in skarn and sparse cassiterite-quartz veins along margin of Late Cretaceous multistage biotite granite stock intruded into argillaceous limestone. Highly variable contact metamorphic silicate and sulfide mineral assemblages. Tourmaline-quartz greisen veins in upper part of granite. Local occurrence of U in oxidized tourmalinized mafic dike and adjacent biotite granite. Deposit associated with with late-magmatic stage of Late Cretaceous granite about 76.7 Ma.

Killeen and Ordway, 1955; Mulligan, 1959; Sainsbury, 1972; Hudson and others, 1977; Bond, 1983; Hudson and Arth, 1983; Swanson and others, 1988

Q03-03 65°35'N 168°00'W	Cape Mountain Seward Peninsula	Sn W Sn quartz vein	Produced about 940 tonnes of Sn, mainly from placers. Very minor production from lode deposits.

Occurrences of cassiterite, tourmaline, pyrite, pyrrhotite, fluorite, scapolite, sphalerite, and scheelite along margin of Cretaceous granite. Deposits occur in periphery of pluton, in dikes, in contact-metamorphosed and contact-metasomatized wall rocks, and in quartz veins in pluton. Cassiterite also occurs as replacement of limestone near intrusive contact. Granite intrudes Mississippian limestone, dolomitic limestone, and shale. Age of granite 78.8 Ma. Several small lode prospects and one small lode mine whose main production was from 1903 to 1909. About 9 tonnes cassiterite concentrate shipped in 1905. Probable source for Goodwin Gulch and Tin City cassiterite placer deposits. Strong cassiterite production from placers in Cope Creek and Goodwin Gulch from the mid-1970's to 1989 when placers were exhausted. Total production during this period was about 2.07 million pounds of tin.

Knopf, 1908; Steidtman and Cathcart, 1922; Mulligan, 1966; Hudson and Arth, 1983; Bundtzen and others, 1990

Q03-04 65°38'N 167°35'W	Potato Mountain Seward Peninsula	Sn Sn quartz vein	Up to a few percent Sn

Scattered veins and veinlets of quartz, clay, cassiterite, pyrite, and arsenopyrite associated with contact-metamorphosed tin- and tourmaline-bearing Precambrian or lower Paleozoic carbonaceous phyllite, metasiltstone, and slate, all part of the slate-of-the-York region of Sainsbury. Gravity data indicate an intrusive body lying within 0.5 km of surface. One granitic dike exposed. A small dredge recovered cassiterite for many years and nonfloat placer mining continued in several creeks in the vicinity until the mid-1950's (Cobb, 1973). Limited exploration over the years including an unsuccessful attempt to drill into the top of the buried pluton in 1990.

Steidtman and Cathcart, 1922; Sainsbury, 1969; Hudson and others, 1977; Bruce M. Gamble, written commun., 1986

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q03-05 65°28'N 167°10'W	Lost River Seward Peninsula	Sn, W, F, Be Zn Cu, Pb, Ag Sn-W skarn, Sn greisen, Carbonate-replacement Sn(?)	Reserves of 25 million tonnes grading 0.15% Sn, 0.03% WO_3, 16.3% CaF_2. Produced 320 tonnes Sn

Summary and References

Several deposits and one mine in veins, skarns, greisens, and intrusion breccia formed above a shallow Late Cretaceous granite stock intruding thick sequence of Lower Ordovician limestone and argillaceous limestone. Early-stage andradite-idocrase skarn and later fluorite-magnetite-idocrase vein skarns altered to chlorite-carbonate assemblages that are contemporaneous with greisen formation and cassiterite deposition. Major ore minerals in skarns and greisen are cassiterite and wolframite, with lesser stannite, galena, sphalerite, pyrite, chalcopyrite, arsenopyrite, and molybdenite, and a wide variety of other contact metamorphic and alteration minerals. Age of granite 80.2 Ma. Production mostly from 1952 to 1955 from underground workings a few hundred meters deep along the Cassiterite dike. This dike is a near-vertical rhyolite dike, extensively altered to greisen over the buried granite. Similar smaller deposits nearby include tin-greisen and veins near the Tin Creek Granite and various polymetallic veins and skarns near the Brooks Mountain Granite. Large beryllium deposits peripheral to the skarns replace limestone as fluorite-white mica veins that contain diaspore, chrysoberyl, and tourmaline; probably associated with early stages of granite intrusion. Potential for carbonate-replacement tin deposit. Some placer tin recovered from creek below Lost River mine but placers now exhausted. Major exploration program in early 1970's drilled out several large Sn-W-fluorite-Be ore bodies but depressed metal prices caused cancellation of the program short of development.

Steidtman and Cathcart, 1922; Sainsbury, 1963, 1964, 1965, 1969; WGM, Incorporated, Anchorage, written commun., 1973; Dobson, 1982; Hudson and Arth, 1983; Reed, Menzie, and others, 1989

Q03-06 65°41'N 165°14'W	Kougarok Seward Peninsula	Sn, Ta, Nb Sn greisen with Ta and Nb	Average grade of 0.5% Sn; 0.01% Ta and 0.01% Nb.

Occurs in association with a buried Cretaceous granitic complex, mainly as disseminated cassiterite in quartz-tourmaline-topaz greisen, associated with disseminated tantalite-columbite in quartz-white mica greisen. Sn deposits occur in steep cylindrical pipes of greisenized granite, greisenized dikes, in greisen along roof zone of subhorizontal granite sills, and as stockwork veinlets in schist. Late Cretaceous granite dikes, sills, and plugs above the buried pluton are interpreted as subvolcanic analogues to topaz rhyolite. Granitic rocks intrude poly-deformed graphitic and calcareous quartz schist, part of the undifferentiated Nome Group of Sainsbury (1972), and probably equivalent to the pelitic schist unit of Till (1984). Extensive drilling of properties, 1979 to 1983; dormant since.

Hudson and Arth, 1983; Christopher C. Puchner, written commun., 1984; Puchner, 1985, 1986; Reid, 1987

Q03-07 65°48'N 164°32'W	Serpentine Hot Springs Seward Peninsula	Pb, Zn, As, Ag, Au, Sn Polymetallic vein	No data

Quartz veins and stringers, with disseminated limonite and pyrite, and possibly minor chalcopyrite and argentiferous galena, cut Paleozoic(?) schist composed of varying proportions of quartz, muscovite, chlorite, chloritoid, graphite, pyrite, pyrrhotite, and albite at Midnight, Humboldt, and Ferndale Creeks. Schist part of the mixed unit of Till (1984). Few thin granitic to rhyolitic dikes contain disseminated pyrite and fluorite. Deposit about 5 km from southeast margin of the Sn-bearing Cretaceous Oonatut Granite Complex. Limited exploration. Deposit exposed in trenches cut along northwest- or east-trending faults.

Hudson and others, 1977; Joseph A. Briskey, written commun., 1985

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q03-08 65°56'N 163°21'W	Hannum Creek Northwestern Brooks Range	Pb, Zn, Ag Metamorphosed sedimentary exhalative Zn-Pb?	Up to 10% Pb, 2.2% Zn, 1.4g/t Au, and 60.4 g/t Ag

Blebs, stringers, massive boulders, and disseminations of galena, pyrite, sphalerite, and barite with gangue of quartz, calcite, and limonite gangue; occurs in Paleozoic micaceous quartzite, marble, and quartz-mica-graphitic schist, all within or near exposures of crudely banded micaceous quartzite enclosed in an isolated lens of marble. Marble interbedded with early Paleozoic quartz-mica-graphite schist, part of mixed unit of Till (1984). Deposit is highly oxidized; exposure is poor. Zones of blebs, stringers, and disseminations appear conformable with bedding and banding in quartzite. Zones up to 90 m wide and extend for about 2 km along northwest-southeast trend. Two km farther southeast along strike are oxidized stringer zones or lenses of limonite, quartz, and chlorite are cut by veins and stockworks of quartz and chlorite. Stringer zones and lenses composed of interlayered marble and calcareous quartz-muscovite schist. Quartzite is interpreted as metamorphosed laminated exhalite, possibly a sedimentary exhalative Zn-Pb deposit. Thin lenses of marble are interpreted as former limestone mounds that formed near exhalative vents.

Herreid, 1965b; Joseph A. Briskey, written commun., 1985.

Q03-09 65°41'N 162°28'W	Independence Seward Peninsula	Pb, Ag Polymetallic vein	Samples contain up to 30% Pb, 5,145 g/t Ag, 3.4 g/t Au. Dump specimens average about 20 % Pb and 686 g/t Ag. Produced a few hundred tonnes ore

Oxidized pyrite, galena, sphalerite, and minor tetrahedrite in a vein now composed primarily of limonite and sheared calcite. Vein localized in a fault zone trending nearly north-south. Host rocks are sheared and schistose, micaceous and banded, Paleozoic marble, a Cretaceous granitic pluton crops out about 4 km to the northwest. Deposit exposed in open cuts 2-4 m wide over a length of 600 m. Small production in 1921 and 1922, and limited exploration during several periods since. A few hundred meters of underground workings.

Hudson and others, 1977; Joseph A. Briskey, written commun., 1985

Q03-10 65°10'N 162°37'W	Windy Creek Seward Peninsula	Mo Pb, Zn Porphyry Mo	Grab samples with up to 0.15% Mo, 0.05% Sn, 0.05% W, 0.15% Pb

Veins and stringers of quartz, pyrrhotite, pyrite, fluorite, molybdenite, galena, and sphalerite in hornblende granite of the Cretaceous(?) Windy Creek pluton. Molybdenite reported in skarn along pluton margin. Sporadic stringers and veinlets of quartz containing pyrrhotite, pyrite, and fluorite occur near dikes of altered biotite granodiorite intruding the granite. Wall rocks part of the lower Paleozoic mafic schist, and schist and marble of the mixed unit of Till (1984). Little, if any, exploration.

Miller and others, 1971; Hudson and others, 1977; Joseph A. Briskey, written commun., 1984

Q03-11 65°03'N 162°15'W	Death Valley Seward Peninsula	U Sediment-hosted U	Average grade of 0.27 % U_3O_8. Estimated 450,000 kg uranium oxide

Mainly meta-autunite in Paleocene continental sandstone. Sandstone occurs in marginal facies of a Tertiary sedimentary basin where nearshore coarse arkosic clasts are interbedded with coal and lacustrine deposits. Interpreted as forming when uranium-bearing oxidized groundwater moved down from Cretaceous granitic plutons to west along hydrologic gradient. U precipitated in reducing environment of coal layers. Age of deposit estimated at middle or late Tertiary.

Dickinson and Cunningham, 1984; Dickinson and others, 1987

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q03-12 65°02'N 162°41'W	Omilak area Seward Peninsula	Pb, Ag, Sb Au, Cu, Sn, As Polymetallic vein	About 300 tonnes Au-Pb ore averaging about 73% Pb and 5,000 g/t Ag produced from Omilak mine

Contains the Omilak Mine and two nearby prospects, the Foster and Omilak East. Deposits consist of lenses and gossans of argentiferous galena associated with cerussite, anglesite, pyrite, arsenopyrite, unknown tin sulfosalts(?), and traces of chalcopyrite, with highly variable amounts of calcite, dolomite, tremolite, wollastonite, and other calc-silicate minerals. Veinlets and flat lenses of stibnite also occur at the Omilak mine. Veins and gossan occur along axes and limbs of northwest-plunging folds in Paleozoic(?) marble, and in graphitic, pyrite-feldspar schist, and micaceous schist. Bleaching and silicification associated with veins and gossan. Similar small occurrences are found in an area extending about 12.6 km north from Omilak to the Windy Creek pluton. Omilak mine consist of 55-m-deep shaft, 150-m-long adit, and two working levels. Limited underground exploration prior to 1930; only limited surface trenching since. Production between 1881 and 1890.

Smith and Eakin, 1911; Herreid, 1965b; Mulligan, 1962; Hudson and others, 1977; Joseph A. Briskey, written commun., 1985; Bruce M. Gamble and Alison B. Till, written commun., 1986

Q03-13 64°40'N 165°28'W	Nome district, Mt. Distin Nome	Au Au quartz vein	Grab samples with up to 120 g/t Au, 10 g/t Ag, >0.2% As, >0.1% Sb

Quartz veins along high-angle faults with sparse disseminated gold, arsenopyrite, and sparse pyrite in gangue of quartz, minor carbonate, and plagioclase. Minor chalcopyrite, sphalerite, galena, stibnite, tetrahedrite, and scheelite. Veins range from 2 cm to 1 m wide, most less than 10 cm wide. Several veins contain up to 50 percent stibnite and minor pyrite. Veins occur along thrust faults in zone with strike length of about 6 km and up to 600 m wide. District includes MacDuffie, Sliscovitch, California Gulch, and Stipec, and Kotovic deposits in the Nome district, and many deposits in the Mt. Distin area. Faults in two regional sets trending northeast and northwest. Veins and faults occur in metasedimentary rocks of the Paleozoic mixed unit of Till (1984) and Gamble and others (1985) and in mafic schist of the Nome Group. Late Jurassic or Early Cretaceous age estimated for regional metamorphism, with vein formation during waning stages of metamorphism.

Smith, 1910; Cathcart, 1922; Gamble and others, 1985; D.L. Stevens, written commun., 1991

Q03-14 64°35'N 165°29'W	Rock Creek Nome	Au, Ag, W Au quartz vein	6.04 million tonnes 2.4 g/t Au; up to 0.3% W

Arsenopyrite, scheelite, galena, stibnite, and pyrite in northeast-trending sheeted quartz vein system. Surface exposures indicate mineralization extends for 1200 meters along strike and average 70 meters wide and up to 150 meters deep. Host lithologies are phyllite and schist of Paleozoic Nome Group. Fluid inclusion studies indicate ore deposition occurred in the mesothermal range (240°C-320°C). Ore minerals emplaced along selvages of quartz-host rock contacts. Deposit is believed to have formed by hydrofracturing and dewatering event during waning stages of mid-Cretaceous metamorphic event.

Ted Eggelston and R.V. Bailey, written commun., 1990-1991; Apodaca, 1992

Q03-15 64°39'N 164°14'W	Big Hurrah Nome	Au Au quartz vein	Recent assays of 25 to 65 g/t Au. Produced about 155,500 g Au, averaging about 34.3 g/t Au

Four major quartz veins, and zones of ribbon quartz 1 to 5 m thick and a few hundred meters long contain sparse gold, pyrite, and arsenopyrite, with minor scheelite, chalcopyrite, and sphalerite, in gangue of quartz, carbonate, and feldspar. Intermixed with older, concordant, non-Au-bearing, metamorphic quartz veins. Au-bearing veins range from discordant tension veins to discontinuous quartz lodes that occur in shear zones crossing foliation. Au-bearing veins range from 0.5 to 5 m wide, and extend to a depth of at least 90 m. Most veins are less than 1 m wide. Veins and zones occur in quartz-rich, Paleozoic, graphitic, quartz-mica schist or quartzite of the Nome Group (the mixed unit of Till, 1984). Up to 15 percent arsenopyrite occurs in one vein. Veins interpreted to have formed during shearing and uplift associated with metamorphic dehydration. Late Jurassic or Early Cretaceous age estimated from regional metamorphism. Production from 1903 to 1909, and 1953-1954. Shaft 75 m deep; about 550 m of underground workings. Periodically re-examined and considerable exploration during the 1980's.

Collier and others, 1908; Cathcart, 1922; Asher, 1969; Mullen, 1984; Gamble and others, 1985; Read, 1985; Read and Meinert, 1986

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q03-16 64°34'N 163°44'W	Daniels Creek, (Bluff) Nome	Au, Ag As, Sb Au quartz vein	At least 5.9 million tonnes grading 3.4 g/t Au. Grab samples with 4 to 40g/t Au, 10 g/t Ag, 4.8% As, >0.1% Sb
Sulfide poor, arsenopyrite, scheelite, and pyrite bearing, auriferous quartz pods and veins extend for about 2 km strike length in three separate mineralized zones: Daniels Creek, Koyana Creek, and the Saddle Prospect. Sheeted veins up to 75 cm wide hosted in Paleozoic marble and quartz-mica-feldspar schist of the Nome Group. Interstitial native gold in arsenopyrite-rich fractions. Two quartz veins contain up to 60 percent arsenopyrite. Mineralization was originally thought to be one or several strata-bound gold-bearing schist units; however drilling has shown that best auriferous mineralization occurs in deformed rocks along two en echelon thrust faults. Regional metamorphism probably of Late Jurassic or Early Cretaceous age; veins formed in waning stages of metamorphism. Minor underground workings; negligible production. Probable source of gold in nearby Daniels Creek placer deposit and some marine placers of the Solomon District. Herreid, 1965a; Mulligan, 1971; Hudson and others, 1977; Gamble and others, 1985; Richard Heinze, written commun., 1990; Don Stevens, written commun., 1991			
Q03-17 64°42'N 162°46'W	Eagle Creek Seward Peninsula	U, Th, REE Felsic plutonic U	Grab samples of float with up to 0.15% U_3O_8, 1.05% Th, and 2% REE
U-, Th-, and REE-minerals disseminated along margins of alkaline (pulaskite) dikes intruded into Cretaceous Kachauik granitic pluton, marble, and schist. Idocrase principal U-, Th-, and REE-bearing mineral. Local numerous occurrences of U- and Th-minerals in stream-sediment samples underlain by the nearby Darby pluton (granite). West, 1953; Miller and others, 1976; Miller and Bunker, 1976			
Q03-18 64°48'N 165°24'W	Monarch, Cub Bear, American Sinuk River	Fe, Mn, F Stratabound Fe-Mn	May contain up to 750,000 tonnes averaging 45% Fe and 8% Mn. Also contains anomalous Zn.
Massive segregations and lenses of goethite pseudomorphs of magnatite and pyrolusite, and very minor sphalerite and fluorite. Ore minerals generally occur parallel to flat-lying layering in calc-schist and marble of the Mount Distan sequence, part of the highly-deformed Nome Group. Extensive dolomite replacement near contacts between meta sedimentary rocks in area of deposits suggests thrust fault modification of original stratabound Fe deposits. Deposit interpreted as stratabound deposit modified by subsequent regional metamorphism and penetrative deformation. Gossan at the Monarch deposit occurs along the steeply-dipping Monarch fault. Herreid, 1978, 1970; Bundtzen and others, 1994, 1995.			
Q03-19 64°46'N 164°58'W	Aurora Creek Sinuk River	Zn, Pb, Cu, Ba, Ag, Au Kuroko massive sulfide?	Nearly 2,400 m of mineralized layers along strike; one zone in one drill core contains an average of 15.9% Zn, 1.38% Pb, 0.07 % Cu, 35% Ba, 2.6 g/t Au, 45 g/t Ag
Disseminated to massive sphalerite, galena, barite, pyrite, magnetite, and minor chalcopyrite in muscovite-feldspar metavolcanic schist of Aurora Creek sequence that is part of the Late Proterozoic and early Paleozoic Nome Group. Sulfide minerals occur for 2,400 m along strike. Explored by with limited drill cores and trenches. Intense alteration to tourmaline occurs in feldspar-rich metavolcanic schists near massife sulfides and barite occurrences. Limited sulfur isotopic analyes indicate formation in seawater-contaminated, marine volcanogenic setting. Similar, but smaller occurrences occur at nearby prospects at Nelson, Rocky Mountain Creek, and Quarry. Deposit interpreted as stratabound deposit modified by subsequent regional metamorphism and regional deformation. Aurora Creek deposit interpreted as similar to Ansil mine and related deposits in Noranda area of Quebec. Herreid, 1968, 1970; Bundtzen and others, 1994, 1995			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q04-01 67°30'N 161°50'W	Omar Northwestern Brooks Range	Cu, Pb, Zn, Ag, Co Kipushi Cu-Pb-Zn	Grab samples with 15.3% Cu, 0.14% Pb, 0.95% Zn, and 20 g/t Ag

Summary and References

Disseminated to massive chalcopyrite, bornite, lesser chalcocite, minor tennantite-tetrahedrite, very minor galena, supergene copper carbonates, and iron-oxide minerals occur in veinlets, irregular stringers, or as blebs in brecciated dolomite. Gangue dolomite, calcite, and quartz with anomalously high Zn and Co. Sulfide zone about 3 km long occurs along north-northwest trending fractures. Local solution breccia and faulted and brecciated gossan. Local remobilization of sulfides into fractures. Host rocks are Ordovician to Devonian dolomite and limestone of the Baird Group; part of Kelly River allochthon. Host rocks strike north-northeast to south-southeast; dips vary from gentle to vertical. Few minor isoclinal folds.

Degenhart and others, 1978; Jansons, 1982; Mayfield and others, 1983; Inyo F. Ellersieck, written commun., 1985; Folger and Schmidt, 1986

Q04-02 67°28'N 161°35'W	Frost Northwestern Brooks Range	Cu, Zn, Pb, barite Cu-Zn-Pb-Ba vein	Estimated to contain 0.9 million tonnes barite; and possibly as much as 9 million tonnes. One vein with 13.2% Zn, 0.5% Cu, and 21% barite

Chalcopyrite and galena in undulating quartz-calcite-barite veins, and lenses and pods of barite at least 30 m long by 10 m thick. Veins, lenses, and pods crosscut Ordovician to Devonian dolomite and limestone of the Baird Group for at least 1.6 km. Some calcite-barite veins surround barite lenses.

Degenhart and others, 1978; Inyo F. Ellersieck and J.M. Schmidt, written commun., 1985

Q04-03 67°18'N 157°12'W	Smucker Arctic	Cu, Zn, Pb, Ag Kuroko massive sulfide	More than 8 million tonnes with 0.8% Cu, 2.3% Pb, 6.8% Zn, 6.4 oz/t Ag, minor Au

Stratiform, disseminated fine- to medium-grained pyrite, sphalerite, galena, chalcopyrite, and owyheeite in a quartz-calcite-pyrite matrix occur over a strike length of 1,000 m and widths of up to 60 m. Deposit occurs on limb of recumbent, asymmetric antiform. Host rocks: a mafic and felsic metavolcanic sequence composed of quartz-muscovite-feldspar schist, quartz-chlorite-calcite phyllite, and porphyroclastic quartz-feldspar-muscovite schist; and an interlayered metasedimentary sequence composed of quartz-muscovite-chlorite phyllite, calc-schist, and marble. Host rocks part of the Devonian and Mississippian Ambler sequence derived from bimodal calcic and calc-alkaline volcanic rocks and impure clastic and calcareous sedimentary rocks. Deposit and host rocks subjected to greenschist-facies metamorphism. Host rocks strike west-northwest, dip moderately south, and contain abundant south-dipping, tight to isoclinal folds.

Charles M. Rubin, written commun., 1984; Rubin, 1984; Hitzman and others, 1986

Q04-04 67°11'N 156°22'W	Arctic Arctic	Zn, Cu, Pb, Ag, Au Kuroko massive sulfide	37 million tonnes with 4.0% Cu, 5.5% Zn, 0.8% Pb, 47 g/t Ag, 0.62 g/t Au

Stratiform, semimassive to massive chalcopyrite and sphalerite with lesser pyrite, minor pyrrhotite, galena, tetrahedrite, arsenopyrite, and traces of bornite, magnetite, and hematite. Deposit occurs in thick horizon with areal extent of about 900 by 1,050 m, and in two thinner horizons above main horizon. Sulfides form multiple lenses up to 15 m thick over stratigraphic interval of 6 to 80 m. Main horizon hosted in mainly graphitic pelitic schist and metarhyolite porphyry derived from submarine ash-flow tuff. Host rocks part of the Devonian and Mississippian Ambler sequence. Gangue mainly calcite, dolomite, barite, quartz, and mica. Locally abundant chlorite, phlogopite-talc-barite, and pyrite-calcite-white mica occur in hydrothermally-altered wall rocks overlying, underlying, and interlayered with sulfide mineralization. Alteration interpreted as occurring during rapid influx of cold seawater into a hot hydrothermal vent system.

Wiltse, 1975; Sichermann and others, 1976; Hitzman and others, 1982; Schmidt, 1983; Jeanine Schmidt, written commun., 1984; Schmidt, 1986, 1988; Hitzman and others, 1986

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q04-05 67°04'N 156°59'W	Ruby Creek, (Bornite) Arctic	Cu, Co, Zn, Ag Kipushi Cu-Pb-Zn	91 million tonnes grading 1.2% Cu; 4.2 million tonnes of up to 4% Cu

Strata-bound disseminated to massive chalcopyrite, bornite, chalcocite, pyrite, and minor sphalerite in brecciated dolomite and metamorphosed calcareous sedimentary rocks, part of the Devonian Bornite Marble (Hitzman and others, 1982). Local sparse carrollite, chalcopyrite, reinerite, galena, pyrrhotite, and marcasite. Large masses of dolomite breccia in matrix of dolomite, calcite, or fine-grained pyrite. Matrix of pyrite breccia locally replaced by Cu-, Zn-, and Co-sulfides. Individual zoned sulfide bodies with interior containing bornite, chalcocite, and carrollite, middle containing bornite, and chalcopyrite, and exterior containing chalcopyrite, pyrite, and peripheral pyrite. Hydrothermal mineralization extensive in dolostone bodies of biohermal and back-reef facies. Clasts of hydrothermal dolostone in breccias, possibly synsedimentary, indicate possible coeval mineralization and sedimentation. Three major hydrothermal dolomite formation events. Subsequent intense polymetamorphism to greenschist facies, and broad folding.

Runnells, 1969; Sichermann and others, 1976; Hitzman and others, 1982; Hitzman, 1983; M.W. Hitzman, written commun., 1984; Bernstein and Cox, 1986; Hitzman, 1986

Q04-06 67°01'N 156°50'W	Asbestos Mountain Kobuk	Asbestos, jade, asbestos, talc Serpentine-hosted asbestos	No data

Serpentinite with veins of cross- and slip-fiber tremolite and chrysotile; small deposits of talc, soapstone, and nephrite. About 35 tonnes tremolite mined from 1940 to 1945. Probably source of nephrite jade boulders in Dahl Creek. Part of dismembered Jurassic or older ophiolite, exposed discontinuously in klippe in the Jade Mountains-Cosmos Hills area, along the northern flank of Yukon-Koyukuk basin.

Coats, 1944; Heide and others, 1949; Roeder and Mull, 1978; Loney and Himmelberg, 1985b

Q04-07 66°16'N 157°20'W	Wheeler Creek Northwestern Koyukuk Basin	U Felsic plutonic U	Grab samples with up to 0.0125% U

Uranothorianite and gummite in small, altered, smoky quartz-rich veinlets, and in altered areas in Late Cretaceous alaskite. Deposit about 500 m long by 50 m wide.

Eakins and Forbes, 1976; Miller, 1976; Jones, 1977

Q04-08 66°15'N 156°03'W	Clear Creek Northwestern Koyukuk Basin	U Felsic plutonic U	Grab samples with up to 0.04% U, and 0.055% Th

Uraniferous nepheline syenite and bostonite dikes in Late Cretaceous andesite. Dikes within contact aureole of Late Cretaceous monzonite to granodiorite pluton of Zane Hills.

Eakin and Forbes, 1976; Miller, 1976; Jones, 1977

Q04-09 66°12'N 156°15'W	Zane Hills Northwestern Koyukuk Basin	U, Th Felsic plutonic U	Grab samples with up to 0.027% Th

Uranothorianite, betafite, uraninite, thorite, and allanite in veinlets in foliated monzonite border phase of the Late Cretaceous Zane Hills pluton. Border phase grades to syenite; biotite-hornblende granodiorite in core of pluton.

Eakin and Forbes, 1976; Miller, 1976; Jones, 1977; Miller and Elliott, 1977

Q04-10 65°30'N 161°26'W	Quartz Creek Seward Peninsula	Pb, Zn, As, Ag Polymetallic vein	Up to 15% combined Pb and Zn, and 340 g/t Ag

Disseminated to massive sulfides scattered over zone 3.2 to 8 km wide and over 29 km long in altered andesite and granite of Jurassic or Cretaceous age. Mainly argentiferous galena, sphalerite, pyrite, and arsenopyrite. Local realgar, orpiment, and tourmaline also present. Considerable exploration, including drilling, in early 1970's.

Miller and Elliott, 1969; Bundtzen and others, 1984

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q04-11 64°45'N 157°30'W	Perseverance Southwestern Kuskokwim Mountains	Pb, Ag, Sb Polymetallic vein(?)	Produced 231 tonnes of ore with average grade of 73% Pb, and 124 g/t Ag.
Coarse-grained galena, tetrahedrite, and traces of fibrous jamesonite in veins crosscutting bedding and schistosity of Paleozoic(?) chlorite-mica schist. Gangue of dolomite and minor quartz. Vein strikes northeast-southwest and dips southeast. Oxidized zones of vein contain cerussite, azurite, malachite, and stibiconite(?). Mined from 1920 to 1927, and 1981. Age of deposit unknown. Brian K. Jones, written commun., 1984			
Q04-12 64°05'N 158°00'W	Illinois Creek Southwestern Kuskokwim Mountains	Cu, Ag, Au, Pb, Zn Manto-replacement deposit (polymetallic Pn-Zn, Au)	Contains 1.54 million tonnes grading, 2.4 g/tonne Au and 70 g/t Ag
High-grade galena-sphalerite veins near contact between altered Cretaceous granite porphyry, and massive, pipe-like gossan in marble. Most of the deposit was originally a massive sulfide body in Paleozoic quartzite, now completely oxidized. Illinois Creek is one of 3 polymetallic gold-bearing gossans aligned along a 12 km long trend parallel to the Kaltag Fault, a major transcurrent fault in Western Alaska. Most of the deposit is a completely oxidized massive sulfide body in Paleozoic quartzite. Abundant sericite alteration in nearby granitic plutons which contain stockwork veinlets with chalcopyrite, galena, and detectable precious metals. Other areas with epigenetic replacement, veins, and skarn with base-metal sulfides. Area is poorly exposed. The plutonic rocks intrude middle Paleozoic and older greenschist, quartzite, limestone, and orthogneiss. Gillerman, 1988; William W. Patton, Jr., written commun.; G. Booth, written commun., 1991			
Q04-13 64°10'N 156°40'W	Kaiyuh Hills (Yuki River) Yukon River	Cr Podiform Cr	Estimated 15,000 to 34,000 tonnes Cr_2O_3 in one deposit. Largest deposit averages 60% Cr_2O_3 on surface
Banded and disseminated chromite from 1 cm to 1 m thick in fresh and serpentinized Jurassic(?) dunite of Kaiyuh Hills ultramafic belt. Dunite interlayered with harzburgite tectonite. Largest deposit, 1 m by 100 m, consists of massive chromite with estimated 5,000 tonnes Cr_2O_3. Lesser occurrences of banded nodular pods of chromite. Metallurgical grade chromite with 46% Cr_2O_3 present. Dunite and harzburgite tectonite faulted at base; interpreted as part of complexly deformed and dismembered ophiolite, part of Rampart ophiolite belt. Loney and Himmelberg, 1984; Foley and others, 1984			
Q05-01 67°26'N 154°07'W	Mount Igikpak and Arrigetch Peaks Brooks Range	Cu, Pb, Zn, Ag, Au, Sn, W, As Polymetallic vein, Au quartz vein, Sn skarn, Cu-Pb-Zn skarn	Grab samples with up to 55 g/t Au, 150 g/t Ag, >0.18% Sn, with commonly substantial Cu, Pb, Zn, and W values
Numerous small polymetallic vein, Au quartz veins, and skarn deposits in metasedimentary rocks adjacent to schistose Devonian granitic plutons. Wall rocks mainly Silurian and Devonian Skajit Limestone or older metasedimentary rocks. Most common deposits are: (1) quartz veins with varying amounts of galena, sphalerite, and chalcopyrite; (2) Sn skarns with disseminated cassiterite, magnetite, chalcopyrite, and arsenopyrite, in gangue of garnet, diopside, hornblende, clinozoisite, and idocrase; (3) Cu-Pb-Zn skarns with vein or sparse disseminated pyrrhotite, pyrite, chalcopyrite, galena, sphalerite, arsenopyrite, and fluorite with similar gangue as Sn skarns; and (4) areas of Fe-stained wall rocks with molybdenite and fluorite. Grybeck and Nelson, 1981; Newberry and others, 1986			
Q05-02 67°25'N 152°50'W	Ann, (Ernie Lake) Brooks Range	Pb, Zn, Ag Polymetallic vein (metamorphosed)	No data
Vein and stratabound massive galena with lesser sphalerite, bornite, chalcopyrite, and secondary malachite and azurite in marble, calc-schist, and pelitic schist. Occurs in Late Proterozoic(?) banded schist and paragneiss. Deposit occurs adjacent to the granite pluton of Ernie Lake, as do similar smaller occurrences nearby, around periphery of pluton. Deposit may be polymetallic vein, or remobilized stratabound deposit. Grybeck, 1977; John T. Dillon, oral commun., 1986			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q05-03 67°19'N 151°14'W	Michigan Creek Arctic	As, Au, Ag, Cu, Zn, Pb Kuroko massive sulfide	Grab samples with up to 8.2% As, 8.3 g/t Au, 3.9 g/t Ag, 0.14% Cu, 0.03% Zn, 0.014% Pb
Disseminated to massive chalcopyrite and argentiferous galena in layers up to 0.1 m thick in felsic schist and in cross-cutting pyrite veins. Occurs in felsic schist, marble, and phyllite of the Devonian and Mississippian Ambler sequence. Dillon and others, 1981; William P. Brosge and John T. Dillon, oral commun., 1986			
Q05-04 67°08'N 155°52'W	BT, Jerri Creek Arctic	Cu, Zn, Pb, Ag Kuroko massive sulfide	BT: 3-4 million tonnes with 1.7% Cu, 2.6% Zn, 0.9% Pb, and 40 g/t Ag
BT deposit: disseminated to massive pyrite, chalcopyrite, sphalerite, galena, and gossan in layers 5 to 12 cm thick. Sparse tennantite and possible enargite. Gangue is quartz, muscovite, and barium feldspar. No vertical zonation. Hosted in Devonian and Mississippian pelitic schist, calc-schist, and metarhyolite ("button") schist, part of the Ambler sequence. Strike length of 2,000 m; average width of 1.5 m. Layering strikes east-west and dips 50° to 70° south. Similar occurrences in zone up to 10 km long to west, along same stratigraphic horizon. Jerri Creek deposit: Mainly disseminated and sparse massive pyrite, sphalerite, and minor chalcopyrite in layers up to 2 cm thick. Hosted in muscovite-quartz schist, actinolite-garnet-quartz schist, and marble adjacent to metarhyolite, all part of the Devonian and Mississippian Ambler sequence. Strike length of 20 km. Hitzman, 1978, 1981; Hitzman and others, 1986			
Q05-05 67°04'N 155°01'W	Sun, (Picnic Creek) Arctic	Cu, Zn, Pb, Ag, Au Kuroko massive sulfide	Average grade of 1 to 4% Pb, 6 to 12% Zn, 0.5 to 7% Cu, 103 to 343 g/t Ag. Single quartz-barite bed with 685 to 1,029 g/t Ag. Less than 3 million tonnes ore determined by drilling.
Stratiform, disseminated to massive sphalerite, chalcopyrite, galena, and argentiferous tetrahedrite with pyrite, arsenopyrite, and barite. Deposit occurs in at least three horizons. Upper horizon is Zn-Pb-Ag rich; middle is mainly Cu-rich; and lower is Cu-Zn rich. Host rock is metarhyolite, muscovite-quartz-feldspar schist, micaceous calc-schist, marble, and greenstone, all part of the Devonian and Mississippian Ambler sequence. Host rocks generally strike northeast and dip moderately southeast. Locally well-developed layering in metarhyolite may represent original bedding in tuff protolith. Bulk of sulfides in felsic schist; thin concordant beds of sulfides in metarhyolite. Small- and large-scale isoclinal folds in host rocks and sulfide layers. Zdepski, 1980; Christopher D. Maars, written commun., 1984; Hitzman and others, 1986			
Q05-06 67°10'N 152°30'W	Roosevelt Creek Arctic	Cu, Zn, Pb, Ag, Au Kuroko massive sulfide	No data
Disseminated(?) and massive sulfides, probably mainly chalcopyrite, sphalerite, and galena, in metavolcanic rocks and pelitic schist and marble of the Devonian and Mississippian Ambler sequence. Grybeck, 1977; William P. Brosge and John T. Dillon, oral commun., 1986			
Q05-07 66°05'N 150°55'W	Caribou Mountain, Lower Kanuti River, Holonada Yukon River	Cr Podiform Cr	Estimated 2,300 tonnes Cr_2O_3 at Caribou Mountain, 730 tonnes at Lower Kanuti River, and up to 25,000 tonnes at Holonada
Elongate belt over 100 km long contains podiform Cr deposits in Jurassic or older dunite and peridotite tectonite. Largest deposits are at Caribou Mountain, lower Kanuti River, and Holonada. Caribou Mountain: ten chromite occurrences; three containing bands of massive chromite, and magnesian chromohercynite in layers up to 3 m thick and 20 m long. Lower Kanuti River: one layer about 1.5 m wide and at least 25 m long with high-chromium chromite contains 7.5% Cr_2O_3. Holonada: ten occurrences of bands of disseminated to massive chromite several meters thick and long. One occurrence 1.5 to 3 m thick with exposed strike length of 130 m, with average grade of 20% Cr_2O_3. Four other occurrences with about 1,000 tonnes averaging 4% to 8% Cr_2O_3. Deposits at all three areas interpreted as part of complexly deformed and disrupted ophiolite, part of Yukon-Koyukuk ophiolite belt. Patton and others, 1976; Foley and McDermott, 1983; Foley and others, 1985; Loney and Himmelberg, 1985a			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q05-08 66°37'N 150°01'W	Bonanza Creek Northeastern Koyukuk River	W, Ag, Cu W skarn	Grab samples with up to 0.89% W, 300 g/t Ag, 0.65%Cu

Scheelite, chalcopyrite, and pyrrhotite in skarn adjacent to intrusive contact with biotite granite pluton. Scheelite occurs mainly as sparse disseminated grains, associated with very sparse sulfides in garnet-pyroxene skarn and on fracture surfaces in calc-silicate schist. Local limonite staining. Local quartz-scheelite veins in calc-silicate schist, and quartz-molybdenite veins in biotite granite. Granite pluton part of the Kanuti batholith with K-Ar age of 90.6 Ma. Wall rocks include middle Paleozoic or older pelitic schist, quartz-mica schist, quartz-feldspar schist, quartzite, and calcareous quartz-mica schist. Deposit associated with marble layer, about 15 m thick, interlayered with pelitic schist. Exploration limited to several trenches.

Clautice, 1980

Q05-09 66°30'N 150°10'W	Upper Kanuti River Northeastern Koyukuk River	Pb, Zn, Ag Polymetallic or epithermal vein	Grab samples with up to 2% Pb, 0.3% Zn, and 30 g/t Ag

Disseminated pyrite, galena, and sphalerite in masses up to 5 mm in diameter occur in extensive altered gossan zone about 100 m long in silicified, locally brecciated, early Tertiary rhyolite porphyry. Rhyolite caps and probably intrudes a Cretaceous pluton of the Kanuti batholith.

Patton and Miller, 1970

Q05-10 65°16'N 150°25'W	Avnet (Buzby) East-Central Alaska	Mn, Ag Mn-Ag vein	Grab samples contain 0.6 to 34% Mn and up to 9.6 g/t Ag

Irregular masses of psilomelane up to almost 8 cm long occur in latticework of thin seams of quartz, and as thin surface coatings on fractured lower and middle Paleozoic chert, quartzite, limestone, dolomite, and greenstone. Exploration consists of one trench and two pits.

Thomas, 1965

Q05-11 65°02'N 150°45'W	Hot Springs Dome East-Central Alaska	Pb, Ag, Zn, Au Cu, Co Polymetallic vein	Grab samples contain about 5.8 g/t Au, up to 274 g/t Ag, 3.7% Pb, and 0.32% Zn

Six, east-west-striking veins, possibly in shear zones, in contact-metamorphosed argillite, graywacke, conglomerate, and minor conglomerate; part of Jurassic and Cretaceous flysch sequence. Veins at surface contain galena coated with anglesite and limonite. At depth, veins also contain siderite, copper carbonates, chalcopyrite, pyrrhotite, pyrite, and erythrite. Zone up to 600 m long and 9 m wide. Numerous quartz veinlets. Deposit occurs at contact with early Tertiary biotite granite. Exploration consists of three shallow shafts.

Maloney, 1971

Q05-12 64°45'N 155°30'W	Beaver Creek Southwestern Kuskokwim Mountains	Ag, Pb, Zn Polymetallic vein	Estimated 14,000 tonnes grading 103 g/t Ag, 0.8% Zn and 0.5% Cu; additional 19,000 tonnes grading 26.1 g/t Ag, 4.2% Pb, 0.16% Zn, 0.2% Cu

Highly oxidized zones with limonite, goethite, argentiferous galena, quartz, and sphalerite; surface occurrences of massive galena and limonite-cerussite gossan. Two zones occur for 300 m along strike, and range from 2.5 to 5 m thick. Zones separated by fractured schist and marble occur in middle Paleozoic(?) muscovite schist trending northeast-southwest and dipping steeply northwest. Deposition of sulfides controlled by metamorphic structures in host rocks. Age of deposit unknown.

Brown, 1926; Thomas, 1963; Brian K. Jones, written commun., 1984

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q05-13 66°38'N 155°55'W	Zane Hill West-Central Alaska	Cu, Au Porphyry Cu-Au	Contains up to 2.0% Cu, 0.2% Mo, and 2.4 g/t Au.

Consists of a stockwork and veins containing chalcopyrite, pyrite, trace molybdenite, and covellite most commonly in a quartz gangue. The stockwork and veins occur in a small monzonite porphyry, exposed over a 5 km2 area, that intrudes older Jurassic andesite, and also in mid-Cretaceous granodiorite. The stockwork and veins occurs in both the Jurassic andesite and in the monzonite porphyry that has K-Ar age of 81 Ma. Like the deposits at Indian and Purcell Mountains, the phyllic-argillic-propylitic alteration assemblage that is annularly distributed around the core of the monzonite porphyry. The Zane Hills deposit occurs about 4 km west of the Hog River placer deposit that has yielded about 6,842 kg of placer gold.

Miller and Ferrians, 1968; Hollister, 1978; Nokleberg and others, 1995a.

Q05-14 66°22'N 155°02'W	Indian Mountain and Purcell Mountain West-Central Alaska	Cu, Au Porphyry Cu-Au	Indian Mountain: Limited analyses range from 0.07 to 0.15% g/t Cu and 0.1 to 1.5 g/t Au. Purcell Mountain: Contains 0.07 to 0.10% Cu but no gold. Placer gold has been commercially recovered from streams draining plutons in area.

Indian Mountain: Consists mainly of tourmaline-bearing breccias with chalcopyrite. Surrounding the breccias are concentric phyllic-argillic-propylitic alteration halos. The halos surround the central parts of a quartz monzonite porphyry intrusion with a size of about 10 km2. A pyrite halo rims the intrusion outboard of the intrusion. Barite, galena, and sphalerite have also been identified at the prospect. Purcell Mountain: Consists of a porphyry copper deposit consists of stockwork veins with chalcopyrite that are also associated with the concentric phyllic-argillic-propylitic alteration halos. The halos surround the central part of a quartz monzonite porphyry intrusion with a size of about 12 km2. A pyrite halo also rims the intrusion.

Miller and Ferrians, 1968; Hollister, 1978; Nokleberg and others, 1995a.

Q06-01 67°45'N 149°05'W	Jim-Montana Brooks Range	Cu, Zn, Ag, Pb Cu-Zn skarn	No data

Disseminated chalcopyrite, sphalerite, with minor galena, tennantite, and malachite stain in skarn developed in marble of the Silurian and Devonian Skajit Limestone.

Grybeck, 1977; DeYoung, 1978

Q06-02 67°36'N 149°50'W	Sukakpak Mountain Brooks Range	Au, Sb, Mo Hg Sb-Au vein	Grab samples with up to 560 g/t Au, 4.5 g/t Ag, 54% Sb, 1.7% Mo, and 0.50% Hg

Disseminated stibnite, with sparse cinnabar, gold, and molybdenite(?) in three calcite-stibnite quartz veins along a high-angle fault that cuts Devonian marble, dolomite, graphitic and calcareous quartz schist. Stibnite forms up to 60 percent of vein. Zone of veins extends for about 1 km with maximum zone width about 100 m. Local slickensides and boudins in veins suggest emplacement during movement on fault.

Dillon, 1982

Q06-03 67°38'N 149°20'W	Victor, Venus, Evelyn Lee, and Ebo Brooks Range	Cu, Ag, Mo Porphyry Cu and Cu skarn	Zones in granitic rocks up to 30 m wide contain up to 0.4% Cu. Grab samples of skarn contain up to 5.5% Cu, 0.41 g/t Au, and 0.29 g/t Ag

Veinlet and disseminated chalcopyrite, bornite, molybdenite, and pyrite in schistose Devonian granodiorite porphyry intruding Silurian and Devonian Skajit Limestone or older marble, calc-schist, and pelitic schist. Skarn in marble adjacent to plutons contain vugs with interstitial bornite, chalcopyrite, bornite, chalcocite, pyrite, magnetite, and some digenite. Skarn consists mainly of garnet, magnetite, diopside, and retrograde vein and replacement epidote, amphibole, chlorite, calcite, and quartz. Skarns were subsequently regionally metamorphosed.

DeYoung, 1978; Donald Grybeck, written commun., 1984; Newberry and others, 1986

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q06-04 67°41'N 148°49'W	Geroe Creek Brooks Range	Cu, Mo Porphyry Cu-Mo	Zones in plutons up to several m thick with up to 0.6% Cu, 0.02% Mo, and 0.1 g/t Au.
Veinlet, stockwork, and disseminated molybdenite, chalcopyrite, and pyrite with quartz, sericite, and chlorite in the Devonian Horace Mountain and Baby Creek plutons composed of metaluminous biotite-hornblende granite with local porphyritic phases. Wall rocks mainly the Silurian and Devonian Skajit Limestone and older calcareous metasedimentary rocks.			
DeYoung, 1978; Newberry and others, 1986			
Q06-05 67°32'N 148°15'W	Chandalar district (Mikado, Little Squaw) Southern Brooks Range	Au Au quartz vein	12,000 tonnes with 75 g/t Au at Mikado and Little Squaw mine. Estimated 45,000 tonnes grading 80 g/t Au for district
Scattered, minor arsenopyrite, galena, sphalerite, stibnite, and pyrite with gold in several quartz veins up to 3 m thick in a zone about 4.0 km long and 1.6 km wide. Veins occur along steeply dipping normal faults in Devonian or older quartz-muscovite schist, phyllite, and quartzite. Veins interpreted to have been emplaced during fault movement. More than 1,000 m of underground workings at Little Squaw and Mikado mines. Minor production and several episodes of exploration activity, notably during the 1920's and 1960's.			
Chipp, 1970; DeYoung, 1978; Dillon, 1982; Ashworth, 1983; John T. Dillon, oral commun., 1986; Rose and others, 1988			
Q06-06 65°23'N 149°30'W	Sawtooth Mountain East-Central Alaska	Sb Au, Ag Sb-Au vein	Grab samples from dump contains up to 46.2% Sb, 0.7 g/t Au, and 15.1 g/t Ag. Produced about 590 tonnes with 58% Sb_2S_3 through 1970
Massive stibnite in a vertical cylindrical lens about 3 m wide. Hosted in argillite of Late Jurassic or Early Cretaceous flysch near contact with Cretaceous granite with K-Ar age of 88.3 Ma. One shaft about 30 m deep. Most production occurred during Korean War. Minor production in 1970 and 1985.			
R.M. Chapman, written commun., 1985			
Q06-07 65°31'N 148°30'W	Gertrude Creek, Griffen, Ruth Creek East-Central Alaska	Au, Sb Ag, Pb Sb-Au vein	Grab samples with up to 15% Sb and 3.9 g/t Au
Quartz stringers up to 8 cm wide with pyrite, arsenopyrite, stibnite, and gold in altered diorite and silica-carbonate rock that consists of dolomite, calcite, and quartz. Hosted in middle Paleozoic greenstone, slate, calc-schist, and Cretaceous monzonite. Mineralized quartz stringers also in shear zone adjacent to serpentinite. Exploration limited to short adit and a few pits scattered across Amy Dome area.			
Foster, 1968a, b; Allegro, 1984a			
Q06-08 65°30'N 148°22'W	Hudson Cinnabar East-Central Alaska	Hg Hg quartz vein	Possibly minor Hg produced
Cinnabar in disseminations and quartz veins in altered Late Cretaceous to early Tertiary granite dikes and plutons intruding Ordovician to Devonian siltstone and argillite. Minor exploration over years but long dormant.			
Robinson and others, 1982			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q06-09 65°37'N 146°43'W	Lime Peak East-Central Alaska	Sn, Ag, Zn, U, W Sn greisen and Sn vein	Grab samples with up to 0.16% Sn, 0.5% Cu, 0.2% Pb, 1.8% Zn, 14 g/t Ag. Estimate 50% probability of 320,000 tonnes of Sn and 10 million ounces Ag

Summary and References

Areas of veinlets, breccia zones, and pods of black tourmaline, and areas of chlorite, sericite, green tourmaline, and quartz alteration in early Tertiary hypabyssal, peraluminous, biotite granite pluton. Granite pluton cut by numerous felsic and minor intermediate dikes. Veins up to 0.5 m wide. Areas of veinlets, breccia zones, and tourmaline pods interpreted as deuteric alteration; areas of chlorite, sericite, and quartz interpreted as hydrothermal alteration. Anomalous high values of Sn and associated pathfinder elements (Ag, B, Bi, Mo, Pb, Zn) found in rock samples from and around pluton. Rare fluorite, topaz, pyrite, chalcopyrite, and molybdenite in altered areas. Placer cassiterite in surrounding area. Two main phases to pluton: older coarse-grained equigranular biotite granite; younger porphyritic biotite granite with fine-grained groundmass. Local miarolitic cavities in pluton. K-Ar ages of 57-66 Ma for granite associated with mineralization; intruding Cambrian(?) sandstone, shale, slate.

Menzie and others, 1983; Burton and others, 1985; W. David Menzie, written commun., 1985; Smith and others, 1987

Q06-10 65°29'N 147°05'W	Roy Creek (former Mount Prindle) East-Central Alaska	U, Th Felsic plutonic U	Drill core with up to 5 to 10% REE by volume

Thin veins with allanite, bastnaesite, monazite, thorianite, thorite, uraninite, and xenotime cut Cretaceous porphyritic biotite syenite and alkali granite. Deposit contains significant La, Ce, Nd, Pr, Y, and fluorite. Marked by hematitic alteration of wall rocks and leaching of magnetite in host rocks. Deposit and granitic rocks occur about 25 km west of Mount Prindle and intrude Cambrian(?) sandstone, quartzite, argillite, and chert.

Burton, 1981

Q06-11 65°21'N 146°33'W	Dempsey Pup East-Central Alaska	Sb, Au(?) Sb-Au vein or polymetallic vein(?)	Grab samples with up to 28% Sb. Produced a few hundred tonnes of low-grade ore.

Quartz vein with small lenses and stringers of stibnite and possibly gold. Hosted in middle Paleozoic or older quartz schist, mica schist, and marble of Yukon-Tanana terrane. Several short tunnels.

Killeen and Mertie, 1951

Q06-12 65°29'N 145°53'W	Table Mountain East-Central Alaska	Au Sn, Be, W Sn polymetallic vein	Grab samples with up to 140 g/t Au and 0.15% Be

A variety of types of deposits, all(?) associated with felsic igneous rocks. Pyrrhotite, arsenopyrite, minor chalcopyrite, rare enargite and sphalerite, and high Au values occur in black biotite schist and in quartz veins adjacent to fault zone intruded by a hypabyssal felsic dike. About 5 km northeast, low Au values in felsic dikes and in country rocks adjacent to an early Tertiary granite pluton, and in felsic dikes in the granite. Granite pluton crops out over 2 km^2 area. Granite and adjacent biotite schist contain high Be values. Small skarns with high W-Au values. Local quartz-tourmaline veins with pyrrhotite, arsenopyrite, scheelite, stibnite, and carbonate veins.

Burack, 1983; Foster and others, 1983; W. David Menzie, written commun., 1985; Newberry and Burns, 1988

Q06-13 65°33'N 145°15'W	Miller House East-Central Alaska	Au Au-As polymetallic vein	Grab samples with up to 3.9 g/t Au

Massive to disseminated arsenopyrite in four large and four small, iron-stained shear zones over 150 m long that cut mid-Paleozoic or older schist of Yukon-Tanana terrane. Intense alteration along zones. Possibly Early Tertiary age interpreted for deposit.

Tripp and others, 1982; Menzie and others, 1983

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q06-14 65°29'N 144°53'W	Ketchem Dome East-Central Alaska	Sn Sn greisen	Grab samples with up to 0.51% Sn

Greisen zones, up to 4 cm wide, and quartz veins in intensely altered, chloritic breccia along northern margin of the multi-phase early Tertiary, Circle (granite) pluton (K-Ar age of 60.5 Ma). Pluton intrudes mid-Paleozoic or older schist of the Yukon-Tanana terrane. Limited exploration in 1978 and 1981.

Foster and others, 1983; Menzie and others, 1983; W. David Menzie, written commun., 1984

Q06-15 65°27'N 144°50'W	Bedrock Creek East-Central Alaska	Cu, W, Th Porphyry Cu(?)	No data

Disseminated monazite with minor scheelite, pyrrhotite, garnet, ilmenite, zircon, biotite, topaz, and malachite in early Tertiary granite of the Circle pluton (K-Ar age of 60.5 Ma). Pluton intrudes middle Paleozoic or older schist of Yukon-Tanana terrane.

Nelson and others, 1954

Q06-16 65°07'N 144°38'W	Salcha River East-Central Alaska	W W skarn	No data

Scheelite occurs in discontinuous idocrase-garnet skarn, in layered calc-silicate schist, and in impure marble along contact with early Tertiary granite pluton. Schist and marble part of mid-Paleozoic or older Yukon-Tanana terrane.

Foster and others, 1983; Menzie and others, 1983; W. David Menzie, written commun., 1984

Q06-17 65°07'N 147°23'W	Fort Knox East-Central Alaska	Au, Ag, Mo Bi Granitoid-related gold	153,8 million tonnes grading 0.82 g/t Au

Free gold, bismuthinite, and minor to trace molybdenite and chalcopyrite in sulfide-poor, quartz vein stockwork. Gold is remarkable pure (980 fine) which is extremely unusual. Mineralization hosted in porphyritic granodiorite and preferentially emplaced along a steeply dipping fracture system trending North 70 degrees West. Deposit is at least 1500 meters long, 300 meters wide, and 250 meters deep and open ended at depth. Chemically, the Fort Knox pluton, which hosts the mineralization, is alkali-calcic and peraluminous. Mineralization may have occurred during late stages of emplacement of the nearby Gilmore Dome stock which is radiometrically dated at 92 Ma, or alternatively, during a younger heating event that post-dates early Mo-Bi mineralization.

Robinson and others, 1990; Arne Bakke, written commun., 1991; Bakke, 1995; Bundtzen and others, 1996.

Q06-18 65°04'N 147°25'W	Cleary Summit (Flanks of Pedro Dome) East-Central Alaska	Au, Ag Pb, Zn, Sb, As, W, Sn Polymetallic vein, Au-quartz vein	Total production estimated as 145,000 tonnes containing 10 to 55 g/t Au. True north deposit with 6.24 milion tonnes grading 2.23 g/t Au.

Quartz fissure veins from a few centimeters to a few meters thick with various proportions of gold, boulangerite, jamesonite, galena, stibnite, pyrite, arsenopyrite, tetrahedrite, and minor scheelite. Most productive veins strike northwest-southeast and dip variably to south. Cleary summit region includes 78 known lode occurrences, 30 with production. Veins in interlayered mica quartzite, graphitic schist, pelitic schist, chlorite-actinolite greenschist, calc-schist, and marble of the upper Precambrian(?) Cleary sequence, part of the mid-Paleozoic or older Yukon-Tanana terrane. Several theories of origin have been proposed. The older is that the veins are related to Cretaceous intermediate composition plutons, several of which are exposed or are proposed under the Cleary anticline. More recently, several workers have proposed that the metals and the veins were remobilized from the Cleary Sequence. The veins are the source of rich placers in creeks that drain the area. Several periods of active mining, mostly before 1941. The largest producers were the Cleary Hill and Hi-Yu mines. Persistent, though somewhat erratic, exploration since before World War I, including several major exploration projects in the 1980's.

Chapman and Foster, 1969; Metz and Halls, 1981; Smith and others, 1981; Newberry and Burns, 1988; Robinson and others, 1990; Metz, 1991; Buntzen and others, 1996.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q06-19 64°59'N 147°21'W	Stepovich Lode East-Central Alaska	W, Au W skarn	Estimated 20,000 tonnes grading 0.5 to 3.6% WO_3. Produced about 4,000 units WO_3

Scheelite in layered skarn, or locally in zoned veins crosscutting skarn. Skarn types include scheelite-amphibole-quartz-calcite, pyroxene-garnet-scheelite, and quartz-amphibole-calcite-scheelite varieties. District includes 15 known lode tungsten prospects, four with significant production. Skarns form discontinuous bodies near, and at contact with the Gilmore Dome (granite) pluton of Late Cretaceous age. Deposit occurs in calc-schist and marble of the Cleary sequence and in interlayered amphibolite, all part of the middle Paleozoic or older Yukon-Tanana terrane. Includes Spruce Hen, Yellow Pup, and Stepovitch mines. Production between 1916-1919, 1941-1945, and 1951-1955.

Byers, 1957; Metz and Halls, 1981; Robinson, 1981; Allegro, 1984b; Robinson and others, 1990; Metz, 1991

Q06-20 65°00'N 147°49'W	Scrafford East-Central Alaska	Sb, Au Sb-Au vein	Footwall chip samples contain 1.4 to 5.7 g/t Au. Produced 906,000 kg Sb from 2,500 tonnes ore, averaging 36% Sb.

Massive stibnite along east-west-striking shear zone. Also disseminated quartz stockwork and veinlets with arsenopyrite and stibnite in feldspathic quartzite and quartz mica schist in footwall of shear zone. Barren pelitic schist and quartzite in hanging wall. Host rocks part of the upper Precambrian(?) Cleary sequence, part of the mid-Paleozoic or older Yukon-Tanana terrane. Several periods of active mining when Sb prices have been high.

Chapin, 1914, 1919; Metz and Halls, 1981; Robinson and Bundtzen, 1982; Thomas E. Smith and Paul A. Metz, written commun., 1984; Metz, 1991

Q06-21 64°52'N 148°05'W	Ester Dome East-Central Alaska	Au, Ag Polymetallic vein(?)	Produced 194,000 tonnes of ore with average grade of 3.0 to 80.0 g/t Au

Quartz fissure veins from a few centimeters to 5.5 m thick and up to 1,200 m long with gold, pyrite, arsenopyrite, and stibnite, and minor jamesonite, argentite, chalcocite, and covellite. Area includes 58 known lode occurrences, 27 with production. The largest deposits include Ryan Lode and the Grant and Mohawk deposits. Steeply dipping quartz veins up to a few meters thick most common; local sheared veins up to 22 m thick. Multiple episodes of quartz deposition. Veins occur in micaceous quartzite, graphitic schist, calc-schist, and marble of mid-Paleozoic or older Yukon-Tanana terrane. About 26 producing vein deposits in area. The Silver Dollar and Mohawk deposits contain an estimated 900,000 tonnes grading 3.0 g/tonne Au and 6.0 g/tonne Ag. Grant deposit has estimated 192,300 tonnes grading 12.0 g/t Au. Ryan Lode deposit has estimated 13.2 million tonnes grading 1.95 g/t Au. Several periods of production, notably in the 1930's and the 1980's. The most prominent properties are the Ryan Lode and the Grant mine; both of which are currently active. Ester Dome undoubtedly is the source for some of the rich placers located radially around it.

Hill, 1933; Thomas, 1973; R.C. Burggraf, written commun., 1989, Robinson and others, 1990; Bundtzen and others, 1996.

Q06-22 64°37'N 148°51'W	Liberty Bell Alaska Range and Yukon-Tanana Upland	Au, Ag, Cu, Bi Kuroko massive sulfide(?) or polymetallic gold vein	Estimated 91,000 tonnes with 34.3 g/t Au, 10% As, 2.0% Cu

Fine-grained arsenopyrite, chalcopyrite, pyrrhotite, and bismuthite in stringers and laminations that occur parallel to foliation. The sulfide zone reaches a maximum thickness of 10 m and is 200 m long. Layering ranges from a few centimeters to 1 m thick. Lenses and laminations parallel foliation in siliceous metavolcanic phyllite of the California Creek Member of the Mississippian(?) Totatlanika Schist, but are locally folded. Quartz-tourmaline-sulfide veins, locally with symmetrical wall rock alteration, are from 10 cm to 1 m thick and crosscut sulfide zones and adjacent schist. The sulfides occur immediately adjacent to a metamorphosed porphyry interpreted as a Paleozoic igneous plug that was contemporaneous with the volcanic rock protoliths of the Totatlanika Schist. White mica from plug yields K-Ar age of 90 Ma, which indicates the age of a regional metamorphic event in the Yukon-Tanana terrane. Quartz veins may represent either remobilized stratiform sulfides, or polymetallic veins associated with nearby Tertiary(?) plutonic rocks. Gold produced in 1930's.

Hawley, 1976; E.R. Pilgram, written commun., 1976; Gilbert and Bundtzen, 1979; Bundtzen and Gilbert, 1983; Thomas K. Bundtzen, written commun., 1985, 1989

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q06-23 64°20'N 146°22'W	Democrat (Mitchell Lode) East-Central Alaska	Au, Ag, Pb, Sb Granitoid-related gold	1989 test output of 88,000 tonnes grading 2.2 g/t Au; 5.0 g/t Ag

Summary and References

Tetrahedrite, galena, acanthite, owyheeite, and other silver sulfosalts, and free gold with quartz in hydrothermally altered granite porphyry. Granite yields K-Ar age of 89 Ma. Strong sericite alteration halo surrounds stock, which intrudes sillimanite bearing schists of Yukon-Tanana terrane. Granite porphyry is part of 35 km long sill complex that intrudes along Richardson Lineament. Gold bullion occurs as interlocking alloys of native silver and high fineness gold that averages 67% gold and 33% silver. Silver sulfosalts locally abundant with 'bonanza' grades of up to 66,000 g/tonne silver obtained in localized mineral zones. Mineralization believed to have formed during high level emplacement of granite porphyry along Richardson Lineament.

Bundtzen and Reger, 1977; T.K. Bundtzen and R.B. Forbes, written commun., 1990

Q06-24 64°20'N 144°14'W	Blue Lead, Tibbs Creek, Gray Lead East-Central Alaska	Au, Ag, Sb Polymetallic vein or Sb-Au vein	Produced 905 g Au and 707 g Ag from 136 tonnes ore

Group of quartz veins with gold, pyrite, arsenopyrite, and stibnite. Veins pinch and swell; width ranges from 1 cm to 2.4 m, with average of 1 m. Masses of nearly pure stibnite up to 0.6 m thick and 30 m long. Veins occur in Cretaceous(?) granitic rocks intruding mid-Paleozoic or older metasedimentary rocks of the Yukon-Tanana terrane. Abundant faults and shear zones. About 240 m underground workings. Explored from about 1935 to 1941. Minor production in 1970's.

Thomas, 1970; Menzie and Foster, 1978; Robinson and others, 1982

Q07-01 66°32'N 140°17'W	Alto Fish River	Fe Stratabound Fe	Medium. Reserves of 50 million tonnes grading 55% Fe.

Consists of oolitic magnetite that occurs in a 45 meter-thick bed that is exposed along a strike length of 350 meters. Bed part of recessive weathering black shales about 50 meters above the base of the Jurassic and Lower Cretaceous Kingak Formation. Deposit age interpreted as Permian.

Norris, 1976; Yukon Minfile, 1987.

Q07-02 66°30'N 140°20'W	Rusty Springs (Termuende) Northern Cordilleran	Ag, Zn, Cu Pb, Ba Southeast Missouri Zn-Pb-Ag	Medium?

Consists of sphalerite, tetrahedrite and pyrite, and minor galena that occur in vugs, quartz-calcite veinlets and as widespread massive sulfide lenses. Deposit hosted in brecciated dolomite and shale of the Middle Devonian Ogilvie Formation near the core of an anticline. Most of deposit occurs in previously altered, vuggy dolomitized limestone, approximately 100 meters thick, that is crudely localized near a contact with unconformably overlying slates of the Mississippian Hart River Formation. Deposit age interpreted as Middle Devonian.

Yukon Minfile, 1987.

Q07-03 65°12'N 141°11'W	Three Castle Mountain Unassigned	Pb, Zn Ba Sedimentary exhalative Pb-Zn	Up to 17% Zn and 2% Pb in 3 separate deposits.

Disseminated to massive galena, sphalerite, and barite in middle to lower Upper Devonian chert, shale, and limestone of the McCann Hill chert of the North American craton margin. Area includes least three prospects: Three Castle Mountain, Pleasant Creek, and VABM Casca; other occurrences are also known. Sulfides and barite occur as disseminated to massive layers 3 to 100 cm thick in mudstone. Also occurring locally are coarser grained, sphalerite-dominated masses in carbonate breccia. Deposits interpreted as a sedimentary-exhalative deposit similar to middle Paleozoic deposits in western Brooks Ranges or in the western Alaska Range, such as the Gagaryah deposit.

Brabb and Churkin, 1969; Bundtzen and others, 1982; T.K.Bundtzen, written commun., 1992

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q07-04 64°34'N 142°11'W	Eagle C3 Fortymile	PGE Podiform Cr(?)	Grab samples contain up to 3 g/t Pt, 1.5 g/t Pd, and 0.03 g/t Rh
Anomalous PGE in two lenses of clinopyroxenite in small ultramafic body that appears to be pendant in a small Mesozoic(?) granodiorite pluton. Pyroxenite intruded by coarse-grained, irregular felsic dikes. Local hydrothermal alteration associated with felsic dikes. Anomalous PGE in altered zone and in clinopyroxenite. Only one of the 32 separate ultramafic bodies in area exhibits significant values of PGE. Clinopyroxenite may be part of deformed ophiolite of Seventymile terrane, or part of zoned mafic-ultramafic pluton. Foster and Keith, 1974; Foster, 1975; Keith and others, 1987			
Q07-05 64°31'N 142°30'W	Slate Creek (Fortymile) Fortymile	Asbestos Serpentine-hosted asbestos	Estimated 58 million tonnes grading 6.4% fiber
Antigorite with minor clinochrysotile, chrysotile, magnetite, brucite, and magnesite in serpentinized harzburgite. Chrysotile asbestos occurs in zones of fracturing near centers of thicker serpentinite, primarily as cross-fiber asbestos in randomly oriented veins about 0.5 to 1 cm thick. Veins contain alternating zones of chrysotile and magnetite, and commonly exhibit magnetite selvages. Some chrysotile altered to antigorite. Harzburgite occurs as tabular tectonic lenses, generally from 60 to 150 m thick and up to 800 m long. Ultramafic rocks part of deformed ophiolite of Seventymile terrane. Foster and Keith, 1974; Robert K. Rogers, written commun., 1984			
Q07-06 64°34'N 140°20'W	Shell Creek Unassigned	Fe Ironstone	Medium (estimate). Reserves not available. Grade approximately 29% Fe.
Banded ore consists of two facies: a black, slaty, magnetite facies and a grey, cherty, pyrite-pyrrhotite facies. Deposit hosted in tightly folded quartz-chlorite and quartz-mica schists of Precambrian and (or) Cambrian age. Deposit age interpreted as Precambrian to Cambrian. Gross, 1969; Yukon Minfile, 1978.			
Q07-07 64°27'N 140°43'W	Clinton Creek Fortymile	Asbestos Serpentine-hosted asbestos	Medium. Reserved of 6.8 million tonnes grading 4.37% fibre.
Consists of cross-fibre chrysotile asbestos veinlets that occur in a body of serpentinite associated with the Proterozoic/Paleozoic Nasina metasedimentary series. Approximately 0.94 million tonnes of fibre were produced from 15.9 million tonnes of ore mined between 1967 and 1978. Deposit age interpreted as Late Paleozoic? EMR Canada, 1989.			
Q07-08 64°07'N 141°55'W	Purdy Yukon-Tanana Upland	Au Au quartz vein	Minor production
Small deposit notable for large quartz-calcite fissure vein and veinlets with spectacular "lace" gold. Large vein extends about 2 m; terminated at one end by fault. Large vein completely mined-out by 1960. Vein and veinlets cut mid-Paleozoic or older metasedimentary schists of Stikinia(?) terrane. Small veins and veinlets mined in 1969 and early 1970's. Helen L. Foster, written commun., 1984; W. David Menzie, written commun., 1985			

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q07-09 64°04'N 138°14'W	Brewery Creek (Loki Gold) Tombstone	Au Sb Sb-Au vein	Medium. Reserves of 19.2 million tonnes grading 1.53 g/t Au.

Deposit occurs along a shear zone that occurs between a sill-like body of quartz-monzonite, syenite and latite porphyry and underlying graphitic argillite, chert, sandstone, conglomerate and bedded barite of the Devonian and Mississippian Earn Group. Eight separate deposits occur over a strike length of 5.5 km. Gold occurs in fine chalcedony-pyrite-arsenopyrite stockworks within several semi-conformable sills and adjacent host rock and in the footwall sedimentary rocks. Narrow stibnite veins are common, but mainly post-date deposition of gold. About 90% of the deposit is oxidized at depths of 10-110 m. An open pit, heap-leach mine operation will be opened in late 1995. Deposit age interpreted as mid-Cretaceous.

Bremmer, 1990; Loki Gold Corp. news release, November 1, 1994.

Q08-01 65°15'N 133°00'W	Snake River (Crest Iron) Rapitan	Fe Ironstone	Large. Reserves of 5.6 billion tonnes grading 47.2% Fe.

Consists of a large hematite and jasper iron-formation that occurs near the base of a section of conglomeratic mudstone and diamictite of the Late Proterozoic Rapitan Group of the Windermere Supergroup. The iron formation forms a stratigraphic interval approximately 130 meters thick. The richest part of deposit occurs in the top 80 meters that contains little or no interbedded sedimentary rocks. Deposit age interpreted as Late Proterozoic.

Yeo, 1986; Stuart, 1963.

Q08-02 64°39'N 136°51'W	Hart River Gillespie	Zn, Cu, Ag Pb, Au Sedimentary exhalative Zn-Cu-Pb	Medium. Reserves of 1.068 million tonnes grading 3.6%Zn. Average grade of 1.45% Cu, 0.9% Pb, 49.7 g/t Ag, 1.4 g/t Au.

Consists of pyrite and pyrrhotite and minor sphalerite, galena and tetrahedrite that occur as a tabular mass along a facies change from dolomite to calcareous black argillite of the Early Proterozoic Gillespie Lake Group. Host rocks are cut by numerous diabase sills and dikes that metamorphose the dolomite to serpentinite-talc and the argillite to hornfels. Footwall is silicified and has a stockwork of sulfide veinlets, whereas the hanging wall consists of thinly layered sulfides. Deposit age interpreted as Early Proterozoic.

Morin, 1978; Yukon Minfile, 1985; Abbott,1987, 1993; EMR Canada, 1989; MacIntyre, 1991.

Q08-03 64°43'N 135°13'W	Nick Dempster	Ni, Zn, PGE Sedimentary exhalative Ni-Zn	Medium. Reserves of 900,000 tonnes grading 5.3% Ni, 0.73% Zn, 0.8 g/t PGE+Au.

Consists of pyrite, vaesite, melnikovite-type-pyrite, sphalerite and wurtzite that occur in a gangue of phosphatic-carbonaceous chert, amorphous silica and intergrown bitumen. Deposit forms a thin, conformable unit at the contact between Middle and Upper Devonian Earn Group. Host rocks are basinal sedimentary part of a Devonian and Mississippian clastic wedge exposed in an east-west trending syncline. The basin is interpreted as a local trough or embayment on the eastern margin of the Selwyn Basin. Deposit age interpreted as Middlt to Late Devonian.

Hulbert and others, 1992; Yukon Minfile, 1992.

Q08-04 64°19'N 133°45'W	Rusty Mountain (Vera, Val, Cavey) Tombstone	Ag, Pb Zn Ag-Pb-Zn polymetallic vein	Medium. Reserves of 949,640 tonnes grading 2.67% Pb, 2.62% Zn, 324 g/t Ag.

Consists of galena, sphalerite and argentiferous tetrahedrite with minor chalcopyrite, and pyrite. Deposit occurs as lenses and shoots along steeply dipping breccia zones in dolomite of the Early Proterozoic Purcell- Wernecke Assemblage and in fracture systems in Lower Paleozoic siltstones. Deposits related to intrusion of mid-Cretaceous Tombstone Plutonic suite. Deposit age interpreted as Cretaceous(?).

EMR Canada, 1989.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q08-05 64°23'N 132°31'W	Goz Creek Area (Barrier Reef) Northern Cordilleran	Zn, Pb Ag, Cd Southeast Missouri Pb-Zn	Medium. Reserves of 2.49 million tonnes grading 11% Zn+Pb.

Consists of sphalerite with minor galena, pyrite and boulangerite that occur as fracture and breccia filling and disseminations. Deposit occurs in both stratigraphically and tectonically controlled zones in pervasively silicified sandy dolostone. Two main deposits and numerous occurrences extend for 8 km along strike of the Risky Formation of the Upper Proterozoic Backbone Ranges Group. Host rocks interpreted as part of a Cambrian- Devonian passive margin. Smithsonite occurs as weathering product of sphalerite. Deposit age interpreted as Late Proterozoic.

Dawson, 1975; EMR Canada, 1989; Dawson and others, 1991; Fritz and others, 1991.

Q08-06 64°02'N 135°46'W	Ray Gulch (Potato Hills, Mar) Tombstone	W Au, Sn, As W skarn	Large. Reserves of 7.26 million tonnes grading 0.07% WO_3.

Consists of scheelite that occurs as disseminations and tabular layers in sulfide-free diopside-amphibole-epidote skarn. Deposit hosted in calcareous metasedimentary rocks and tuff of the Upper Proterozoic Hyland Group that is intruded by quartz monzonite sills that dip gently northward towards the Potato Hills Stock. Igneous rocks part of the mid-Cretaceous Tombstone Plutonic suite. Eight separate skarns occur, the lower four of which contain a high-grade zone of 3.6 million tonnes grading 0.93% WO_3. Deposit age interpreted as mid-Cretaceous.

Lennan, 1986; EMR Canada, 1989; Yukon Minfile, 1992.

Q08-07 64°25'N 134°40'W	Blende (Braine) Gillespie	Zn, Cu, Pb, Au, Ag Sedimentary exhalative Pb-Zn	Large. Reserves of 19.6 million tonnes grading 3.04% Zn, 2.81% Pb, 56 g/t Ag, 1.6% Cu, 2.75 g/t Au.

Consists of pyrite, sphalerite and galena with local chalcopyrite and tetrahedrite that occur in siderite- or dolomite-quartz veins and breccia. Deposit hosted in dolomite of the Gillespie Lake Group of the Early Proterozoic Wernecke Supergroup. Mafic sills are spatially associated with mineralized veins and vein-breccias within anastomosing shear zones in competent stromatolitic dolostone. Multistage deposition may be related in part to intrusion of gabbro and diorite. Deposit age interpreted as Early Proterozoic.

Mustard and others, 1990; Yukon Minfile, 1992; NDU Resources, press release, 1993; Robinson and Godwin, 1995.

Q09-01 64°56'N 130°41'W	Gayna River Northern Cordilleran	Zn, Pb Southeast Missouri Pb-Zn	Medium. Resource of 50 million tonnes grading 4.7% Zn, 0.3% Pb.

Consists of sphalerite with minor pyrite and galena that occur in breccias and as tabular replacement bodies in Late Proterozoic shallow water carbonate of the Little Dal Group (Mackenzie Mountain Assemblage). Replacement bodies interpreted as mineralized breccias that formed as slumps over the flanks of stromatolitic reefs, and also as solution-collapse and fault-related crackle breccias. Secondary breccias are generally richest. The Gayna River district comprises some 18 deposits and more than 100 occurrences. Several deposits exceed 1 million tonnes of 10% Zn+Pb. Deposit age interpreted as Late Proterozoic.

Hewton, 1982; EMR Canada, 1989.

Q09-02 64°03'N 129°25'W	Bear-Twit Northern Cordilleran	Zn, Pb Ag Southeast Missouri Pb-Zn	Medium. Reserves of 8 million tonnes grading 5.4% Zn, 2.6% Pb, 0.5 g/t Ag.

Consists of galena and sphalerite with minor tetrahedrite that occur in brecciated dolomitized shallow water (reef) carbonates of the Lower Devonian Whittaker, Delorme and Camsell Formations. Host rocks interpreted as part of a Cambrian to Devonian passive margin. Deposit occurs in cross-cutting fractures, breccia matrices, fossil replacement, and also as disseminations in dolomite. Deposit age interpreted as Early Devonian.

Brock 1975; Dawson, 1975; Archer Cathro and Associates, company report, 1978; EMR Canada, 1989.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q10-01 64°25'N 124°45'W	MacKenzie Basin Unassigned	Salt Stratform salt	Large. Reserves and grade not available.

Consists of salt and associated with gypsum that occur in Cambrian, Ordovician and Silurian sedimentary rocks. Drilling for oil wells encountered four salt beds, with a total thickness of approximately 13 meters. Salt is 97% sodium chloride. Salt has not been collected from these beds, but has been collected from evaporating basins near brine springs issuing from the base of an escarpment on the Salt River. Deposit age interpreted as Paleozoic.

Camsell, 1917; Lord, 1951.

Q52-01 67°50'N 128°03'E	Syncha-I & II Verkhoyansk	Au Au quartz vein	Contains up to 2-5 g/t Au.

Consists of two deposits about 20 km apart. Au quartz veins occur in an extensive northwest-striking zone in anticlinal domes formed in calcareous sandstone and shale. Most veins are tabular, 2 to 3 m thick, and 120 to 150 m long. Veins occur both parallel to and across bedding. Also occurring are extensive, conformable, sheet-like veins that are about 2.5 m thick and to 300 m long. Also occurring are small networks of veins in shear zones that are up to 5 m thick and 300 m long. Vein gangue is mostly quartz with subordinate carbonate and chlorite. Ore minerals comprise 1% of veins, and include galena, sphalerite, chalcopyrite, pyrite, arsenopyrite, tetrahedrite(?), cassiterite, and gold. Host rocks exhibit mild silica, sericite, and carbon alteration.

Amuzinsky, 1975; Ivensen and others, 1975.

Q52-02 67°11'N 127°45'E	Kuolanda Vostochno-Verkhoyansk	Pb, Zn, Ag Cu Ag polymetallic vein	Average grade of 20-30% Zn, 2% Pb, 1.3% Cu, up to 953 g/t Ag. Reserves of 15,000 tonnes lead, 120,000 tonnes zinc.

Consists of a mineralized breccia that contains abundant veins and stringers of massive and disseminated galena and sphalerite that are hosted in Lower Carboniferous siltstone and sandstone. Main ore mineral is sphalerite, with lesser amounts of galena and chalcopyrite. Subordinate minerals are siderite, arsenopyrite-glaucodot, pyrite-melnikovite, pyrrhotite, and native silver. Veins are divided into sulfide and quartz-sulfide types. Some veins range up to 20 m long and 0.2-0.3 m thick. Vein zones range up to up to 280 m long and from 1.5 to 10 m wide. Deposit occurs along axis of an anticline.

Ivensen and others, 1975; Tseidler, written commun., 1985.

Q52-03 67°08'N 130°41'E	Iserdek Verkhoyansk-Indigirka	Hg Clastic sediment-hosted Hg	No data.

Deposit occurs in dome of an anticline formed in Lower Permian sandstone and siltstone along cross-cutting, steeply-dipping faults, and along subconformable inter- and intra-bedded fractures. Main ore minerals are cinnabar, quartz, and dickite.

Maslennikov, 1985, written commun., 1977; Shur, 1985.

Q52-04 67°06'N 131°36'E	Betyugen Verkhoyansk-Indigirka	Sb Sb vein	Average grade of 35-40% Sb; up to 4.5% As.

Consists of small quartz-stibnite vens in gently-dipping interbed fractures. Veins range from 0.5 to 10 m thick and 30 to 200 m long. Two ore bodies predominate. Main minerals are stibnite, quartz, kaolinite, dickite, hydromica, ankerite, arsenopyrite, pyrite, and gold. Wallrocks exhibit minor sericite, kaolinite, and sulfide alteration. Deposit occurs in the Dulgalak anticline dome formed in an uniform sequence of Upper Permian siltstone.

Maslennikov, 1985, written commun.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q52-05 66°55'N 131°01'E	Zagadka Verkhoyansk-Indigirka	Hg, Sb Clastic sediment-hosted Hg	Average grade of 0.22-6.2% Hg, 0.8-20% Pb, 2-10% Zn, 4-10% Sb, and up to 30 g/t Ag. Estimated resource of 1,718 tonnes mercury and 1,000 tonnes antimony.

Consist of cinnabar and metacinnabarite and are relatively younger than associated Sb-Au vein deposits that consist of stibnite and berthierite. The Zagadka clastic sediment-hosted Hg deposit occurs in Upper Permian sandstone and siltstone that is gentle folded and cut by steeply-dipping faults. Deposit is located a linear zone about 2.4 km long within one of the faults. Thickness and morphology of deposit is controlled by shear zones and associated feathered veins and stringers. Ore deposit is mainly cinnabar that occurs in zones that range from 0.4 to 3 m thick. Subordinate minerals are galena, sphalerite, stibnite, Pb-sulfosalts, and cassiterite. Gangue minerals are quartz, dickite, and carbonate minerals. Wall rocks exhibit dickite, quartz and carbonate alteration.

Maslennikov, written commun., 1977, 1985.

Q52-06 66°43'N 131°03'E	Zvezdochka Verkhoyansk-Indigirka	Hg Clastic sediment-hosted Hg	Medium. Average grade of 1.5-1.95% Hg; Reserve of 3712 tonnes Hg.

Consists of intercalated Triassic sandstone and siltstone deformed into small folds that strike roughly north-south. Ore bodies are 0.2 to 11 m thick, dip westerly at 70-75°, and are occur along a fault along the axis of an anticline. Outlines of ore bodies are not distinct and were found by geochemical channel sampling. Deposit hosted mostly in sandstone in the western limb of an anticline. Cinnabar is the major ore mineral; native mercury occurs at depths greater than 100 m. Other ore minerals are metacinnabarite, pyrite, maracasite, galena, sphalerite, chalcopyrite, and arsenopyrite are less wide-spread. Stibnite, gold, and silver are rare. Gangue minerals are quartz, ankerite, calcite, dickite, and kaolinite. Wallrocks exhibit intense silica, dickite, and carbon alteration.

Maslennikov, 1977; Klimov, 1979; Maslennikov, written commun., 1985; Shur, 1985.

Q52-07 66°15'N 131°48'E	Kholbolok Verkhoyansk-Indigirka	Hg Clastic sediment-hosted Hg	Contains up to 0.62% Hg.

Deposit occurs in an anticlinal dome formed in Middle Triassic sandstone along intersections of variously-oriented faults. Deposit located by geochemical sampling. Disseminated ore occurs in silicified sandstone and metasomatic shear zones. Ore bodies range up to 15 to 20 m thick. Mjaor ore mnerals are cinnabar (5%), quartz, ankerite, and dickite. Rare ore minerals are pyrite, stibnite, realgar, orpiment, metacinnabarite, chalcopyrite, tetrahedrite, and gold are rare. Wallrocks exhibit silica and dickite alteration.

Ivensen and others, 1975; Klimov, 1979; Shur, 1985.

Q52-08 66°14'N 129°58'E	Bochiyskoe Verkhoyansk	Sn Sn polymetallic vein	Average grade of 0.36-0.52% Sn.

Deposit occurs in a sandstone bed on the eastern limb of an anticline and consists of a stringer from 8 to 10 m thick and 600 m long. Veins consist predominantly of sulfides, including chalcopyrite, pyrite, galena, arsenopyrite, sphalerite, pyrrhotite, and stannite. Other vein minerals are quartz, tourmaline, calcite, ankerite, and cassiterite. Wallrocks exhibit tourmaline, chlorite, sericite, and kaolinite alteration.

Ivensen and Proschenko, 1961.

Q52-09 66°08'N 129°36'E	Imtandzha Verkhoyansk	Sn Sn polymetallic vein	No data.

Deposit occurs in a zone of an intense fissuring up to 500 m wide, 2 km long, and along the axis of an anticline. Granodiorite porphyry dikes associated with deposit. Dikes cut polymetallic veins and in turn are cut by Sn-sulfide veins. Early-stage silver-polymetallic veins are mostly conformable. Later-stage veins are mostly cross-cutting, but are less common. Veins are 0.01 to 0.85 m thick. Major ore minerals are galena, sphalerite, and siderite. Lessor vein minerals are quartz, tetrahedrite, pyrite, arsenopyrite, and boulangerite. Later-stage veins contain quartz, chlorite, pyrite, arsenopyrite, galena, cassiterite, tourmaline, and stannite and are 0.1-0.6 m thick. Stringers range 2 to 3 m thick and are up to 1 km long.

Indolev and Nevoisa, 1974; Ivensen and Proschenko, 1961.

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Q52-10 65°54'N 129°45'E	Chochimbal Verkhoyansk	Au, Ag, Pb Polymetallic vein	Range of 0.1-15 g/t Au. Average grade of 2-3 g/t Au; up to 6,000 g/t Ag; 0.1% Sb; up to 1% As; 2% Zn; 18% Pb.

Consists of shallow-dipping, and steeply-dipping crosscutting carbonate-quartz-sulfide veins that occur in the Imtandzha anticlinal dome formed in Middle Carboniferous clastic rocks. Ten known ore bodies are known. Ore bodies range from 0.1 2.8 m thick and are 400-500 m long. Major ore minerals are quartz (30-60%), siderite (20-25%), sulfides (25-30%), pyrite, arsenopyrite, Fe-sphalerite, and galena. Lesser ore minerals are chalcopyrite, pyrrhotite, tetrahedrite, bournonite, native gold (fineness 713-743), and boulangerite.

Indelev and Nevoisa, 1974; Ivensen and others, 1975; Vladimirtseva, written commun., 1985.

Q52-11 65°42'N 128°26'E	Galochka Verkhoyansk	Au Au quartz vein	Small. Contains up to 20.5 g/t Au; up to 6.4 g/t Ag.

Cnsists of quartz stringers that are 30 m wide, 170 m long. Hosted along a roughly north-south trending fault that cuts an anticlinal dome formed in Lower Permian sandstone and shale. Stringers are 0.02 to 0.1 m thick and include quartz, calcite, chlorite, sphalerite, galena, pyrite, chalcopyrite, and gold.

Vladimirtseva, written commun., 1985.

Q52-12 65°46'N 130°35'E	Mangazeika Vostochno-Verkhoyansk	Pb, Ag Zn Ag polymetallic vein	Average grade of 75% Pb; 0.3-5% An; 500-3,938 g/t Ag; and 0.1-0.5 g/t Au. Estimated reserves of 62,375 tonnes lead, 2,900 tonnes zinc, and more than 1,000 tonnes silver. Silver mined from 1915-1922.

Consists of nine interbedded polymetallic veins that occur in Lower Permian deposits that are deformed into gently-plunging, tight folds that form a long, thin map pattern. Veins fill fissures along argillite and sandstone bed contacts. Ore bodies are conformable to bedding, 50 to 1,300 m long, and 3 cm to 1 m thick. Main ore minerals are galena and sphalerite. Minor ore minerals are pyrite, arsenopyrite, chalcopyrite, owyheeite, freibergite, diaphorite, boulangerite, pyrargyrite,miargyrite, cassiterite, stannite, and native gold, native silver, and argentite. Gangue minerals are manganosiderite, quartz, ankerite, sericite, chlorite, and tourmaline. Deposit formed in seven stages.

Indolev and Nevoisa, 1974; Tseidler, written commun., 1985.

Q52-13 65°39'N 130°36'E	Bezymyannoe Vostochno-Verkhoyansk	Ag, Pb Ag polymetallic vein	Small. Averages grade of 4,800 g/t Ag; to 41% Pb; to 3% Zn; 0.11-0.54% Sn; 0.33-4.5% As; 0.11-0.54% Cu.

Consists of twelve gentlly-dipping veins that occur near the dome of an anticline formed in Lower Permian clastic rocks. Veins occur along or inclined to bedding, along sandstone and siltstone contacts, in fissures, and in cement breccia in sandstone beds. Veins are 50 to 600 m long and 5 to 60 cm thick. Veins consist mostly of quartz and siderite. Ore minerals comprise 10 to 15% of veins. Main ore minerals are owyheeite, diaphorite, galena, and miargyrite. Subordinate minerals are freibergite, arsenopyrite, pyrite, chalcopyrite, pyrargyrite, stannite, sphalerite, cassiterite, argentite, native silver and gold, boulangerite, jamesonite, ferberite, and pyrrhotite. Deposit formed in nine stages.

Indolev and Nevoisa, 1974; Tseidler, 1985, written commun.

Q52-14 65°37'N 131°49'E	Anomalnoe Yana-Polousnen	Sn Sn silicate-sulfide vein	Average grade of 0.001-2.57% Sn.

Consists of three types of veins: (1) concordant occurrences in interbed fractures; (2) cross-cutting veins from 0.1 to 20 m thick; and (3) mineralized shear zones from 0.1 to 9 m thick. Vein zones range from 100 m to 2 km long. Main ore minerals are tourmaline, chlorite, quartz, arsenopyrite, cassiterite, wolframite, pyrite, and pyrrhotite. Lesser ore minerals are galena, Fe-sphalerite, Mn-siderite, scheelite, stannite, and tetrahedrite. Wallrocks exhibit tourmaline, silica, and chlorite alteration. Deposit occurs along western limb of an overturned syncline formed in Triassic to Early Jurassic sandstone and intercalated siltstone and conglomerate. Sedimentary rocks are contact metamorphosed from an unexposed intrusion. Pre-ore lamprophyre dikes occur within the ore field.

Ivensen and others, 1975; Shur, 1985.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q52-15 65°30'N 129°60'E	Dyabkhanya Verkhoyansk	Au, Ag Cu, Pb, Zn Au polymetallic vein	Average grade of 3.9-11% As; up to 5.6 g/t Au; 1-4.31% Cu; 0.2-0.86% Pb; 0.49-1.48% Zn; 40-589.2 g/t Ag.

Consists of a set of sulfide-quartz veins and stringers that are hosted in Late Carboniferous and Early Permian sedimentary rocks. Deposit occurs in three zones that are 270 to 2,000 m long and 1 to 30 m wide. Stringers range from 0.15 to 0.3 m thick. Major ore minerals are pyrite, arsenopyrite, and chalcopyrite. Rare ore minerals are pyrrhotite, sphalerite, galena, and tetrahedrite. Gangue minerals are quartz and siderite. Host rocks exhibit minor carbonate and sulfide alteration.

Ivensen and others, 1975; Vladimirtseva, written commun., 1985.

Q52-16 64°49'N 130°37'E	Balbuk Verkhoyansk	Pb Au, Ag Pb polymetallic vein	Average grade of 11.2% Pb. Local areas with 380-420 g/t Ag and 70-80 g/t Au.

Consists of a set of cross-cutting quartz-galena veins that occur in the dome of an anticline formed in Permian sandstone and siltstone. Main vein dips vertically, is 120 m long, and has an average thickness of 0.88 m. Vein contains swells up to 3 m thick that are spaced every 10 to 12 m. Swells form verticle columns. Breccia ores formed when host rock clasts were coated with quartz and galena. Some evidence indicates that some minerals crystallized from colloidal suspension. Veins locally consist mostly of galena (75%).

Vikhert and others, 1961.

Q53-01 67°38'N 134°47'E	Ege-Khaya Yana-Polousnen	Sn, Zn Sn polymetallic vein	Medium. Average grade of 0.1-3% Sn; 0.1-3% Zn. Limited production.

Consists of mineralized shear zones, stringers, and less common veins. Deposit occurs in zones from 0.7 to 4 m thick and up to 1 km long, dips steeply, and extends to a depth of 500 m. Host rocks exhibit minor contact metamorphism and consist of Upper Triassic shale and interbedded sandstone. Major minerals are quartz, chlorite, cassiterite, sphalerite, pyrrhotite, pyrite, marcasite, siderite, and calcite. Subordinate minerals are arsenopyrite, galena, stannite, chalcopyrite, wolframite, bismuth, tourmaline, and albite. Sulfides are predominant at depth. Wallrocks exhibit chlorite, silica, and sulfide alteration.

Flerov, 1976; Shur, 1985; Spomnor and others, written commun., 1985.

Q53-02 67°33'N 137°55'E	Kysylga Dogdo-Erikit	Au, Ag Au-Ag epithermal vein	Average grade of 3.0-84.5 g/t Au, 1-37 g/t Ag; 0.01-0.1 As; 0.01-0.04% Sb; 0.002% Sn, and 0.03% Pb.

Consists of veins in a zone that varies from 0.60-1.25 m thick and up to 400 m long. Veins composed of gangue quartz and calcite with ore minerals (1-5%) of arsenopyrite, pyrite, Ag-tetrahedrite, pyrrhotite, sphalerite, galena, chalcopyrite, boulangerite, Ag-jamesonite, and gold (fineness of 638). Veins strike from roughly east-west to northeast and dip steeply to south. Veins exhibit breccia or, less commonly, comb and massive structures, and often grade into stringers. Deposit occurs in feathered fissures of a northwest-striking major fault in Late Triassic sandstone and siltstone. Host rocks exhibit linear folding and intense contact metamorphism adjacent to a granitic intrusive. Wallrocks exhibit sericite, chlorite, and feldspar alteration.

Shosin and Vishnevsky, 1984; Vladimirtseva, written commun., 1985; Nekrasov and others, 1987; Gamyanin and Goryachev, 1988.

Q53-03 67°35'N 134°06'E	Billyakh Adycha-Taryn	Sb, Au Au-Sb polymetallic vein	Contains up to 23.2% Sb.

Consists of stibnite and quartz veins, stibnite stringers, and two stockworks in the dike, adjacent to hanging wall of dike. Main ore minerals are stibnite, quartz, ankerite, calcite, gold, and dickite. Deposit occurs in an east-west trending granite-porphyry dike that intrudes Upper Triassic sandstone and siltstone deformed into a gently-plunging fold. Wallrocks exhibit sericite, silica, and sulfide alteration. A granite body is interpreted to occur at depth. The dike has a K-Ar isotopic age of 119 Ma, is 7 km long, 2-35 m thick, and dips steeply to south.

Indolev and others, 1980; Maslennikov, written commun., 1985; Shur, 1985.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q53-04 67°17'N 133°47'E	Khoton-Khaya Yana-Polousnen	Sn Sn-polymetallic vein, Sn silicate-sulfide vein	Sn 1.2-1.8%.

Consists of steeply-dipping mineralized shear zones that average 1 to 1.5 m thick and 100 to 1,000 m long. Ore minerals are quartz, tourmaline, cassiterite, stannite, arsenopyrite, pyrite, chalcopyrite, sphalerite, galena, bismuthine, chlorite, and siderite. Wallrocks exhibit silica, tourmaline, and sulfide alteration. Deposit hosted in Upper Triassic sandstone and shale near the top of an unexposed granitic intrusion. Sedimentary rocks are contact metamorphosed and are cut by numerous dikes of granite porphyry, granodiorite porphyry, and less common diorite.

Flerov, 1976; Spomior and others, written commun., 1985.

Q53-05 67°17'N 134°38'E	Kester Yana-Polousnen	Sn, Ta, Nb, Li Sn greisen	Small. Average grade of 0.3% Sn; up to 0.5% Nb_20_5 ; up to 0.35% Li_20 . Partly mined.

Consists of greisen with major minerals of quartz, muscovite, albite, potassium feldspar, molybdenite, zinnwaldite, tourmaline, topaz, amblygonite, apatite, cassiterite, wolframite, and tantaloniobate. Also occurring are stannite, arsenopyrite, and Pb sulfosalts. Host granite exhibits intense greisen alteration and local tourmaline and sulfide alteration. Deposit exhibits an irregular shape and occurs within the margin of a stock of subalkalic alaskite granite that intrudes the Arga-Ynnakhai granodiorite pluton. Deposit dimensions are 80 by 1,200 m and is up to 60 m thick.

Flerov, 1976; Shur, 1985; Spomior and others, written commun., 1985.

Q53-06 67°09'N 134°21'E	Ulakhan-Egelyakh Yana-Polousnen	Sn Sn silicate-sulfide vein	Major. Average grade of 0.7% Sn, Pb, Zn, Cu.

Consists of shear zones, extensive veins and, stockworks that strike northeast. Ore zones average 1.6 m thick and range up to 2 km long. Minerals are quartz, chlorite, cassiterite, sphalerite, arsenopyrite, galena, chalcopyrite, siderite, fahlore, tourmaline, bismuthine, and pyrargyrite. Deposit hosted in Upper Triassic sandstone and shale that is contact metamorphosed near the contact of the Arga-Ynnak-Khai granite pluton.

Flerov, 1976; Shur and Flerov, 1979; Shur, 1985; Spomior and others, written commun., 1985.

Q53-07 67°02'N 133°60'E	Ak-Altyn Adycha-Taryn	Au Ag Au-Ag epithermal vein	Small. Average grade of 0.2-60.4 g/t Au; and 0.1-1% Ag, Hg, Pb, Sb, Zn, As, Cu.

Consists of quartz and quartz-carbonate veins, up to to 2 to 3 m thick and stringers that occur in a zone 10-30 m wide and 150 m long. Deposit is hosted in gently-dipping Middle Triassic (Ladinian) clastic rocks that are intruded by Lower Cretaceous diorite porphyrite dikes. Ore is dominated by fine-grained quartz (chalcedony) with sparse sulfides (about 1%), including galena, sphalerite, chalcopyrite, arsenopyrite, and pyrite. Gold fineness is low.

Vladimirtseva, written commun., 1985.

Q53-08 66°38'N 136°51'E	Lazo Yana-Kolyma	Au Au quartz vein	Small. Average grade of 0.1-9.1 g/t Au.

Consists of a set of en echelon quartz veins and locally a stockwork that strike northeast. Veins are 0.04 to 0.4 m thick and up to 100 m long. Density of veins ranges from 1 to 10 per one meter. Ore minerals are arsenopyrite, sphalerite, pyrite, chalcopyrite, tetrahedrite, galena, boulangerite, and sparce scheelite. Gold occurs irregularly with an average grade of 1.2 g/t Au in the stockwork. Wallrocks exhibit beresite alteration. Deposit occurs along limb of a syncline formed in contact metamorphosed Upper Triassic siltstone and sandstone. Sedimentary rocks are intruded by diorite porphyrite dikes and two small stock-like diorite and granodiorite plutons.

Rozhkov and others, 1964; Flerov and others, 1979;Vladimirtseva, written commun., 1987.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q53-09 66°29'N 137°03'E	Sentachan Adycha-Taryn	Sb Sb-Au vein or clastic sediment-hosted Sb-Au	Average grade of 3.2-40.3% Sb. Locally up to 30 % Sb and 50 g/t Au. Mined. Proven reserves of 100,000 tonnes antimony

Consists of two rod-like veins, from 85 to 200 m long and 0.2-3.1 m thick, occur in shear zones that strike northwest and dip 60-80° northwest. Veins extend to at least a depth of 600 m. Main ore minerals are stibnite and quartz. Subordinate ore minerals are ankerite, muscovite, pyrite, arsenopyrite, dickite, and hydromicas. Rare minerals are sphalerite, gold, chalcostibnite, berthierite, tetrahedrite, zinkenite, jamesonite, aurostibnite, and chalcopyrite. Wallrocks exhibit quartz, carbonate, hydromica and dickite alteration. Disseminated pyrite and stibnite occur in aureoles around deposit. Deposit hosted in Upper Triassic (Norian and Rhaetian) clastic rocks that are deformed into northwest-trending, gently-plunging folds. Ore bodies occur along northwest-trending Adycha-Taryn fault zone and are conformable to folding.

Berger, 1978; Zharikov, 1978; Klimov and Indolev, 1979; Indolev and others, 1980; Maslennikov, written commun., 1985; Shur, 1985.

Q53-10 66°28'N 137°39'E	Burgavli Yana-Kolyma	Sn Sn quartz vein	Medium. No data.

Consists of stockworks, mineralized shear zones and short feathered veins. Ore minerals are quartz, adularia, arsenopyrite, muscovite, cassiterite, fluorite, tourmaline, beryl, topaz, apatite, scheelite, wolframite, and bismuthine. Some ore bodies are dominated by pyrrhotite, arsenopyrite, ferruginous sphalerite, stannite, chalcopyrite, pyrite, galena, sphalerite, and siderite. Wallrocks altered to greisen along with tourmaline, and quartz alteration. Deposit occur in an east-west trending fault that cuts Middle Jurassic sandstone in a small anticline. Host rocks are contact metamorphosed over an area of 3 km^2.

Flerov, 1976; Flerov and others, 1979.

Q53-11 66°17'N 136°53'E	Delyuvialnoe Yana-Kolyma	Au W Granitoid-related Au	Medium. Range of 0.1-75.8 g/t Au; average grade of 5 g/t Au; 0.1-3% W ; 0.01-1.1% As.

Consists of shear zones and quartz stringers that occur in a brachyanticlinal dome formed in contact metamorphosed Upper Triassic (Norian) sandstone and siltstone. Deposit comprises an area 500 by 1,500 m. Shear zones range from 1 to 20 m thick; stringers occur in zones up to 100 m thick. Shear zones and stringers occur in areas up to 250-300 m long, trend east-west, and dip 50-70°. An unexposed part of the neighboring Chenkelenyn intrusion is interpreted to occur at depth. Ore minerals are arsenopyrite, pyrite, more seldom galena, chalcopyrite, scheelite, wolframite, bismuthine, native gold (fineness 600-700), and cassiterite. Gangue minerals are mainly quartz and less common chlorite and carbonate minerals. Wallrocks exhibit chlorite and sulfide alteration.

Rozhkov and others, 1964; Flerov and others, 1979; Vladimirtseva, written commun.,1985.

Q53-12 66°17'N 137°58'E	Kere-Yuryak Yana-Kolyma	Sn, W Sn-W greisen	Average grade of 0.6% Sn; 0.487% As; 0.62% W.

Deposit occurs in apical portion of a granite pluton that intrudes an anticline formed in Middle Jurassic sandstone. Consists of stockwork veins and stringers that occur along the upper contact of the pluton. Veins and stringers are 0.1 to 2 m thick and range up to 100 m long. Outcrops of vein and stringer zones vary from 50 to 150 m wide. Major minerals are quartz, tourmaline, muscovite, arsenopyrite, cassiterite, and wolframite. Rare minerals are topaz, apatite, scheelite, tetrahedrite, pyrite, molybdenite, and bismuthine. Deposit associated with intense greisen alteration.

Flerov and others, 1979.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q53-13 66°06'N 137°48'E	Uzlovoe Adycha-Taryn	Au, Sb Sb-Au vein or clastic sediment-hosted Sb-Au	Average grade of 6.64 g/t Au for one ore body, and range of 0.2-36.2 g/t Au. Average grade of 0.1-48% Sb.

Consists of quartz-stibnite veins and stringers that occur in mylonitc formed in Triassic rocks in the Adycha-Taryn fault. Two stringers are known, along with stibnite lenses and tabular bodies. Zones range up to 2.5 to 3 m thick and up to100 m long. Stringers are associated with disseminated sulfide aureoles. Major minerals are quartz, stibnite, arsenopyrite, and pyrite.

Maslennikov, written commun., 1985.

Q53-14 65°60'N 135°56'E	Ilin-Tas Yana-Polousnen	Sn W, Au Sn silicate-sulfide vein	Major. Average grade of 0.7-2.5% Sn; 0.3-1.0% $W0_3$; up to 10 g/t Au.

Consists of complex veins and less common shear zones and stringers that occur in contact metamorphosed Upper Triassic sandstone and siltstone adjacent to the Bezymyanny granitoid pluton. Ore bodies dip steeply, range from 0.01 to 6 m thick. and are about 100 m long. Veins are most dense at a distance of 500-1,000 m from the intrusive contact. Major minerals are quartz, tourmaline, cassiterite, stannite, wolframite (ferberite), pyrrhotite, pyrite, arsenopyrite, and chalcopyrite. Also occurring are Bi and Te minerals.

Shur and Flerov, 1979; Spomior and others, written commun., 1985.

Q53-15 65°56'N 135°43'E	Alys-Khaya Yana-Polousnen	Sn Co Sn polymetallic vein	No data.

Consists of complex steeply-dipping northeast-striking polymetallic veins. Zones of closely-spaced veins are common. Veins range up to 1 m thick and about 100 m long. Veins are mainly quartz and chlorite. Main ore minerals are cassiterite, stannite, Co-arsenopyrite, safflorite, and sphalerite. Rare minerals are wolframite and chalcopyrite. Deposit occurs in one limb of a north-northwest-trending anticline formed in contact metamorphosed Upper Triassic (Norian) sandstone and shale. Sedimentary rocks are intruded by rhyolite, dacite, and andesite-basalt dikes that were also contact metamorphism during intrusion of Khatakchan granodiorite.

Flerov, 1976; Shur, 1985.

Q53-16 65°46'N 134°45'E	Burgachan Yana-Polousnen	Sn Co Sn polymetallic vein	Medium. Average grade of 1.2% Sn; up to 0.34% Co.

Consists of shear zones and steep-lying complex veins that are about 1 m thick and up to 800 m long. Deposit extends more than 200 m vertically. Minerals are quartz, chlorite, cassiterite, stannite, pyrrhotite, pyrite, chalcopyrite, arsenopyrite, sphalerite, galena, sulfosalts, molybdenite, glaucodot, and bismuthine. Wallrocks exhibit silica, chlorite, sulfide, and tourmaline alteration. Deposit hosted in Upper Triassic (Carnian) sandstone, siltstone, and argillite that are contact metamorphosed and intruded by granodiorite, diorite porphyrite, and lamprophyre dikes.

Flerov, 1976; Shur, 1985; Spomior and others, written commun., 1985.

Q53-17 65°41'N 133°29'E	Prognoz Vostochno-Verkhoyansk	Ag, Pb Ag polymetallic vein	World class. Average grade of 3% Pb; 1% Zn; up to 600 g/t Ag. Probable resource of more than 2,000 tonnes silver.

Consists of long and thin sulfide-carbonate veins that are hosted in Triassic clastic rocks. Major minerals are siderite, galena, pyrargyrite, owyheeite, and various Ag minerals, and sphalerite. Premineralization granite-porphyry dikes occur within the deposit.

Vladimirtseva, written commun., 1985; Alekseev and others, 1991.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q53-18 65°12'N 133°59'E	Bugdogar Yana-Polousnen	Sn Pb Sn polymetallic vein	Small. Average grade of 0.01-0.2% Sn; 0.1-3% Pb; up to 0.2% W .
Consists of more than 30 shear zones with mainly quartz and sulfide minerals. Shear zones range from 1 to 8 m thick, up to 1 km long, and occupy an area of 1.5 km^2. Main ore minerals are limonite, cassiterite, wolframite, galena, arsenopyrite, and chalcopyrite. Ore partly oxidized. Deposit hosted in Middle Triassic contact metamorphosed sandstone and shale adjacent to contact of the small Bugdogar granite stock. Tseidler, written commun., 1985.			
Q53-19 64°46'N 135°44'E	Imnekan Verkhoyansk-Indigirka	Sb Sb vein	No data.
Consists of massive quartz-stibnite veins that contain up to 1% pyrite, plus arsenopyrite, galena, sphalerite, and other sulfides. Deposit spatially associated with pre-mineralization lamprophyre dikes and occurs in the dome of the Korobchataya anticline formed in intercalating Lower-to-Middle Triassic siltstone and sandstone. Veins occur along a zone of major, deep, longitudinal and transverse, intersecting faults, in fractures that occur diagonal to the fold axis. Veins also occur along the contacts between dikes and host rocks. Wallrocks exhibit quartz-sericite, carbonate, and silica alteration. Klimov and Indolev, 1979.			
Q53-20 64°42'N 137°40'E	Singyami Verkhoyansk-Indigirka	Hg Clastic sediment-hosted Hg	No data.
Consists of cinnabar that occurs in cross-cutting and interbedded shear zones. Deposit hosted in Middle-to-Upper Triassic sandstone and siltstone that are deformed into brachyanticlines associated with faults. Klimov, 1979.			
Q53-21 64°34'N 134°49'E	Khunkhada Tompon	W, Sn W-Sn skarn	Small. Contains up to 0.25% $W0_3$.
Consists of sheet-like skarn bodies that occur in contact metamorphosed Upper Permian-to-Lower Triassic siltstone. Skarn bodies range from 1.4 to 3.5 m thick and from 10 to locally more than 100 m long. Major minerals are pyroxene, garnet, quartz, pyrrhotite, pyrite, arsenopyrite, chalcopyrite, and scheelite. Natapov, written commun., 1985.			
Q53-22 64°30'N 137°18'E	Erikag Tompon	Sn Sn quartz vein	No data.
Consists of sulfide-quartz veins and stringers in a zone that occurs parallel to bedding. Veins and stringers comprise an east-west trending band that dips steeply south. Major minerals are quartz, pyrite, and stannite. Subordinate minerals are arsenopyrite, löllingite, cassiterite, bismuthine, bismuth, chalcopyrite, and sphalerite. Traces of pyrargyrite, tetrahedrite, and silver occur. Wallrocks exhibit intense chlorite, sericite, and tourmaline alteration. Deposit hosted in steeply-dipping, contact metamorphosed sandstone and shale in the contact aureal of the Erikag granodiorite pluton with a K-Ar isotopic age of 125-130 Ma. Sedimentary rocks strike east-west. Flerov and others, 1974.			

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q53-23 64°17'N 137°16'E	Agylki Tompon	W, Cu W skarn	Medium to large?

Consists of scheelite skarn that occurs as layers of metamsomatized limestone in contact metamorphosed Lower Triassic argillite and siltstone. Pyroxene-garnet skarn up to 3 to 5 m thick. Three successive metasomatic mineral assemblages are identified: (1) scheelite-quartz; (2) sulfide; and (3) calcite. Most tungsten occurs in scheelite and rarely in wolframite. Main sulfide minerals are pyrrhotite and chalcopyrite. Subordinate minerals are pyrite, arsenopyrite, stannite, sphalerite, galena, native bismuth, and bismuthine. Contact metamorphosed argillite is ore-free. Deposit occurs on limbs of a brachyform anticline in the thermal aureole of an unexposed granitoid intrusion with numerous apophyses of granodiorite porphyry dikes. Deposit dips 20-35° on the anticline limbs.

Flerov, Bichus, and Korostelev, 1974.

Q54-01 67°33'N 139°14'E	Titovskoe Darpir	B Sn Sn (B) magnesian skarn	Medium to large. Average grade of 9.5% B_2O_3; 0.3% Sn.

Consists of forty ore bodies that occur in Mg skarns that occur along the contact between the quartz monzonite phase of an Early Cretaceous granitoid intrusion and Silurian and Devonian dolomite and limestone. Skarns range from 5 cm to 20 m thick and from 50 to 1,000 m long. Main ore mineral is ludwigite that forms up to 70-80% of some ore bodies. Skarns also contain ascharite, kotoite, datolite, harkerite, monticellite, fluoborite, clinohumite, calcite, periclase, forsterite, diopside, vesuvianite, brucite, garnet, axinite, tourmaline, biotite, phlogopite, serpentine, spinel, hornblende, pyroxene, feldspar, quartz, and magnetite. Sn occurs as an isomorphous admixture in ludwigite. Ludwigite often replaced by sulfides, including pyrrhotite, sphalerite, pyrite, arsenopyrite, and chalcopyrite. Kotoite ore veins occur along margins of ludwigite bodies. Contact between the intrusion and carbonate is highly irregular. Most skarn bodies occur where the contact forms embayments into the intrusion. Deposit occurs in an area 3 by 6 km.

Dorofeev, 1979.

Q54-02 67°21'N 139°27'E	Dogdo Dogdo-Erikit	Hg Barite Volcanic-hosted Hg	Small to medium. Average grade of 0.35 to 0.90% Hg.

Consists of four lenticular and podiform ore bodies that occur in strongly silicified Late Jurassic andesite-dacite tuff. Ore bodies are 20 to 100 m long and 2 to 8 m wide. Ore minerals are quartz, calcite, barite with disseminations and stringers of cinnabar, pyrite, arsenopyrite, sphalerite, galena, and chalcopyrite. Ore district is characterized by a close correlation between Hg content and barite. Deposit controlled by a northwestern thrust fault, secondary quartzite occurrences, and occurrence of ore bodies along feathering fractures of the thrust fault.

Klimov, 1979; Vladimirtseva, written commun., 1987.

Q54-03 67°11'N 138°22'E	Aleshkino Yana-Kolyma	Au Au quartz vein	Medium. Average grade of 8-45.6 g/t Au.

Consists of six quartz veins that range from 0.35 to 1 m thick and up to 160 m long, in a single shear zone. Deposit hosted in cotnact metamorphosed Late Jurassic(?) rocks at top of a major granite intrusion. Main ore minerals are arsenopyrite, pyrrhotite, chalcopyrite, sphalerite, pyrite, gold, and molybdenite. Veins occur in an minor aureole of altered rock.

Vladimirtseva, written commun., 1987.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q54-04 66°27'N 141°09'E	Khotoidokh Chersky-Argatass	Pb, Zn, Ag Cu, Au, Barite Kuroko Pb-Zn massive sulfide	Average grade of 5.15% Pb, 14.9% Zn, 0.7% Cu, and more than 100 g/t Ag. Known resource of 180,000 t Pb, 900,000 Zn, 150,000 tonnesCu, about 1,000 tonnes Ag.

Summary and References

Consists of a steeply-dipping, stratiform body of massive sulfides, up to 13 m thick and 700 m long that occur in Upper Jurassic sedimentary and volcanic rocks. Mineralization ranges from massive to thin-banded. Main ore minerals are pyrite, galena, chalcopyrite, tetrahedrite, and barite. High concentrations of Ag and Au occur. Wallrocks exhibit propylitic and later quartz-sericite alteration. Deposit hosted mainly in marine clastic sedimentary rocks and intercalated rhyolite lava and tuff, and minor basalt of the Kimmeridgian Dogda suite that is about 450 m thick. Deposit underlain by rhyolite and overlain by siltstone.

Naumov, written commun. 1987; Danilov and others, 1990.

Q54-05 65°47'N 138°22'E	Uchui Yana-Kolyma	Au Au quartz vein	Small. No data.

Consists of a set of quartz veins in thin sandstone beds. Veins are short and cross-cutting with a complex morphology. Veins are up to 250 m long and 26 m thick, and locally grade into sheet stockworks that range from 10 to 20 m thick and to 150 m long. Six major veins occur. Major vein minerals are quartz, albite, carbonates, and sericite. Also occurring are small amounts of arsenopyrite, pyrrhotite, sphalerite, tetrahedrite, chalcopyrite, galena, pyrite, and gold. Disseminated arsenopyrite commonly occurs in wallrocks. Wallrocks exhibit silica, albite, and carbon alteration. Deposit hosted in Upper Triassic shale that is folded into a major anticline.

Skornyakov, written commun., 1951; Rozhkov and others, 1964.

Q54-06 65°48'N 143°27'E	Tikhon Dogdo-Erikit	Ag, Au Au-Ag epithermal vein	Small. Average grade of 30-1,257 g/t Ag; up to 10.9 g/t Au.

Consists of shear zones and stringers in metasomatically altered and silicified Cretaceous rhyolite. Deposit occurs along a northeast-striking fault. Deposit up to ten meters thick and up to hundreds of meters long. Deposit minerals are quartz, adularia, sericite, calcite, pyrite, sphalerite, galena, and dickite. Also occurring is a broad spectrum of Ag minerals, including freibergite, acanthite, pyrargyrite, miargyrite, stephanite, argentopyrite, silver, polybasite, and billingsmith. Deposit associated with quartz-sericite metasomatic facies that grades into quartz-adularia, quartz-chlorite-kaolinite, and quartz-chlorite-calcite facies.

Gamyanin, 1974; Gamyanin and Arkhipov, 1979; Nekrasov and others, 1987; Vladimirtseva, written commun., 1987.

Q54-07 65°36'N 138°33'E	Tumannoe Yana-Kolyma	Au Au quartz vein	Small. Average grade of 0.1-177 g/t Au.

Consists of small, conformable quartz veins hosted in Norian siltstone. Veins composed of scheelite, galena, sphalerite, chalcopyrite, pyrite, and gold. Sulfide disseminations in in an aureole in host rocks.

Vladimirtseva, written commun., 1987.

Q54-08 65°40'N 142°07'E	Svetloe, Medvezhje Yana-Kolyma	Sn, W Sn quartz vein and greisen	Small. Average grade of 0.01-0.38% Sn; 0.4-10% WO_3 ; up to 0.1% Mo, Bi.

Consists of quartz veins and muscovite greisen zones that occur near contact of Chibagalak and Porozhnotsepin granite plutons. Vein and greisen occurs both within the plutons and the country rocks. Veins and greisen zones strike northeast, are thin and short. Greisen mainly quartz (60-80%) and muscovite (20-40%). Other minerals are chlorite and less than 10% tourmaline. Main ore mineral are wolframite, arsenopyrite, and cassiterite. Subordinate minerals are molybdenite, sphalerite, bismuthine, and native bismuth.

Shur, 1985; Vladimirtseva and Vladimirtseva, written commun., 1987.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q54-09 65°35'N 140°59'E	Burkat Yana-Kolyma	Sn W Sn quartz vein	Small. Average grade of 0.2-15% Sn; 0.1-7% WO_3 .
Consists of seeply dipping quartz and quartz-tourmaline veins and stockworks that range from 0.6 to 2 m thick and up to 600 m long. Veins and stockworks are abundant near the contact of a the Burkat granitoid pluton and occupy an area of 3 km^2. Main ore minerals are cassiterite, with crystals to 3 cm, and wolframite. Less abundant are asenopyrite, pyrite, chalcopyrite, and bismuthine minerals. Veins associated with muscovite and tourmaline greisen aureoles. Vladimirtseva and Vladimirtseva, written commun., 1987.			
Q54-10 65°30'N 138°55'E	Darpir Yana-Kolyma	Au Au quartz vein	Small. No data.
Consists of about 70 quartz and quartz-carbonate veins hosted in Upper Triassic sandstone and shale. Most veins strike northeast and range up to 200 m long and from 0.5 to 0.8 m thick. Vein zone extends for 30 km. Vanina, Malyutka, Iskra, and Dar veins are most important and consist of lenses up to 60 to 80 m long. Ore minerals are arsenopyrite, galena, and native gold (fineness 789). Shale exhibits minor chlorite, carbon, and pyrite alteration. Sandstone locally altered to beresite. Skornyakov, written commun., 1951.			
Q54-11 65°32'N 140°18'E	Imtachan Yana-Kolyma	Au Au quartz vein	Small. No data.
Consists of two steeply-dipping, subparallel quartz veins that are 0.65 and 1.8 m thick and from 150 to 250 m long. In plan view veins cut at an acute angle a complex gabbro-diabase and granite-porphyry dike that is 33-50 m thick and dips steeply SE. Veins have apophyses from 20 to 50 m long. Ore minerals are arsenopyrite, galena, sphalerite, tetrahedrite, and native gold (fineness 845). Gabbro-diabase and grandiorite-porphyry exhibit chlorite, quartz, and beresite alteration, and contain disseminated arsenopyrite and pyrite. Alteration zones range up to 2 m thick. Deposit hosted in Upper Triassic sedimentary rocks. S.I. Gavrikov, B.A. Onishinko, Timopheev, written commun., 1962; Goryachev, 1985; V.A. Amuzinskyi, G.S. Anisimova, and Ya.Yu. Zhdanov, written commun., 1992.			
Q54-12 65°28'N 140°32'E	Yukhondja Yana-Kolyma	Au Au quartz vein	No data.
Consists of two quartz veins composed of quartz, muscovite, and calcite. Veins range up to 1 m thick and 50 m long and are hosted in Upper Triassic siltstone. Ore minerals are Ag tetrahedrite, pyrite, scheelite, arsenopyrite, native gold (fineness 570-620), and very scarce galena. K-Ar isotopic age of 131 Ma for vein muscovite. Wallrocks exhibit minor beresite alteration. Goryachev, 1981.			
Q54-13 65°24'N 142°60'E	Khaptagai-Khaya Yana-Kolyma	Au Au quartz vein	Small. Average grade of 5-30 g/t Au; locally up to 3,861.4 g/t Au.
Consists of subparallel low-sulfide quartz veins and stringers that occur en-echelon in the Khaptagai-Khaya granite-porphyry stock that intrudes Upper Triassic sandstone and shale. Ore minerals are arsenopyrite, pyrite, sphalerite, galena, gold sulfosalts (fineness 759), and sometimes scheelite. Later-stage quartz-stibnite veins cut the gold-quartz veins and are variably oriented. Granite-porphyry exhibits intense beresite alteration. Veins strike 20-60° northeast. Deposit contains thirty veins that range up to 1 m thick; associated stringers range up to 3 m. Veins form knee morphology with a 90° bend. Rozhkov and others, 1971; Shur, 1985; Vladimirtseva, 1987.			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q54-14 65°15'N 143°51'E	Solkuchan (Khatys) Dogdo-Erikit	Ag, Sn Pb, Zn Sn polymetallic vein	Medium. Average grade of 200 g/t Ag, 0.04 to 2.16% Sn, 0.03 to 2.71% Pb, 0.02 to 5.85% Zn.

Consists of three steeply-dipping quartz-carbonate-sulfide veins that occur in a Early Cretaceous subvolcanic dacite stock. Veins range up to 3.4 m thick and up to 900 m long. Ore minerals are pyrite, pyrrhotite, arsenopyrite, sphalerite, galena, Ag-tetrahedrite (31-39% Ag), boulangerite, pyrargyrite, canfieldite, electrum (fineness 685), cassiterite, covellite, scorodite, cerussite, smithsonite, melnikovite, and Fe-hydroxides. Anomalous Cu, Sb, Ge, and Id occur.

Khaustova and Vladimirtseva, written commun., 1987; Nekrasov and others, 1987; Shkodzinsky and others, 1992.

Q54-15 64°57'N 141°07'E	Zhdannoe Yana-Kolyma	Au Au quartz vein	Small. Average grade of 22-95 g/t Au. Mined out.

Consists of a set of 13 interbedded veins that range from 0.1 to 3 m thick and to 500 m long. Some ore bodies occur in cross-cutting fissures. Ore minerals are arsenopyrite, pyrite, galena, sphalerite, native gold (fineness 848), and very scarce boulangerite and chalcopyrite. Pre-mineral content of quartz veins is 1 to 3%. Veins accompanied by minor wallrock alteration to bersite. Deposit occurs in the hinge of a brachyanticline at its periclinal closure and is hosted Upper Triassic (Carnian) silty shale and sandstone.

Gavrikoy and Zharova, 1963; Rozhkov and others, 1971; Vladimirtseva, written commun., 1987; V.A. Amuzinskyi, G.S. Anisimova, and Ya.Yu. Zhdanov, written commun., 1992.

Q54-16 64°48'N 141°52'E	Alyaskitovoe Yana-Kolyma	Sn, W Sn-W greisen	Small. Average grade of 0.45-1.33% WO_3 ; up to 0.38% Sn. Partly mined.

Consists of veins and greisen that occur inside and adjacent to a stock of two-mica granite that intrudes Upper Triassic sandstone and shale. Variable thickness and length. Veins occur in fissures that strike north-northeast and dip northwest at 75-85°. Veins have complex morphology with lenses that occur en echelon and that alternate with thin stringers. Main ore minerals are wolframite, cassiterite, and arsenopyrite. Gangue minerals are mainly quartz, muscovite, tourmaline, and apatite. A complex combination of sulfosalts of lead, silver, and bismuth occur in veins. Wallrocks exhibit quartz-muscovite, muscovite-apatite, and tourmaline greisen alteration

Shur, 1985; Vladimirtseva and Vladimirtseva, written commun., 1987.

Q54-17 64°45'N 142°43'E	Tuora-Tas Yana-Kolyma	Au Au quartz vein	No data.

Consists of a set of small, thin veins that are hosted in Upper Triassic (Carnian) sandstone. Both cross-cutting and conformable veins occur. Veins composed of quartz, chlorite, rare carbonate, albite, and muscovite. Main ore minerals are arsenopyrite, pyrite, galena, and native gold (fineness 884). Also occurring are rare sphalerite, chalcopyrite, and scheelite. Minor beresite alteration also occurs in wallrocks that are deformed into low-amplitude folds with widths to 500 to 800 m; and are cut with numerous fissures. Diorite-porphyrite dikes also occur within the ore field.

Rozhkov and others, 1971; Shur, 1985.

Q54-18 64°45'N 143°50'E	Sokh Yana-Kolyma	Au Au quartz vein	Small. Average grade of 16.3-57.5 g/t Au; contains up to 1,745 g/t Au.

Consists of small cross-cutting and conformable gold-quartz veins that are hosted in Triassic sandstone and shale. Both cross-cutting and conformable veins occur. Main ore minerals are arsenopyrite, galena, sphalerite, and native gold (fineness 883). Chlorite and sericite also occur in veins.

Vladimirtseva, written commun., 1987; Yakutia Gold Occurrences Atlas, 1992.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q54-19 64°42'N 141°26'E	Bazovskoe Yana-Kolyma	Au Au quartz vein	No data.

Consists of shear zones hosted in Upper Triassic (Norian) sandstone and shale. Shear zones contain densely-packed quartz veins and stringers with variable orientation and thickness. Veins and stringers dip steeply to southwest and to northeast. Shear zones range up to 100 m thick, up to several hundred meters long. Zones divided into Western, Central, and Eastern shear zones. In addition to quartz, veins contain carbonate, chlorite, and albite. Ore minerals are mainly arsenopyrite, galena, and native gold (fineness 823). Scheelite, sphalerite, and pyrite are scarce. Wallrock exhibit beresite alteration.

Snyatkov, 1958; Rozhkov and others, 1971.

Q54-20 64°30'N 138°25'E	Erel Verkhoyansk-Indigirka	Hg Clastic sediment-hosted Hg	Small. Average grade of 0.65% Hg.

Consists of three steeply-dipping ore bodies that occur in zones of brecciated Triassic sandstone that are cemented with quartz and carbonate. Ore bodies range from 2.8 to 7 m thick and up to 50 m long. Minerals include cinnabar, with less than 1% pyrite and arsenopyrite. Gold is very scarce.

Vladimirtseva, written commun., 1987.

Q54-21 64°32'N 141°43'E	Talalak Yana-Kolyma	Au Au quartz vein	Medium. Average grade of 39.6 g/t Au for vein No. 1. Partly mined.

Consists of interbedded quartz veins that range from 0.15 to 3.4 m thick and are about 100 m long. Veins vary from lens-like to platyform. Veins composed of quartz, ankerite, sericite, albite, and potassium feldspar. Ore minerals are arsenopyrite, pyrite, chalcopyrite, galena, tetrahedrite, bournonite, boulangerite, and native gold (fineness 954). Wallrocks exhibit beresite alteration. Deposit occurs in the hinge of the Talalak anticline and is hosted Upper Triassic (Lower Carnian) siltstone and shale.

Snyatkov, 1958; Arsky, 1966; Vladimirtseva, written commun.,1987; Rozhkov and others, 1971.

Q54-22 64°25'N 142°19'E	Dirin-Yuryak Yana-Kolyma	Au Au quartz vein	Range of 0.1-3,988 g/t Au. Average grade of 226 g/t Au.

Consists of several veins that occur subconformable to bedding in Upper Triassic (Carnian) shale that is exposed in the hinge of an anticline. Veins range from 0.01 tp 1 m thick. Veins composed of quartz, carbonate minerals, chlorite, sericite, and albite. Main ore minerals are pyrite, arsenopyrite, galena, tetrahedrite, bournonite, and native gold (fineness 963). Sphalerite and chalcopyrite are scarce.

Snyatkov, 1958; Rozhkov and others, 1971; Vladimirtseva, written commun., 1987; Yakutia Gold Occurrences Atlas, 1992.

Q54-23 64°17'N 142°46'E	Sarylakh Adycha-Taryn	Au, Sb Sb-Au vein	Large? Up to 60% Sb; up to 10,000 g/t Au. Average mining grade of 6% Sb and 6 g/t Au. Mined and proven reserves of 130,000 tonnes antimony.

Occurs in Adycha-Taryn fault zone. Hosted in Upper Triassic (Norian) sandstone and shale. Consists of three rod-like stibnite veins that occur in shear zones that feather along the main fault. Ore body No. 1, the major deposit, varies from 0.2 to 5 m thick and dips steeply northeast at 55-80°, and extends for several hundred m along strike and down-dip. Deposit is very complex, and ranges from massive antimony to disseminations and stringers. Deposit predominatly stibnite (40-80%) and quartz (10-60%). Rare minerals are arsenopyrite, pyrite, muscovite, ankerite, berthierite, native gold (fineness 983), native antimony, aurostibnite, chalcostibnite, and other sulfosalts. Native aluminum and chromium occur. Host rocks are intensely altered to beresite and argillite.

Anasenko and Bichok, 1970; Berger, 1978; Zharikov, 1978; Indolev and others, 1980; Shur, 1985; Vladimirtseva, written commun., 1987; Yakutia Gold Occurrences Atlas, 1992.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q54-24 64°12'N 141°41'E	Badran Yana-Kolyma	Au Au quartz vein	No data.

Consists of a long vein that intrudes a thrust fault dips gently north-northeast at 25-27°. Thrust fault about 10 m thick and occurs in folded Upper Triassic sandstone and shale. Vein exhibits complex morphology, is highly convoluted, and trails off along strike as discrete lenses. Main ore body occurs in an area where fault changes strike. Minerals are pyrite, arsenopyrite, fahlore, sulfosalts of Pb, Cu and Ag, and native gold (fineness 896-920). Gold occurs in ribbon-like forms within the vein. Deposit is highly-oxidized with Cu, Fe, and Sb sulfates.

Akhyaev and others, written commun., 1981; Amuzinsky and others, 1989; Anisimova and others, written commun., 1990; Yakutia Gold Occurrences Atlas, 1992;

Q54-25 64°13'N 140°25'E	Selerikan Verkhoyansk-Indigirka	Sb Sb vein	No data.

Deposit occurs in the Ayabin thrust fault that occurs conformable to a small northwest-trending anticline formed in Upper Norian sandstone. Ore body exhibits a complex morphology and consists of two quartz-stibnite veins that alternate with small stringers and lenses of stibnite. Pyrite also occurs.

Indolev and Krimov, 1979.

Q54-26 64°08'N 139°52'E	Seikimyan Verkhoyansk-Indigirka	Hg Clastic sediment-hosted Hg	Up to 0.1-0.5% Hg.

Consists of stringers and disseminations. Major minerals are quartz, dickite, cinnabar, calcite, pyrite; and rare galena, sphalerite, and arsenopyrite. Deposit hosted in feathered shear and breccia zones that range from 0.4-7 by 50-200 m, in sandstone. Deposit occurs on northeastern limb of an anticline formed in Upper Triassic sandstone and siltstone. Deposit is bounded by faults that occur parallel to the major, regional Bryungadin fault.

Klimov, 1979; Vladimirtseva, written commun., 1987.

Q54-27 64°08'N 143°04'E	Sana Yana-Kolyma	Au Au quartz vein	Small. No data.

Consists of a set of small, interbedded, cross-cutting quartz veins that intrude siltstone and argillite layers in Upper Triassic sandstone. Veins range from 0.05 to 1 m thick and up to 450 m long. Three prominent veins occur; one has been prospected. Major gangue minerals are quartz, wide-spread carbonate minerals, adularia, chlorite, and albite. Major ore mineral is aresenopyrite along with pyrite, galena, gold (native 892), sphalerite, tetrahedrite, and scheelite are less wide-spread. Wallrock s altered to minor beresite and adularia.

Skornyakov, written commun., 1951; Rozhkov and others, 1971; Yakutia Gold Occurrences Atlas, 1992; Sustavov, 1993.

Q54-28 64°04'N 142°37'E	Bekkem Yana-Kolyma	W Mo, Sn W-Mo-Sn vein and greisen	Small. Average grade of 1.56% WO_3; up to 0.42% Mo; 0.01-0.18% Sn.

Consists of a set of 30 subhorizontal veins that occur in the apical portion of a granite stock that intrudes Upper Triassic sandstone and shale. Veins range from 0.3 to 0.9 m thick and up to 650 m long. Major and minor minerals are quartz, tourmaline, wolframite, arsenopyrite, molybdenite, cassiterite, scheelite, pyrite, chalcopyrite, bismuthine, and galena are predominant. Deposit is vertically zoned, with wolframite, tourmaline, and quartz occurring in the upper portion, and molybdenite, sulfides, and quartz occurring in the lower portion. Veins assocated with greisen aureoles up to 3 m thick.

Shur, 1985; Vladimirtseva and Vladimirtseva, written commun., 1987.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q54-29 64°03'N 143°19'E	Maltan Adycha-Taryn	Au, Sb Sb-Au vein	Medium. Average grade of 10.8% Sb; 8.87 g/t Au.

Consists of lens-like veins, shear zones, and stringers that either intrude ore are subconformable to Upper Triassic siltstone. Ore bodies are about 10 m and about 100 meters long. Veins and stringers intruded by a diorite-porphyrite dike with a K-Ar isotopic age of 140 Ma. Two mineral assemblages occur: (1) an early-formed assemblage of arsenopyrite-sulfostibnite with native gold (fineness 800-900); and (2) a late-formed assemblage of stibnite-berthierite with native gold (fineness 966). Early assemblage consists of quartz and ankerite, as well as pyrite, arsenopyrite, sphalerite, chalcopyrite, galena, tetrahedrite, chalcostibite, bournonite, and jamesonite. Late assemblage consists of quartz, stibnite, and berthierite, and also pyrite, ankerite, and dickite. Wallrocks altered to beresite and younger argillite. Altered rocks contain abundant needle, disseminated arsenopyrite.

Indolev and others, 1980; Vladimirtseva, written commun., 1987; Yakutia Gold Occurrences Atlas, 1992.

Q55-01 65°36'N 144°33'E	Shirokoe Dogdo-Erikit	Au, Ag Au-Ag epithermal vein	Small. 1.6-4.2 g/t Au; 4-560 g/t Ag.

Consists of a northeast-trending zone of disseminated minerals in quartz vein and silicified zone that ranges from 2 to 3 m thick and up to 700 m long. Vein intrudes Upper Jurassic(?) rhyolite. Deposit best developed in a 100-m-long zone at the southeast end of the vein. Major minerals are pyrite, goethite, and pyrargyrite. Host rhyolite is intensely silicified.

Vladimirtseva, written commun., 1987.

Q55-02 64°57'N 144°01'E	Mitrei Yana-Kolyma	Au Au quartz vein	Small.

Thin quartz veins and veinlets cut dikes of rhyolite-dacite composition of Late Jurassic and Early Cretaceous age. Dikes altered to beresite. Mineral associations are: arsenopyrite-pyrite-quartz; albite-muscovite with chalcopyrite and sphalerite; gold-tetrahedrite-buornonite; gold-jamesonite-zinkenite; and post-ore, quartz-carbonate-chlorite.

Rozhkov and others, 1971

Q55-03 65°13'N 148°02'E	Agyndja Rassokha	Cu Basaltic Cu and sediment-hosted Cu	Large. Average grade about 1% Cu.

Disseminated and vein-like ore bodies, and less common breccia ores, occur in red, amygdaloidal trachybasalt and sandstone of Middle to Upper Ordovician age. Ore minerals are bornite, chalcocite, chalcopyrite, covellite, and locally native copper. Copper minerals in trachybasalt occur in amygdules and synvolcanic fissures in the upper portion of lava flows. Ore minerals occur both as cement and as clasts in sandstone. The bottom of stratified ore bodies is commonly composed of mineralized trachybasalt overlain by copper-bearing sandstone. The deposit extends over about 100 km^2. Individual ore horizons are 1 to 30 m thick and trend northwest. Ore-bearing sequence is broken by faults of diverse orientation, including numerous thrust faults which repeat the mineralized horizons.

Shpikerman and others, 1988

Q55-04 64°32'N 149°23'E	Vesnovka Omulevka River	Cu, Pb, Zn, Ge Kipushi Cu-Pb-Zn	Small.

Vein and disseminated ore occurs in Middle Ordovician limestone, shale, and siltstone. Ore bodies trend east-west and occur as metasomatic replacements conformable to bedding. Dimensions and morphology of ore bodies are not well defined. Ore minerals include sphalerite, galena, chalcopyrite, and renierite(?). The calcareous siltstone which hosts the ore bodies is silicified and cut by calcite veins.

V.I. Shpikerman, oral commun., 1989

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q55-05 64°13'N 148°23'E	Omulev Omulevka River	W Stratabound W	Small. Average grade up to 1% WO_3.

Deposit consists of veins in Middle Ordovician black carbonaceous, calcareous siltstone. The main ore mineral is scheelite. Pyrite, antimonial realgar, orpiment, galena, and chalcopyrite are locally present. Ore minerals are restricted to a conformable, thin layer that is intricately folded along with adjacent rocks, all of which were subjected to greenschist-facies metamorphism. Deposit occurs in a core of a large, open, northwest-trending anticline. No magmatic rocks occur nearby. Mineralized area covers about 100 km^2.

Shpikerman and others, 1986

Q55-06 64°03'N 144°49'E	Khangalass Yana-Kolyma	Au Au quartz vein	Small.

Conformable and cross-cutting quartz lenses with albite, ankerite, muscovite, disseminated pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, marcasite, and gold occur in Lower and Middle Triassic sandstone and shale that folded into an open anticline.

Rozhkov and others, 1971

Q55-07 64°09'N 146°16'E	Tunguss Yana-Kolyma	Au, Sb Au quartz and Sb vein	Small.

Quartz veins occur near the contact of an Upper Jurassic to Early Cretaceous granite porphyry dike. Mineral associations are: arsenopyrite-pyrite-quartz; albite-muscovite with chalcopyrite and sphalerite; tetrahedrite-bournonite; lead sulfo-antimonides with gold; and quartz-stibnite with berthierite and zinkenite; which formed during the last stage of mineralization.

Rozhkov and others, 1971

Q55-08 64°02'N 147°42'E	Darpir Darpir	Sn Zn Sn silicate-sulfide vein	Medium. Average grade about 0.5% Sn.

A set of quartz-chlorite, quartz-tourmaline, and, less common quartz veins and lenses, occur in contact-metamorphosed, Lower and Middle Jurassic clastic sedimentary rocks. Ore bodies occur about 2.0-2.5 km from the contact of the Darpir granite pluton. More than 20 veins are known, most of which trend northeast and about east-west, with dips of 50-85°. Veins are up to 200 m long and 0.4 to 2.7 m thick. Ore minerals are cassiterite, sphalerite, pyrite, arsenopyrite, and locally galena, and titanomagnetite; all of which occur as disseminations and sulfide segregations in veinlets. An and Sn are the most important commodities. Wall rocks are commonly tourmalinized.

Klochkov and others, written commun., 1979

Q56-01 66°51'N 153°54'E	Slezovka Yarkhodon	Pb, Zn Southeast Missouri Pb-Zn	Small.

Vein, disseminated, and breccia ores occur in Middle Devonian clastic sedimentary rocks and carbonates, in association with a mineralized dolomite sequence in a synclinal fold. Deposit is made up of 5 mineralized beds, each 3-5 m thick, separated by barren interbeds 3-10 m thick. Ore minerals include galena, sphalerite, pyrite, and barite. Ore bodies are cut by quartz and calcite veinlets.

Artemov and others, written commun., 1976

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q56-02 66°36'N 154°19'E	Gornoe Yarkhodon	Pb, Zn Southeast Missouri Pb-Zn	Small.

Vein, disseminated, and breccia ores occur in clastic and carbonate rocks from a Middle Devonian continental shelf environment. Mineralization is near a tectonic contact with Upper Proterozoic sedimentary rocks. Host rocks are fossiliferous dolomite. Ore minerals include abundant galena, sphalerite, chalcopyrite, hematite, pyrite, limonite, magnetite, malachite, azurite, cerussite, wulfenite, barite, and calcite. Brachiopods are replaced with galena locally, but more often, galena forms replacement bodies in dolomite or cement in breccia ore.

Nikolaev, written commun., 1972

Q56-03 65°43'N 152°12'E	Pobeda Oroek	Fe Ironstone	Medium. Proven reserves 2.8 million tonnes Fe. Estimated resources of 18 million tonnes Fe. Grade ranges from 46-70% Fe.

Stratiform hematite occurs in Upper Proterozoic dolomitic marble in a zone of imbricated thrust faults. Gabbro and gabbro-amphibolite bodies with hematite occur along thrust fault planes. Mineralization includes massive, brecciated, and stockwork ores. Massive ores contain up to 70% iron. Brecciated ores are composed of clasts of hematized dolomite and gabbro-amphibolite cemented by hematite. Stockwork ore forms separate halo-shaped bodies around the massive and brecciated ores. Ores also contain calcite, quartz, barite, chlorite, pyrite, chalcopyrite, galena, and malachite. Ore-bearing horizon extends for 18 km, but the best defined stratiform deposit is 150 to 600 m long and 2 to 20 m thick. Mineralized dolomite is underlain by hematitic sandstone with up to 34% iron.

Potapova, written commun., 1954; Kravchenko and others, written commun., 1979; Kats, written commun., 1979.

Q56-04 65°21'N 152°57'E	Kopach Shamanikha	Au Au quartz vein	Small. Grab samples with up to 12 g/t Au, 0.3% Cu, and 0.1% Pb.

Disseminated and vein occurs in metarhyolite and biotite-amphibole-chlorite-quartz schist of Upper Proterozoic age. Wall-rock alteration includes silicification, epidotization, and sulfidization. Ore minerals are pyrite, magnetite, hematite, goethite, and native gold. Ore bodies contain 10 to 20% quartz. Ore veins are localized along the contacts of metarhyolite bodies; both within them and in adjacent rocks. Veins vary in thickness from 8 cm to 2 m and are often associated with boudinage structures. Ore is confined to selvages of veins. Basalt dikes cut the metarhyolite bodies.

Semenov and others, written commun., 1974

Q56-05 64°58'N 153°04'E	Glukhariny Shamanikha	Au Au quartz vein	Small. Grab samples with up to 25 g/t Au and up to 50 g/t Ag.

Gold in quartz-chlorite-epidote schist, quartzite, and metarhyolite of Upper Proterozoic age; and in quartz-cemented breccias in these rocks. Wall rocks are metamorphosed to upper greenschist facies. Ore minerals are native gold, pyrite, galena, chalcopyrite, arsenopyrite, and hematite. Ore minerals occur in three east-west trending zones up to 1,200-4,000 m long and 400 to 900 m wide.

Lutskin, written commun., 1964; Semenov, written commun., 1974

Q56-06 64°54'N 152°48'E	Oroek Oroek	Cu Sediment-hosted Cu	Small. Contains 0.2 to 4% Cu (average grade of 1.0%); up to 44 g/t Ag, up to 7 g/t Au. Probable resource of 5 million tonnes Cu.

Stratiform copper deposits in an Upper Proterozoic volcaniclastic sequence 150-180 m thick. Sequence is dominated by quartzite, chlorite and graphite-chlorite shale, and phyllite. Thin conformable beds of basalt and tuffaceous rocks occur. Copper occurs as chalcocite, bornite, and chalcopyrite in the metamorphosed sandstone, siltstone, and shale. Ore-bearing sequence contains many quartz boudins with chalcopyrite, bornite, and hematite. Later cross-cutting quartz veins also contain minor malachite, chalcocite, azurite, chrysocolla, bornite, and native copper. Mineralized rocks are deformed and form an overturned, isoclinal fold whose limbs dip southeast at 40°-90°.

Volkodav and Korobitsyn, written commun., 1979

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q56-07 64°18'N 153°58'E	Rogovik Eastern Asia-Arctic: Omsukchan	Ag, Au Au-Ag epithermal vein	Medium. Contains 0.5 to 34 g/t Au and 2.7 to to 747 g/t Ag.

Area underlain by Triassic sedimentary rocks with a complicated block structure and widespread explosive (cryptovolcanic) breccias that occur in a series of graben-like depressions and cross structures. Breccias and sedimentary rocks are locally intensely altered, and contain veins and veinlets of banded quartz with adularia, argentite, and pyrargyrite with Ag and Au values.

Umitbaev, 1986

Q57-01 67°31'N 160°49'E	Dalny Oloy	Cu, Mo, Au Porphyry Cu-Mo and polymetallic vein	Small.

Stockwork made up of a network of quartz, carbonate-quartz, and quartz-sulfide veinlets 0.3-5 mm thick that contain fine-grained disseminated pyrite, pyrrhotite, chalcopyrite, and magnetite, and lesser galena, sphalerite, arsenopyrite, and molybdenite. Ore bodies occur in an Early Cretaceous intrusive complex, including syenite-diorite porphyry and quartz syenite porphyry, which intrudes Upper Triassic shale. Wall rocks adjacent to the plutonic rocks are altered to quartz and potassium feldspar, and quartz-biotite and quartz-sericite-chlorite metasomatites. Occurrences of gold and several other metals are widespread near the periphery of the plutonic complex.

Gorodinsky, Gulevich, and Titov, 1978

Q57-02 67°17'N 159°22'E	Innakh Oloy	Cu, Mo, Au Polymetallic vein and Porphyry Cu-Mo	Small.

Quartz and quartz-carbonate veins several tens of meters long contain masses and disseminations of pyrite, chalcopyrite, molybdenite, magnetite, galena, sphalerite, arsenopyrite, löellingite, tetrahedrite, and native bismuth. Gold is associated with pyrite and other sulfides, magnetite, and tetrahedrite ores. Veins occur in contact-metamorphosed siltstone about 1.5-2 km from a Cretaceous gabbro-monzonite-syenite pluton; especially near diorite and monzodiorite dikes. Pluton itself is characterized by small stockwork zones of gold-molybdenite-pyrite-chalcopyrite deposits. Ore bodies are associated with two tectonic zones; one trends northwest, and the other about north-south.

Gorodinsky and others 1974; Goryachev and Polovinkin, 1979.

Q57-03 67°08'N 161°13'E	Klen Oloy	Au, Ag Au-Ag epithermal vein	Medium. Grade ranges from traces up to 380.5 g/t Au and up to 1067.9 g/t Ag.

Steeply-dipping carbonate-quartz veins trending northwest are several hundreds of meters to 1300 m long. The veins contain disseminated pyrite, chalcopyrite, arsenopyrite, gold, argentite, and freibergite; in propylitized, silicified, and sericitized Cretaceous volcanic rocks. Au/Ag ratio in the ores is about 1:3.

Gorodinsky and others, 1974; Shilo and others, 1975

Q57-04 66°43'N 157°21'E	Berezovska Berezovka	Pb, Zn, Cu, Ag Polymetallic vein and Kuroko massive sulfide	Small. Average grade of 4.07% Pb, 6.89% Zn, 0.03% Cu, 250.3 g/t Ag.

Silver-bearing concordant quartz-sulfide veins and stratiform barite-sulfide bodies occur in Upper Devonian carbonate and volcaniclastic rocks. Major sulfides are galena and sphalerite.

Gorodinsky and others, 1974; N.A. Bobrov, written commun., 1976; V. Shpikerman, this report.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q57-05 65°18'N 156°57'E	Zet Kedon	Au, Ag Au-Ag epithermal vein	Small.

Mineralized quartz and chalcedony-quartz veins, veinlets, and breccias are transitional into quartz-carbonate-hydromica and adularia-chlorite-quartz metamorphic rocks. Vein contacts are not well defined. Disseminated and masses of pyrite, hematite, and galena are present; sphalerite, chalcopyrite, molybdenite, arsenopyrite, and pyrargyrite are less abundant. Gangue minerals include amethyst, kaolinite, and fluorite. Gold is finely dispersed in the ore; the Au/Ag ratio is 1:5. Deposit occurs in Middle to Upper Devonian dacite tuff. Gold-silver ore bodies occur within a zone that is generally about 200-250 m wide, but may be as much as 500-700 m wide if low-grade off-shoots are included. District extends northeast for 3-4 km.

Kovalchuk and others, written commun., 1969; Shamin and others, written commun., 1983

Q57-06 65°17'N 159°32'E	Medgora Left Omolon	Mo, Cu Mo-Cu skarn	Medium. Average grade of 0.1 to 0.64% Mo, 0.94 to 2.94% Cu, and 0.4 g/t Au.

Consists of disseminated veinlets containing molybdenum and copper mineralization that are associated with the Early Cretaceous Medgora granite-granodiorite intrusion. Metallic minerals are pyrite, chalcopyrite, molybdenite, pyrrhotite, magnetite, hematite, and sphalerite. Skarn bodies associated with the intrusion are composed of garnet, pyroxene, actinolite, scapolite, calcite, quartz, chlorite, epidote, and green mica. Individual ore zones extend for 30-160 m. Copper content of the ore varies from hundredths of a percent to over 2%.

Gorodinsky, Gulevich, and Titov, 1978.

Q57-07 64°57'N 156°26'E	Olcha Kedon	Au, Ag Hg, Cu, Mo Au-Ag epithermal vein	Medium. Grade ranges 0.5 to 273 g/t Au and 26.3 to 4978 g/t Ag. Inferred resource of approximately 50 tonnes Au.

Ore bodies consist of steeply dipping quartz, carbonate-quartz, and adularia-quartz veins and stockwork zones, which range from several tens of meters to 1300 m long. They are hosted in Middle to Late Devonian volcanic rocks of the Kedon series. Veins occur along fractures, mainly within extrusive andesite breccia of the volcanic vent facies, and more rarely, in hypabyssal dacite-porphyry bodies and felsic extrusive rocks. Ore minerals include gold (500-700 fine), chalcopyrite, argentite, polybasite, galena, sphalerite, pyrite, hematite, manganese oxides, stromeyerite, tetrahedrite, native silver, and tellurides. Gangue minerals are quartz and adularia, with lesser calcite, dolomite, rhodochrosite, and barite. Gold and silver is associated with mercury, copper, molybdenum, lead, zinc, manganese, and arsenic. Ore minerals are accompanied by propylitic and quartz-sericite alteration. Gold-silver ore bodies are controlled by arcuate faults around a volcano-tectonic depression over a basement composed of Archean metamorphic rocks and Early Paleozoic(?) carbonate and clastic sedimentary rocks. Adularia from quartz veins has been dated by K-Ar as 268 Ma and by Rb-Sr as 251 Ma. More recent K-Ar dating of adularia from gold-bearing veins yeilded an age of 318 Ma.

Zagruzina and Pokazaniev, 1975; Pokazaniev, 1976a, b; I.N. Kotlar, written commun., 1984.

Q57-08 64°52'N 158°39'E	Obyknovennoe Kedon	Au, Ag Au-Ag epithermal vein	Estimated about 5 tonnes Au ore averaging 29.6 g/t Au and 68 g/t Ag.

Northwest trending zones of adularia-quartz veins and veinlets in extrusive bodies of intensely silicified and sericitized, fluidal rhyolites of the Kedon series. Dominant ore minerals are galena, sphalerite, pyrite, bornite, electrum, and silver sulfosalts. The Au/Ag ratio is 1:2 or 1:3. Ore zones extend for 400 m and range up to 120 m thick.

Burenkova, written commun., 1989

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q57-09 64°22'N 160°22'E	Bebekan Left Omolon	Mo, Cu Porphyry Cu-Mo	Small to medium. Average grade about 0.5% Mo, 0.7% Cu with minor Pb, Zn, W, Au, and Ag.

Stockwork of sulfide-quartz veinlets with disseminated molybdenite, chalcopyrite, pyrite, sphalerite, pyrrhotite, arsenopyrite, bornite, and covellite. Deposit occurs in an Early Cretaceous stock of porphyritic granodiorite. Ore body is confined to silicified and sericitized rocks marked by biotite, quartz, and orthoclase. Ore body is about 1.5 km by 400-500 m in size and coincides with the intrusion. A pyrite aureole extends about 1 km from the intrusion area and coincides with a zone of propylitization of the Upper Jurassic volcanic and sedimentary country rocks.

Alekseenko, Korobeinikov, and Sidorov, 1990

Q57-10 64°16'N 160°02'E	Tumannaya Kedon	Au, Ag Au-Ag epithermal vein	Small. Up to 16.7 g/t Au and 50 g/t Ag.

Quartz veins and veinlets occur in an area several hundreds of meters long and up to 20 m wide in Middle Upper Devonian volcanic rocks of the Kedon series. Veins contain disseminated pyrite, sphalerite, chalcopyrite, arsenopyrite, gold, electrum, and silver sulfosalts.

Biryukov, written commun., 1988

Q58-01 67°49'N 167°28'E	Svetlin Chukotka	Au Au quartz vein	Small. Average 5.0 to 30 g/t Au.

Deposit consists of lenticular and lenticular quartz veins tens to hundreds of meters long, and linear stockworks with disseminated arsenopyrite, pyrite, galena, sphalerite, and chalcopyrite; minor boulangerite, stibnite, and ubiquitous gold. Veins occur in altered Lower to Middle Triassic carbonaceous shale, siltstone, and sandstone; in hornfels; and in Triassic gabbro-diabase sills. About 200 en echelon veins are known along zones up to 10 km long. Gold ore bodies are confined to a fracture zone between two Early Cretaceous granitic bodies which occur at the intersections of major east-west and northwest structures.

Shavkunov and Panychev, written commun., 1977

Q58-02 67°45'N 165°27'E	Elombal, Yakor Eastern Asia-Arctic: Omsukchan	Au, As, Sb Sb-Au vein?	Small.

Numerous, generally north-south zones of fracturing, silicification, and ankeritization, contain veins and veinlets of calcedony-like quartz with gold, arsenopyrite, stibnite, native arsenic, realgar, orpiment, pyrite, and chalcopyrite. Ore bodies are confined to hypabyssal intrusions of mid-Cretaceous (K-Ar age of 97 Ma) syenite to diorite porphyry that intrude a weakly deformed Upper Triassic sandstone-shale sequence. Mineralization is controlled by a major northwest trending fault.

Aksenova, 1990

Q58-03 67°14'N 163°44'E	Asket Oloy	Cu, Mo, Au Porphyry Cu-Mo and Polymetallic vein	Small. Average grade about 0.5% Cu, 0.05% Mo, and 0.2 g/t Au.

Deposit consists of a stockworks of quartz-sulfide and chlorite-sulfide veinlets with disseminated pyrite and chalcopyrite, and subordinate molybdenite, magnetite, native gold, marcasite, ilmenite, sphalerite, pyrrhotite, and arsenopyrite. Ore body confined to zones of fissuring and brecciation at the contact of an Early Cretaceous diorite body that intrudes volcanic and sedimentary rocks. Copper-porphyry mineralization is associated with propylitic alteration of the host rocks. Numerous quartz and quartz-carbonate veins with gold-silver-polymetallic ore minerals are associated with the porphyry Cu-Mo body.

Gorodinsky and others, 1974; Gulevich, written commun., 1987

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Summary and References			
Q58-04 67°13'N 166°16'E	Kulpolney Eastern Asia-Arctic: Chukotka	Hg Cu, Zn, Pb, Au, Ag Volcanic-hosted Hg	Small.

Quartz, quartz-dickite, and quartz-carbonate veins, as well as breccias and altered rocks contain disseminated veinlets that include polymetallic tetrahedrite-tennantite ore bodies in spilite, gabbro-diabase, and tuffaceous and volcaniclastic rocks of Upper Jurassic age. Ore bodies are confined to the southern end of a volcanic depression related to Early Cretaceous hypabyssal intrusions and necks of intermediate to mafic composition. Ore bodies are controlled by east-west structures and a radial fracture zone. Main ore and vein minerals are Hg-tetrahedrite, tetrahedrite, quartz, dickite, and nacrite, with subordinate amounts of galena, sphalerite, chalcopyrite, pyrite, chalcocite, calcedony, chlorite, illite, ankerite, and calcite.

Kopytin, 1978

Q58-05 66°36'N 164°30'E	Peschanka Oloy	Cu, Mo, Au Porphyry Cu-Mo	Large. Estimated resources 940 million tonnes with average grade 0.51% Cu, 0.019% Mo, 0.42 g/t Au, and 1.4 g/t Ag.

Deposit is confined to the eastern portion of the Late Jurassic and Early Cretaceous Egdegkych multiphase pluton. Pluton composed of monzodiorite and quartz monzodiorite intruded by planar bodies of quartz monzonite and granodiorite porphyry. Sulfide veinlets and disseminations, with Co and Mo minerals, are pervasive throughout the entire elongated monzonite-granodiorite porphyry body, and extend into wall rocks. Main ore minerals are pyrite, chalcopyrite, bornite, tetrahedrite-tennantite, and molybdenite. Magnetite, hematite, sphalerite, galena, chalcocite, native gold, gold tellurides, enargite, arsenopyrite, pyrrhotite, and marcasite occur in minor amounts or are rare. Gangue minerals are quartz, carbonate, and anhydrite. Four mineral associations are distinguished: (1) molybdenite that is associated with the quartz-sericite subzone of phyllic alteration; (2) pyrite and chalcopyrite, associated with quartz-sericite-chlorite alteration; (3) chalcopyrite, bornite, and tetrahedrite coincident with quartz-sericite and biotite alteration; and (4) polysulfide mineralization which occurs with all alteration types. Mineralization was preceded by wide-spread pyritization in the peripheral propylitic zone. Trace elements include Ag, Pb, Bi, Co, Ni, Zn, Pd, Pt, and Te.

Gorodinsky and others, 1978; Volchkov and others, 1982; Kaminskiy and Baranov, written commun., 1982; Migachev and others, 1984; Gulevich, written commun., 1987; Shpikerman and Dylevskyi, wirtten commun., 1992.

Q58-06 66°30'N 164°24'E	Vesennee Oloy	Au, Ag Au-Ag epithermal vein	Medium. Grade ranges from 0.1 to 48 g/t Au and up to 300 g/t Ag.

Carbonate-quartz veins, altered veinlets, and mineralized breccias occur in structurally complex forms. Veins are controlled by northeast and approximately east-west fractures which cut northwest-trending zones of copper-porphyry bodies. Individual ore bodies extend for 150-500 m. Main gangue minerals are quartz, calcite, and rhodochrosite with subordinate adularia, dolomite, celestite, and gypsum. Ore minerals include sphalerite, galena, pyrite, chalcopyrite, tetrahedrite, tennantite, bournonite, and electrum, with minor silver sulfides and sulfosalts, stannite, and matildite. Au:Ag ratio varies from 1:5 to 1:30. Ores commonly contain trace Cu, Mo, As, Bi, Sb, Co, Ni, Mn, Cr, Cd, In, and Te. Ore bodies occur mainly in propylitized trachyandesites of an Upper Jurassic volcaniclastic sequence that is intruded by hypabyssal bodies and dikes of gabbroid rocks, syenite, granodiorite porphyry, and andesite-dacite, of Late Jurassic to Late Cretaceous ages.

Gorodinsky and others, 1974; Shilo and others, 1975; Shapovalov, 1976; Sidorov, 1978; Gulevich, written commun., 1987

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q58-07 66°28'N 166°48'E	Uralskoe Eastern Asia-Arctic: Koni-Yablon	Hg, Sb, Au, Ag Volcanic-hosted Hg	Small.

Mercury deposits are present along two northeast-trending belts associated with hypabyssal bodies of Early to Late Cretaceous granite porphyry and quartz porphyry. Deposits are hosted by sandstone and siltstone in a Lower Cretaceous volcaniclastic molasse. Individual ore zones are typically 100 m long by 20-30 wide. Ore minerals are cinnabar, metacinnabar, pyrite, arsenopyrite, chalcopyrite, hematite, silver sulfosalts, and native gold. Gangue minerals include quartz, calcedony, kaolinite, hydromica, calcite, and chlorite. Cinnabar is mainly confined to silicified and sericitized rocks as fine disseminations, powdery coatings, and thin veinlets. High concentrations of lead, zinc, antimony, molybdenum, tin, tungsten, and bismuth are characteristic of the ores. Cinnabar ore bodies are localized at the intersections of structures that trend approximately north-south and east-west.

Babkin, 1975

Q58-08 66°29'N 164°49'E	Teleneut Aluchin	Cr, Ni Podiform Cr	Small. Up to 70% chromite.

Deposit occurs in serpentinite at the south end of the Aluchin alpine-type ultramafic body. Irregularly-shaped chromite deposit extends about 1.5 km toward the north with a width of about 700 m. Chromite ores are disseminated, banded, lenticular, and sometimes massive; with a chromite content up to 70%. Disseminated pentlandite, millerite, bravoite, violarite, pyrrhotite, and chalcopyrite occur in both chromite rich and chromite poor zones, in serpentinite, and in listwänite.

Aksenova, Dovgal, and Sterligova, 1970

Q58-09 65°47'N 165°06'E	Rzhavy Central Koryak	Cu, Mo, Au Porphyry Cu-Mo	Small.

Stockwork and disseminated veinlets of pyrite, chalcopyrite, molybdenite, magnetite, pyrrhotite, and native gold are hosted by Cretaceous diorite, granodiorite, and diorite and granodiorite porphyry. Central portions of the stockworks are locally dominated by molybdenite. Peripheral zones are marked by chalcopyrite; sometimes with intergrowths of galena, sphalerite, and tetrahedrite-tennantite, especially in andesite lavas.

Gulevich, written commun., 1987

Q58-10 64°42'N 166°50'E	Irgunei Eastern Asia-Arctic: Koni-Yablon	Au, Ag Cu, Pb, Zn Au-Ag epithermal vein	Medium. Ore contains 0.2 to 68 g/t Au and 11.2 to 146 g/t Ag.

Deposits consist of adularia-quartz and adularia-carbonate-quartz veins containing electrum, silver sulfosalts and selenides, galena, sphalerite, chalcopyrite, and, more rarely, molybdenite, arsenopyrite, cinnabar, and realgar. Veins occur over a complex intrusive dome at the intersection of a northeast trending fault, the Anadyr suture, and a northwest trending fault. A large hypabyssal andesite body occurs in the center of the dome and is surrounded by smaller stocks and dikes of diorite, granodiorite porphyry, andesite-dacite, and rhyolite. Periphery of the zone is composed of sheets of Lower and Upper Cretaceous felsic and basic volcanic rocks. Veins are commonly hosted in highly altered quartz-adularia-hydromica rocks near the hypabyssal body, and are associated with radial fissuring and fault zones.

V.P. Vasilenko, written commun., 1973

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q58-11 64°32'N 165°07'E	Lastochka Eastern Asia-Arctic: Koni-Yablon	Mo Bi, Ag Mo greisen and vein	Small. Average grade of 0.03-0.1% Mo.

Consists of steeply-dipping, linear zones containing a disseminated molybdenum stockwork composed of quartz-molybdenum veins and veinlets associated with adjacent greisen. Stockwork contains from a few thousandths of a percent to 10% and more molybdenum. K-feldspar, silicate, and pyrite alteration are common. Greisen contains coarse flakes of muscovite (30-50%), quartz (50-60%), sericite, and pyrite. Molybdenite contains less than 30 g/t Re. Major ore minerals are molybdenite, galena, sphalerite, chalcopyrite, bismuthinite, and cassiterite. Less frequent are scheelite, tourmaline, and fluorite. Ore zones, containing up to few % Mo, have sharp boundaries. Away from Mo ore zones, base metal, Ag, and Bi increase as Mo decreases. Molybdenite-bearing quartz veins commonly occur within quartz-muscovite greisen. Deposit occurs along contacts of a Late Cretaceous leucocratic granite stock that also contains small bodies of pegmatite and aplite, and zones of greisen.

V.A. Faradliev, written commun., 1971; V.I. Golyakov, written commun., 1973.

Q59-01 67°60'N 170°36'E	Omrelkai Eastern Asia-Arctic: Chukotka	Hg, Sb Volcanic-hosted Hg	Small.

Ore district is composed of seven areas spaced about 1 km apart, which occur in a graben-like, east-west trending structure in late Mesozoic volcanic rocks. Ore bodies occur in steeply-dipping mineralized fracture zones in tuff of intermediate and moderately felsic composition. Deposits are spatially related to hypabyssal bodies of diorite porphyry, andesite, and basalt that form the feeders for extrusive sheets. Rocks were intensely propylitized and locally silicified, followed by pervasive superimposed pyritization. Cinnabar occurs in separate veinlets and masses but more commonly, as irregularly disseminations in the host rock, and in quartz and calcite veinlets. Cinnabar is commonly associated with pyrite, and, more rarely, stibnite.

Babkin, 1975; Kopytin, 1978

Q59-02 67°02'N 171°58'E	Enmyvaam Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Au-Ag epithermal vein	Small.

Zones of gold-silver veins occur in Upper Cretaceous dacite of the Snezhnin caldera. Zones are typically 1-2 km long and 100-200 m wide.

Chubarov, written commun., 1978

Q59-03 66°14'N 167°56'E	Maly Peledon Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Au-Ag epithermal vein	Small. Contains 0.5-13 g/t Au, and from 5 to 1850 g/t Ag.

Quartz and fluorite-quartz veins with brecciated and cockade structures occur in zones of silicified and argillized, Albian and Cenomanian andesite and rhyolite. Individual veins are tens and hundreds of meters long. Ore occurrences are confined to the southern portion of a paleocaldera. Disseminated pyrite, hematite, and streaks of manganese oxides óccur in the area. Anomalous values of As, Cu, lead, and Zn occur.

Zotov, written commun., 1970; Zotov and others, written commun., 1973

Q59-04 66°15'N 169°34'E	Gornostai Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Au-Ag epithermal vein	Small. Ranges from 0.5 to 11.1 g/t Au, 100-1028 g/t Ag.

A fracture zone approximately 7 km long and 1.5-2 km wide crosses the core of a northwest-trending volcanic structure composed of lower Cretaceous andesite flows cut by necks and dikes of rhyolite and diorite porphyry. Silicified and propylitized volcanic rocks host more 100 veins and sets of stockworks. Vein types are quartz, sulfide-quartz, sparse adularia-quartz, and epidote-chlorite-quartz. Veins average about 150-200 m long and 0.1-1.2 m thick. Veins are typically marked by brecciated, drusy, or cockade structures, or massive. Disseminated sulfides and sulfide veinlets make up 5 to 90% of the veins. Ore minerals are chalcopyrite, pyrite, galena, sphalerite, magnetite, and aikinite.

Timofeev and others, written commun., 1967; Zotov and others, written commun., 1973

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Summary and References			
Q59-05 66°11'N 171°26'E	Chineyveem Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Au-Ag epithermal vein	Small.
Quartz veins with disseminated galena, chalcopyrite, pyrite, tetrahedrite-tennantite, and silver sulfosalts are confined to linear zones of sulfidized and tourmalinized, hydromica-quartz altered rocks; trending nearly east-west and northeast. Gold-silver veins occur in the middle of a collapsed volcanic structure subjected to resurgent doming. Veins and highly altered rocks occur along a major fault, where it intersects the contact of a diorite-granodiorite body that intrudes Albian to Cenomanian rhyolite-dacite volcanic rocks. Veins and alteration occur in both the intrusive body and country rocks. Kotlyar, 1986			
Q59-06 65°50'N 170°08'E	Berezovogor Eastern Asia-Arctic: Koni-Yablon	Au, Ag, Pb Cu, Zn Au-Ag epithermal vein	Small.
Quartz veins, and mineralized fractured and brecciation belts 200-1000 m long, occur in propylitized andesites of Upper Cretaceous age. Ore bodies trend predominantly northwest. Typical gangue minerals are: quartz, sericite, carbonate, chlorite, and adularia. Ore minerals are: galena, chalcopyrite, sphalerite, pyrite, tetrahedrite-tennantite, gold, silver sulfosalts, molybdenite, marcasite, and hematite. Au:Ag ratio is about 1:30. Zakharov, written commun., 1977			
Q59-07 65°27'N 173°04'E	Ust-Belaya Ust-Belaya	Cr, PGE Podiform Cr	Medium. Up 10-30% Cr.
Zones of closely spaced, banded chromite (10-30% chromite) occur as lenses, schlieren, and vein-like bodies of disseminated and massive chromite. Chromite occurs in layers up to 1300 m long and 400 m wide in dunite of the Ust-Belaya alpine-type ultramafic body. The chromite occurrences extend northward for 13 km along a belt more than 2 km wide. Silkin, 1983			
Q59-08 65°17'N 169°00'E	Serovskoe Eastern Asia-Arctic: Koni-Yablon	Au, Ag Au-Ag epithermal vein	Small.
Carbonate-quartz, and barite-carbonate-quartz veins containing galena, sphalerite, pyrite, chalcopyrite, pyrargyrite, and electrum occur in Late Cretaceous syenite-diorite, quartz diorite, granodiorite, and granite; which are intruded by hypabyssal intrusions of intermediate and basic composition. Au:Ag ratio is about 1:100. Veins occur where the Anadyr fault is cut by northward-trending fractures. Vasilenko, 1974; Zakharov, written commun., 1977			
Q59-09 64°48'N 168°36'E	Travka Eastern Asia-Arctic: Koni-Yablon	Mo Porphyry Mo	Small.
Disseminated molybdenite and pyrite occur in altered, silicified, Lower Cretaceous extrusive volcanic rocks that are related to a granodiorite-granite plutonic complex. Nevretdinov, written commun., 1966			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Summary and References			
Q59-10	Parkhonai	Sn	Small.
64°04'N	Central Koryak	Sn polymetallic vein and Sn silicate-sulfide vein	
173°18'E			

Numerous sericite-quartz and tourmaline-chlorite-sulfide veins, veinlets, and mineralized zones contain cassiterite, arsenopyrite, pyrrhotite, pyrite, chalcopyrite, sphalerite, galena, tetrahedrite, various silver minerals, stibnite, and considerable mercury in a Late Cretaceous flysch sequence composed of interbedded sandstone, siltstone, and argillite. Individual ore bodies extend for several hundreds of meters. Clastic rocks are intruded by small bodies and dikes of late Paleogene granite porphyry. Ore bodies are located over the periphery and middle of a volcanic dome that is controlled by a deep, concealed, northwest-trending fault.

Rozenblyum, Zincevich, and Nevretdinov, 1975; Lugov, 1986

Q59-11	Lamut	Hg	Small.
64°05'N	Central Koryak	As, Sb	
172°60'E		Volcanic-hosted Hg	

Lenticular occurrences and masses of quartz, opal, chalcedony, dolomite, dickite, and cinnabar occur in intensely silicified, kaolinized, carbonatized, and chloritized late Paleogene rhyolite, and, less commonly, in basalt and tuffite; along northeast-trending fracture zones. Subordinate ore minerals are metacinnabar, realgar, stibnite, and pyrite.

Babkin, Drabkin, and Kim, 1967; Rozenblyum, Zincevich, and Nevretdinov, 1975

Q60-01	Telekai	Sn	Medium.
67°59'N	Eastern Asia-Arctic: Chaun	Sn silicate-sulfide vein and Sn greisen	
178°05'E			

Quartz-cassiterite, quartz-cassiterite-tourmaline, and cassiterite-chlorite veins, and tin-bearing aplites and greisens, occur in the marginal zone of the Late Cretaceous Telekai granitic pluton. Ore zone extends north-west along the Chukchi fold structure. Quartz, tourmaline, muscovite, sericite, chlorite, albite, potassium feldspar, and fluorite are the main gangue minerals. Cassiterite is the main ore mineral; occurring as masses and in cross-cutting veinlets. Molybdenite, scheelite, löellingite, arsenopyrite, bismuthinite, and magnetite are present locally in some veins and zones of the ore bodies. Chalcopyrite, pyrrhotite, stannite, galena, sphalerite, wolframite, garnet, beryl, rutile, sphene, xenotime, and monazite are present in minor amounts. Mineralization began with albitization and ended with the development of low-sulfide quartz veins.

Voevodin, 1969

Q60-02	Vodorazdelnoye	Sn	Small. High grade ore.
67°55'N	Eastern Asia-Arctic: Chaun	Cu, Ni, Ag, PGE	
178°51'E		Sn silicate-sulfide vein	

Two types of ores are distinguished: (1) cassiterite-quartz-tourmaline veins in and adjacent to the Early Cretaceous Telekaigranite pluton; (2) disseminated veinlets of tin-nickel-copper mineralization with gold and accessory platinum, palladium and rhodium hosted in sericitized, silicified and tourmalinized injection migmatites which form a subhorizontal sheet-like body between the granite and overlying sedimentary rocks. The first ore body type also includes: chlorite, dolomite, and calcite, with minor pyrite, arsenopyrite, pyrrhotite, sphalerite, galena, stannite, scheelite, molybdenite, bismuthinite, and other minerals. The second type of ore bodies consist mainly of chalcopyrite and less abundant pyrrhotite and cassiterite; associated with the nickel minerals niccolite, gersdorfite, corynite, and hauchecornite. Deposit is probably related to two separate magmatic sources at different depths.

Tsvetkov, and Pospelova, 1986; Tsvetkov, 1990

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q60-03 67°47'N 179°46'E	Mymlerennet Eastern Asia-Arctic: Chaun	Sn W, Bi Sn silicate-sulfide vein	Small.

Deposit consists of elongate stockworks of closely spaced, subparallel quartz veinlets with chlorite and sericite. Ore minerals are arsenopyrite, pyrrhotite, cassiterite, and pyrite; with lesser sphalerite, chalcopyrite, cobaltite, and tetrahedrite-tennantite. Tungsten minerals occur locally. Ore minerals are wolframite, scheelite, bismuthinite, native bismuth, topaz, fluorite, muscovite, and albite. Host rocks are variably contact-metamorphosed, Lower and Upper Triassic clastic rocks which are intruded by the dikes of lamprophyre, granodiorite porphyry, and diorite porphyry. Deposit occurs in a zone made up of thrusts and steeply dipping faults that trend northeast and northwest. The stockworks are oriented northeast.

Borodkin, and Pristavko, 1989

Q60-04 66°35'N 175°31'E	Gora Krassnaya Eastern Asia-Arctic: Koni-Yablon	Mo, Cu, Au Porphyry Cu-Mo	Small.

Consists of zones of disseminated sulfide veinlets and auriferous quartz-carbonate and quartz-epidote-chlorite veins that contain pyrite, pyrrhotite, chalcopyrite, and molybdenite in Upper Cretaceous extrusive volcanic and granitic rocks.

Zakharov and V.P. Vasilenko, written commun., 1977

Q60-05 66°28'N 177°38'E	Valunistoe Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Pb, Zn, Cu Au-Ag epithermal vein	Medium. Ranges 1.4 to 787 g/t Au and 2 to 6273 g/t Ag.

More than one hundred adularia-quartz, adularia-carbonate-quartz, and fluorite-quartz veins are located in zones up to 1.5 km long and 400 m wide. Ore minerals consist mainly of finely disseminated electrum, argentite, aguilarite, stromeyerite, native silver, galena, sphalerite, and chalcopyrite. A gold-argentite association is predominant in veins of the upper portions of the deposit. At depth, gold-argentite is succeeded by a gold-chalcopyrite and gold-galena-sphalerite associations. Ore bodies are confined to Upper Cretaceous volcanic rocks within a volcanic dome structure that occurs at the intersection of northwest and northeast trending faults. Wall rocks are dominated by andesite-dacite and dacite with quartz-adularia-hydromica and propylitic alteration. Quartz veins are lenticular to podiform, commonly occur en echelon, and locally pass into a stockwork of veinlets associated with hydrothermal and subvolcanic breccia. Ar-Ar isotopic studies of adularia in Au-Ag vein yields an age of 72 Ma.

Berman and Trenina, 1968; Berman, 1969; Sidorov, 1978; P.Layer, V.Ivanov, and T.Bundtzen, 1994, written commun.

Q60-06 66°22'N 177°11'E	Shakh, Zhilny Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Au-Ag epithermal vein	Small.

Silicified and sulfidized, auriferous zones, and quartz-polymetallic and low-sulfide adularia-quartz veins several hundreds of meters long. Deposit occurs in Upper Cretaceous propylitized, felsic volcanic rocks and underlying Paleozoic talc-chlorite-sericite, quartz-chlorite-sericite, and epidote-chlorite schists, and marble. Ore minerals are pyrite, chalcopyrite, galena, sphalerite, electrum, and argentite. Mineralized zones are controlled by a large, north-south trending fault.

Zakharov, written commun., 1977

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
Q60-07 65°25'N 174°08'E	Skalistaya Pekulney	Cu Ag Basaltic Cu	Small. Cu about 1-2%.

A network of prehnite-pumpellyite-carbonate veinlets 2-20 cm thick contains disseminated copper. Veinlets consist largely (80-90%) of prehnite and low-iron pumpellyite; secondary minerals include laumontite, calcite, dolomite, chlorite, quartz, epidote, and adularia. Native copper intergrowths 0.5-8 mm in diameter are present in prehnite and pumpellyite masses and in wall rocks. Copper content of the ore is about 1-2%. Native copper contains up to 100 g/t Ag. Ore bodies occur in amygdaloidal basalt and associated tuff in a Upper Jurassic to Lower Cretaceous volcaniclastic sequence that extends over an area of about 1.0 by 0.6 km. Similar occurrences of native copper occur along a belt up to 18 km long.

Shkursky and Matveenko, 1973

R01-01 68°11'N 178°55'W	Tenkergin Chukotka	W, Sn Sn quartz vein	Small.

Consists of steeply dipping, branching quartz veins that contain wolframite, scheelite, and subordinate cassiterite that cut contact-metamorphosed Lower to Middle Triassic sandstone and shale. Quartz veins also contain sericite, clay minerals, tourmaline, and beryl. Minor ore minerals include chalcopyrite, arsenopyrite, and sphalerite.

Lugov, 1986

R01-02 68°04'N 178°19'W	Svetloe Chukotka	Sn, W Sn quartz vein	Medium. Has been mined from 1979 to present.

Deposit consists of en-echelon sets of quartz veins and veinlets grouped in two zones that diverge to the southeast. Each ore zone hosts several tens of veins, which are 0.2-1.5 m thick and several hundreds of meters long; and about one hundred smaller veins. Ores dominated by Sn with abundant sulfides that occur over a buried stock of greisenized granite. Veins are hosted in metamorphosed Triassic sandstone and shale cut by granite porphyry and aplite dikes of the Cretaceous Iultin complex. Successive mineral associations are: (1) topaz-fluorite-muscovite stage (greisen); (2) cassiterite-wolframite-quartz stage with topaz, löellingite, and fluorite (this stage is the most productive); (3) arsenopyrite-quartz stage with cassiterite and native bismuth, (4) stannite-chalcopyrite stage with small amounts of bismuthinite, sphalerite, galena, pyrrhotite, and bornite; (5) scheelite-fluorite-albite stage with chlorite, pyrite, marcasite, and cassiterite; and (6) fluorite-calcite stage with kaolinite. Complex cassiterite-wolframite mineralization predominates in the upper portion of the deposit; and tungsten ores are dominant at depth.

Lugov, 1986; Kuleshov, Pristavko, and Plyashkevich, 1988.

R03-01 68°12'N 163°07'W	Lik Northwestern Brooks Range	Zn, Pb, Ag, Barite Sedimentary exhalative Zn-Pb-barite	25 million tonnes of 8.8% Zn, 3.0% Pb, and 38 g/t Ag

Disseminated and massive sphalerite, galena, pyrite, marcasite, and sparse barite in Mississippian and Pennsylvanian shale, chert, and quartz-exhalite of Kuna Formation. Main deposit in zone about 2,000 m long that extends up to 500 m downdip. Ore zones open along strike to north and south. Sulfide horizon varies from tabular to complexly folded. Long and sinuous zone of complex and brecciated textures, possibly a line of vents, occurs within center of deposit, parallel to strike. Host rocks and deposit extensively structurally imbricated with many subhorizontal thrust faults.

Forrest, 1983; Forrest and others, 1984; Forrest and Sawkins, 1987

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R03-02 68°04'N 162°50'W	Red Dog Northwestern Brooks Range	Zn, Pb, Ag, Ba Sedimentary exhalative Zn-Pb-barite	Main deposit: Reserves of 52.2 million tonnes grading 19.5% Zn, 5.3% Pb, 100 g/t Ag. Aqqaluk deposit: Reserves of 76 million tonnes grading 13.7% Zn, 3.6% Pb, 66 g/t Ag. Hilltop deposit: 14.1 million tonnes grading 10.0% Zn, 2.7% Pb, 41 g/t Ag.

Disseminated and massive sphalerite, galena, pyrite, and barite in Mississippian and Pennsylvanian shale, chert, and silica exhalite of the Kuna Formation. Deposit is 1,600 m long and up to 150 m thick. Occurs near base of formation which is locally subdivided into upper ore-bearing Ikalukrok unit and lower calcareous Kivalina unit of this locality. Latter forms stratigraphic footwall for deposits. Barite-rich lenses up to 50 m thick locally cap deposit. Sulfide minerals occur as disseminated sulfides in organic-rich siliceous shale, coarse-grained sulfide veins, fine-grained fragmental-textured to indistinctly bedded sulfides, and silica exhalite lenses. Minor hydrothermal alteration marked by silicification and decarbonatization of shale. Small propylitically altered dioritic plug or hydrothermally altered pyroxene andesite flow occurs at north end of deposit. Host rocks and deposit are extensively structurally imbricated along many subhorizontal thrust faults. Graywacke of the Cretaceous Okpikruak Formation structurally underlies deposit.

Tailleur, 1970; Plahuta, 1978; Booth, 1983; Joseph T. Plahuta, L.E. Young, J.S. Modene, and David W. Moore, written commun., 1984; Lange and others, 1985; Moore and others, 1986; Schmidt and Zierenberg, 1988; Bundtzen and others, 1996.

R04-01 68°20'N 161°52'W	Avan Kobuk	Cr, PGE Podiform Cr	Grab samples with up to 43% Cr and 0.48 g/t PGE. Estimated 290,000 to 600,000 tonnes chromite

Disseminated fine- to medium-grained chromite in Jurassic or older dunite and harzburgite tectonite, locally serpentinized. Part of dismembered ophiolite. Zones of chromite up to a few meters wide and a few hundred meters long in dunite. Intense minor folding of dunite and harzburgite layers. Host rocks part of the Misheguk igneous sequence. Mafic and ultramafic rocks floored by major thrust fault.

Roeder and Mull, 1978; Degenhart and others, 1978; Zimmerman and Soustek, 1979; Mayfield and others, 1983; Foley and others, 1985; Foley, 1988

R04-02 68°15'N 161°05'W	Misheguk Mountain Kobuk	Cr, PGE Podiform Cr	Grab samples with up to 27.5% Cr and 0.31 g/t PGE. Estimated 110,000 to 320,000 tonnes chromite

Disseminated fine- to medium-grained chromite in Jurassic or older dunite and peridotite tectonite, locally serpentinized. Part of dismembered ophiolite. Zones with chromite up to 31 by 107 m. Intense minor folding of dunite and harzburgite layers.

Roeder and Mull, 1978; Degenhart and others, 1978; Zimmerman and Soustek, 1979; Foley and others, 1985; Foley, 1988

R04-03 68°24'N 159°54'W	Nimiuktuk Northwestern Brooks Range	Barite Bedded barite	About 1.5 million tonnes barite

Massive, nearly pure barite in small isolated hill about 7 to 10 m high, 40 m wide, and 60 m long. Stratigraphic contacts not exposed; nearest units are dark shale and chert of the Mississippian and Pennsylvanian Kuna Formation and shale and graywacke of the Lower Cretaceous Okpikruak Formation. Altered Mississippian(?) andesite crops out about 180 m from barite. Size of deposit determined with gravity survey model.

Mayfield and others, 1979; Barnes and others, 1982

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R04-04 68°34'N 158°41'W	Drenchwater Northwestern Brooks Range	Zn, Pb, Ag Sedimentary Zn-Pb and (or) kuroko massive sulfide	Grab samples with more than 1% Zn, 2% Pb, and 150 g/t Ag

Summary and References

Disseminated and massive sphalerite, galena, pyrite, and barite in Mississippian shale, chert, tuff, and quartz-exhalite of the Kagvik sequence. Volcanic sandstone and keratophyre locally abundant. Sulfides occur as disseminations in chert, disseminations and massive aggregates in quartz-exhalite, and as sparse, remobilized disseminations in sulfide-quartz veins crosscutting cleavage in shale and chert. Locally extensive hydrothermal alteration of chert and shale with extensive replacement by kaolinite, montmorillonite, sericite, prehnite, fluorite, actinolite, chlorite, calcite, and quartz. Deposit up to 1,800 m long and up to 50 m thick. Host rocks and deposit extensively faulted and structurally imbricated with many thrust faults dipping moderately south.

Tailleur and others, 1977; Nokleberg and Winkler, 1982; Lange and others, 1985

R04-05 68°20'N 158°30'W	Siniktanneyak Mountain Kobuk	Cr, Ni, PGE Podiform Cr	Grab samples with up to 21% Cr, 0.2% Ni, 0.07 g/t Pt, and 0.1 g/t Pd.

Disseminated fine-grained chromite in discontinuous layers, pods, and wispy layers in Jurassic or older dunite and peridotite tectonite, locally serpentinized. Intense minor folding of dunite and peridotite layers. Host rocks part of the Misheguk igneous sequence. Mafic and ultramafic rocks floored by major thrust fault.

Jansons and Baggs, 1980; Nelson and Nelson, 1982; Mayfield and others, 1983

R04-06 68°22'N 157°56'W	Story Creek Northwestern Brooks Range	Pb, Zn, Ag, Au Pb-Zn-Au-Ag vein	Grab samples with up to 1.5 to 34% Pb, 1.5 to 50% Zn, 35 to 940 g/t Ag, and 1.2 g/t Au.

Crustified sphalerite and galena in cross-cutting quartz veins in tightly folded and faulted sandstone, siltstone, and shale of the Mississippian Kayak Shale; part of Brooks Range allochthon. Maximum width of float zone about 30 to 40 m. Discontinuous mineralized float and outcrops along a linear trend about 3,000 m long across tightly folded strata, indicating origin by replacement in Late Jurassic or younger time.

Ellersieck and others, 1982; Mayfield and others, 1983; Jeanine M. Schmidt and Inyo F. Ellersieck, written commun., 1985

R04-07 68°14'N 157°51'W	Whoopee Creek Northwestern Brooks Range	Zn, Ag, Au Zn-Ag-Au vein	Grab samples with up to 44% Zn, 458 g/t Ag, and 4.4 g/t Au

Fracture zones contain siltstone breccia with matrix of galena, sphalerite, quartz and minor carbonate occurs in tightly folded and faulted sandstone, siltstone, and shale of the Mississippian Kayak Shale. Fracture zone about 6 m long. Discontinuous float or outcrops along a linear trend with minimum length of 1,500 m across tightly folded strata, indicates replacement origin in Late Jurassic or younger time.

Ellersieck and others, 1982; Inyo F. Ellersieck, written commun., 1985

R06-01 69°18'N 145°15'W	Esotuk Glacier Brooks Range	Pb, Zn, Sn, Cu, W Pb-Zn skarn and fluorite vein	Grab samples with up to 0.03% Sn, 0.15% W

Scattered, minor galena, sphalerite, malachite, cassiterite, and axinite in skarn in Devonian or older marble and calc-schist near periphery of Devonian gneissose granite. Few quartz-tourmaline veins.

Grybeck, 1977; W.P. Brosge, oral commun., 1984; Rainer Newberry, written commun., 1985

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R06-02 68°48'N 146°27'W	Porcupine Lake Brooks Range	Cu, Zn, Ag, F Polymetallic vein(?)	Grab samples with up to 4.8% Cu, 0.6% Zn, and 0.2% Ag

Veins and replacement bodies with tetrahedrite, enargite, and fluorite in a silica gangue. Occur in tuffaceous silicified limestone and minor chert breccia of the Mississippian and Pennsylvanian Lisburne Group, about 80 m below contact with the overlying Sadlerochit Group. Distribution of veins and replacement bodies in breccias is highly variable. Areas of densest veins and most mineralization occur intermittently along strike for nearly 1.6 km, and are up to about 2.4 m thick. Veins crosscut bedding at low angles. About 3 to 5 km to north, strata-bound, disseminated fluorite occurs in veins and replacement bodies for several kilometers along strike. Veins are up to 0.9 m thick and grade from 1 percent up to nearly solid fluorite. The fluorite bodies occur within a few meters of top of the Lisburne Group, near contact with the overlying Sadlerochit Group.

Barker, 1978, 1981

R07-01 69°18'N 143°50'W	Romanzof Mountains Brooks Range	Pb, Cu, Zn, Mo, Sn, Ag, F U Polymetallic vein, Pb-Zn and possibly Sn skarn	Grab samples with up to 0.15% Sn

Numerous scattered mineral occurrences of polymetallic sulfides in Devonian(?) granite, Pb-Zn skarns, and quartz veins. Some fluorite greisen. Skarn and quartz veins occur in Precambrian marble and calc-schist of the Neruokpuk Quartzite at the periphery of the Silurian or Early Devonian Okpilak (granite) batholith. The common types of deposits are: (1) zones of disseminated galena, sphalerite, chalcopyrite and pyrite, locally with Au and Ag, in granite; (2) skarn in marble with disseminated magnetite, pyrite, pyrrhotite, sphalerite, and galena in gangue of carbonate, clinopyroxene, epidote, amphibole, beryl, tourmaline, and fluorite; (3) disseminated galena, sphalerite, chalcopyrite, and (or) molybdenite in quartz veins along sheared contact in granite; and (4) fluorite greisen in granite.

Brosge and Reiser, 1968; Grybeck, 1977; Sable, 1977; W.P. Brosge, oral commun., 1984; Newberry and others, 1986

R07-02 68°23'N 142°11'W	Bear Mountain Brooks Range	Mo, W Porphyry Mo	Grab samples with up to 0.8% Mo and 0.6% W

Molybdenite-wolframite-bearing, Tertiary rhyolite porphyry stock with cylindrical core of intrusive breccia intrudes Devonian and Mississippian sedimentary rocks, and Devonian or older metasedimentary rocks of the Neruokpuk(?) Quartzite. Stock located near perimeter of the early Tertiary granite pluton of Bear Mountain. K-Ar isotopic age possibly reset from Devonian. Local rhyolite porphyry dikes and quartz porphyry and some gossan with molybdenite and galena. Zonal alteration pattern with core of sericitic and argillic alteration and outer zone of silicification. Local halo of pyrite and propylitic alteration along margin of porphyry. Exposed area approximately 1 km in diameter.

Barker and Swainbank, 1986

R07-03 68°23'N 142°02'W	Galena Creek Brooks Range	Cu, Zn, Pb, Ag Polymetallic vein	Grab samples with up to 21% Cu, 3.5% Zn, 1.3% Pb, 170 g/t Ag

Disseminated galena, sphalerite, malachite, and barite in quartz veinlets and replacement bodies in phyllite, siltstone, and greenstone of Neruokpuk(?) Quartzite of Devonian or older age. Area of veinlets and mineralization is about 760 by 1,060 m on ridge west of creek. Vein system on east side of creek up to about 2 m wide and 454 m long. Local alteration of phyllite to chlorite, epidote, and calcite. Local malachite staining in greenstone and many early Tertiary rhyolite dikes locally. Granite pluton and rhyolite breccia to east contain scattered hematite alteration and rare kaolinitization.

Brosge and Reiser, 1968; R.C. Swainbank, in Barker, 1981

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R08-01 68°29'N 136°29'W	Fish River (Big Fish, Boundary, Rapid) Fish River	Fe, P, Mn, Gems Stratabound Fe-P	Large. Resource of greater than 1 billion tonnes grading 40% Fe.

Summary and References

Consists of siderite and phosphatic ironstone that occur in shale within a clastic wedge of upper Lower Cretaceous (Albian) age. Deposits occurs as phosphate-siderite pellets and granules within a matrix of detrital quartz and mudstone. Rare phosphate minerals occur in epigenetic fracture veins and to a lesser degree in vugs, bedding plane partings and fault breccia. Deposit is well known as the type locality of lazulite, the official Yukon gemstone. Deposit age interpreted as Early Cretaceous.

Yukon Minfile, 1988.

R52-01 71°40'N 127°18'E	Manganiler Dzhardzhan River	Pb, Zn Mississippi Pb, Zn Southeast Missouri Pb-Zn	No data.

Consists of a layer of concordant, lenticular galena-sphalerite that occurs in Lower Cambrian dolomite. Sulfide layer ranges from 0.4 to 3.6 m thick and up to 135 m long. Disseminated sulfides replace massive, predominantly sphalerite in the lower part of the layer. Sulfides locally banded. Main ore minerals are sphalerite and lesser galena. Subordinate ore minerals are pyrite, marcasite, and smithsonite.

Natapov, 1981; Davydov and others, 1988.

R52-02 71°27'N 127°20'E	Kyongdei Dzhardzhan River	U Sediment-hosted U	Channel samples contain 0.01 to 11% U.

Consists of an uraninite crust in Upper Proterozoic (Vendian) and Lower Cambrian sandstone and limestone. U concentration increases in sulfides disseminations (pyrite and sphalerite), and in bitumen (kerite) inclusions. Deposit occurs along specific stratigraphic intervales in anticlinal domes as lens-shaped ore bodies which range from 0.3 to 2.3 m thick and from 100 to 400 m long. Length of the uranium-bearing zone is 50 km.

Arsky and others, written commun., 1963.

R52-03 70°20'N 129°33'E	Nikolaevskoe, Otkrytoe Verkhoyansk	Au Au quartz vein	No data.

Consists of conformable and cross-cutting quartz veins with gold, galena, arsenopyrite, pyrite, fahlore, sulfosalts, carbonates, and albite. Veins intrude Early Permian sandstone beds in anticlinal hinges. Veins range up to 1 km long, and 0.2 to 1 m thick, locally up to 10 m thick. Sulfides form about 1 to 2%. No observed wallrock alteration. Quartz-lined vugs occur locally.

Abel and Slezko, 1988.

R52-04 69°04'N 126°46'E	Aga-Kukan Dzhardzhan River	Pb, Zn, Cu Southeast Missouri Pb-Zn and sediment-hosted Cu	Small. Up to 1-3% Cu; 0.15 ppm Au; up to 400 ppm Ag.

Consists of disseminated galena, sphalerite, and chalcopyrite that occurs in a layer in Lower Carboniferous (Tournaisian) limestone. Layer is 40 cm thick; thickness of the hosting limestone member is 20 m. Limestone unconformably overlies cross-bedded green sandstone and red siltstone that contains disseminated malachite, azurite, covellite, chalcopyrite, and Cu- hydrocarbonate films. Cu-bearing sandstone and shale contains up to 3% Cu. Sulfide are gently folded and occur for long distances.

Melnikov and Izrailev, 1975.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R52-05 68°56'N 128°24'E	Anna-Emeskhin Verkhoyansk	Au Au quartz vein	Small. Up to 20 g/t Au; up to 23% As.

Consists of eight quartz-carbonate veins that occur over an area 70 by 100 m. Veins cut a dike of Triassic diabase. Veins range up to 20 m long and up to 2 m thick. Major minerals are arsenopyrite, pyrite, galena, and chalcopyrite. Sulfides comprise 1 to 2% of veins. Diabase exhibits quartz-sericite-chlorite-albite-carbonate metasomatic alteration near veins.

Arsky and others, written commun., 1963; Ivensen and others, 1975.

R52-06 68°42'N 127°46'E	Syugyunyakh-Kende Verkhoyansk	Au Au quartz vein	Small. Average grade of 5-8 g/t Au; locally up to 20 g/t Au; up to 50 g/t Ag.

Description for two separate deposits about 20 km apart. Each deposit consists of a set of sheet-like quartz veins that range up to 0.5 m thick. Major minerals are gold, arsenopyrite, pyrite, chalcopyrite, galena, and sphalerite. Veins intrude Middle Carboniferous argillite and sandstone. Veins occur in anticlinal hinges and do not extend along either strike or dip. Sulfides comprise 1 to 3% of the veins.

Arsky, Borisov, and Lazurkin, written commun., 1963; Ivensen and others, 1975.

R52-07 68°11'N 128°11'E	Enichan-Tolono Verkhoyansk	Au Au quartz vein	Small. Average grade of 10-24 g/t Au.

Consists of a set of thin quartz veins with minor sulfides. Veins occur in zones with contorted outlines. Deposit less than 0.5 m thick and several ten of meters long.

Arsky, Borisov, and Lazurkin, written commun., 1963.

R53-01 70°42'N 134°31'E	Burguat Kular	Au Au quartz vein	Small. Up to 5-8 g/t Au; up to 1% Pb; up to 1% Zn; up to 0.01% Ag.

Consists of lenticular veins and shear zones of quartz and carbonate-quartz that contain gold and scarce sulfides (1 to 2%) including pyrite, galena, sphalerite, and chalcopyrite. Veins strike northeast and dip steeply to southeast or northwest at 50-65°. Veins range from 0.1 to 4 m thick and up to 100 to 200 m long. Major minerals are carbonate, quartz, and sulfides, including pockets and disseminations of pyrite, arsenopyrite, galena, and other minerals. Gold is fine-grained, mostly 0.1 to 0.2 mm, with some to 3 mm. Deposit hosted in Upper Permian and Triassic sandstone and shale.

Ivensen and others, 1975.

R53-02 70°13'N 134°17'E	Dzhuotuk Kular	Au Au quartz vein	Small. Average grade of 0.1-30.0 g/t Au; more than 1% As; up to 1% Pb, Zn; up to 0.1% Bi, Sn; up to 0.01% Ag.

Consists of more than 20 deposits of steeply-dipping shear zones and cross-cutting veins that are hosted in Upper Permian and Lower Triassic clastic rocks. Host rocks altered to silica and sulfide minerals. Individual deposits range up to 1500 m long and from 1 to 30 m thick. Major minerals are quartz, carbonate, arsenopyrite, galena and pyrite, with lesser sphalerite and chalcopyrite. Conformable and cross-cutting arsenopyrite-quartz veins range up to 1.5 m thick and up to 100 m long.

Ivensen and others, 1975.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R53-03 69°58'N 134°41'E	Tirekhtyak district (Nagornoe, Podgornoe, Kular	Sn, W Sn quartz vein	Small. Up to 5% Sn; up to 1% $W0_3$; up to 0.6% Pb; up to 1% As.

Summary and References

Consists of veins of tourmaline-quartz and cassiterite-scheelite-quartz; and cassiterite stringers. Major minerals are beryl, pyrrhotite, arsenopyrite, muscovite, sphalerite, and galena. Veins and stringers range from 0.01 to 1.2 m thick and up to 100 m long. Veins and stringers strike northeast and occur near the contact of the Early Cretaceous Tirekhtyak granite pluton of Early Cretaceous age. Veins and stringers intrude aplite dikes and granites and adjacent Triassic clastic rocks that are contact metamorphosed.

Ivensen and others, 1975.

R53-04 70°05'N 135°32'E	Baidakh Verkhoyansk-Indigirka	Sb Sb-Au vein	Small. Average grade of 39.9-72% Sb.

Consists of a lenticular shear zone that ranges from 0.2 to 0.5 m thick and dips steeply to the southeast at 60°. Shear zone cuts veins with a complex mineralogy. Shear zones and veins contain breccia zones and stringers. Deposit occurs in anticlinal dome formed in Middle Triassic sandstone and shale. Main minerals are stibnite, ankerite, and quartz. Rare minerals are chlorite, pyrite, arsenopyrite, chalcopyrite, cinnabar, galena, sphalerite, calcite, kaolinite, and gold. Shear zones and veins intrude diorite-porphyrite (Lower Cretaceous) and spessartite (Mid-Cretaceous) dikes. Wallrocks altered to graphite, sericite, and chlorite.

Ivensen and others, 1975; Indolev and others, 1980.

R53-05 70°01'N 133°24'E	Solur Kular	Au Granitoid-related Au	Small. Up to 10 g/t Au; 0.03-1% W; 0.07-0.1% Bi; 0.03-0.1% Sn; 0.01-0.3% Cu.

Consists of lenticular quartz and carbonate-quartz veins and shear zones that strike northeast and roughly east-west. Major minerals are arsenopyrite, pyrite, chalcopyrite, galena, wolframite, bismuth, and gold. Deposit hosted in Late Permian clastic rocks in a zone adjacent to an Early Cretaceous granite pluton.

Ivensen and others, 1975.

R53-06 69°48'N 134°45'E	Kyuchyuss Verkhoyansk-Indigirka	Au, Hg, Sb Sb-Au-Hg vein	Large. Average grade of 4.5% As, up to 15% Sb, up to 0.6% Hg, and up to 300 g/t Au. Estimated reserves of 240 tonnes Au.

Consists of steeply-dipping reverse shear zones that range from 0.1 to 1 m thick, and veins that range from 0.1 to 0.5 m thick. Veins and shear zones consist of quartz-stibnite, cinnabar-stibnite-quartz, realgar-quartz and quartz, with varying amounts of ankerite, calcite, kaolinite, dickite, arsenopyrite, pyrite, orpiment, berthierite, sphalerite, galena, bournonite, pyrrhotite, fahlore, mercury (up to 15%), and gold. Ore minerals occur in stringers and disseminations. Veins and shear zones intrude Middle Triassic (Anisian and Ladinian) sandstone and siltstone that are part of a flysch sequence. Shear zones range up to 3 km long and, and based on drill data and data from two adit levels, extends 500 to 550 m deep. Alteration minerals are argillite, hydromica, silica, and graphite.

Ivensen and others, 1975; Indolev and others, 1980; Konyshev and others, 1993.

R53-07 69°44'N 137°00'E	Aragochan Yana-Polousnen	Pb, Zn Polymetallic vein	Small. Average grade of 5.28% Pb; 3.6% Zn.

Consists of seven sheet-like veins. Veins range from 120 to 700 m long and 0.4 to 1.13 m thick. Major minerals are quartz, calcite, siderite, galena, sphalerite, pyrite, and rare cassiterite. Veins hosted in Upper Jurassic sandstone and shale that dip 60-65° N.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R53-08 69°54'N 136°47'E	Sigilyakh Chokurdak	Sn Sn silicate-sulfide vein	Small. Average grade of 1.27% Sn.

Consists of veins that intrude contact metamorphosed Late Jurassic sandstone. Veins range from 55 to 140 m long and 0.05 to 6.8 m thick. Veins strike northwest and dip southwest at 60°. Major minerals are quartz, marcasite, pyrrhotite, chalcopyrite, galena, and sphalerite.

Arsky and others, written commun., 1963.

R53-09 69°48'N 136°40'E	Ulakhan-Sala Yana-Polousnen	Sn Sn silicate-sulfide vein	Small. Average grade of 0.84% Sn.

Consists of four quartz-tourmaline and tourmaline-chlorite-quartz veins that range from 320 to 1400 m long and 0.2 to 3.6 m wide. Major minerals are cassiterite, pyrrhotite, arsenopyrite, sphalerite, chalcopyrite, galena, wolframite, scheelite, and calcite. Veins are brecciated. Sn decreases with depth. Wallrocks altered to silica and sulfides. Veins hosted in Late Jurassic sandstone and shale are display minor contact metamorphism. Host rocks form monocline that strikes from north to east.

Arsky and others, written commun., 1963.

R53-10 69°36'N 133°07'E	Novoe Kular	Au Granitoid-related Au	Small. Average grade of 0.2-6.8% $W0_3$; 0.03-0.16% Sn; 0.5-5% As.

Consists of steeply-dipping, cross-cutting shear zones and lenticular veins in tension gashes. Shear zones strike northeast and dip northwest or southeast at 15-60°. Shear zones commonly several meters thick, locally to 10- to12 m, and up to 1.5 km long. Lenticular veins range from 0.1 to 2 m thick and up to 50 to 100 m long. Major minerals arequartz, wolframite, arsenopyrite, carbonates minerals, cassiterite, and gold. Deposit hosted in Upper Permian sandstone and shale near the dome of the Central-Kular anticline.

Ivensen and others, 1975.

R53-11 68°03'N 135°50'E	Argin Yana-Polousnen	Sn Sn quartz vein	Small. Up to 4.13% Sn.

Consists of a set of thin quartz veins and stringers that range from 1 to 10 cm thick. Major minerals are cassiterite, arsenopyrite, pyrrhotite, galena, wolframite, scheelite, tourmaline, and zinnwaldite. Most veins about 100-120 m long; one vein is 470 m long. Deposit hosted in an Early Cretaceous granite altered to greisen.

Arsky and others, written commun., 1963.

R54-01 71°06'N 141°43'E	Churpunnya Chokurdak	Sn Sn silicate-sulfide vein	Small. Up to 10% Sn.

Consists of shear zones, stringers, and veins with tourmaline and quartz-tourmaline; cassiterite (to 10%), sericite, maracasite, and 1-2% arsenopyrite, bismuth, bismuthine, wolframite, pyrrhotite, chalcopyrite, stannite, valleriite, siderite. Ore zones range from 0.1 to 0.7 m thick, are about one hundred meters long, and are drilled to a depth of 150 to 200 m. Deposit hosted in intensely tourmalinized and silicified rhyolite-dacite volcanic rocks and in a related Early Cretaceous granitoid stock.

Nekrasov and Pokrovsky, 1973; Flerov and Shur, 1986; Kholmogorov, written commun., 1987.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R54-02 70°10'N 140°48'E	Pavel-Chokhchurskoe Chokurdak	Sn Sn polymetallic vein and greisen	Average grade of 0.1-3% Sn; up to 1% As; up to 0.5% Cu; up to 0.1% Bi; up to 0.03% W, Mo, and Be; up to 0.01% In.
Consists of stockworks, linear stringer, and veins that range up to 800 m long, are 1.5-5 m thick, and dip 60-80°. Individual veins and stringers range up to 0.01-10 cm thick. Major minerals arequartz (30-40%), tourmaline, topaz (1-5%), fluorite (to 50%), muscovite, cassiterite, arsenopyrite (to 80%), chalcopyrite (to 5-10%), pyrite, wolframite, and bismuthine. Deposit hosted in contact metamorphosed Late Jurassic sandstone and siltstone, and in Early Cretaceous granite and granite-porphyry dikes and stocks. Deposit associated with greisen alteration. Nekrasov and Pokrovsky, 1973; Prokhorova, Invanov, 1973.			
R54-03 69°55'N 139°19'E	Ukachilkan Chokurdak	Sn Sn polymetallic vein	No data.
Consists of steeply-dipping shear zones and veins that strike about north-south and range up to 1,500 m long and up to 15-20 m thick. Major minerals are quartz, pyrrhotite, sphalerite, galena, calcite, sericite, pyrite, siderite, arsenopyrite, muscovite, marcasite, chalcopyrite, cassiterite, stannite, axinite, tourmaline, chlorite, wolframite, silver, bismuth, and sulfosalts. Deposit has a vertical extent of 350 m. Shear zones and vein occur in an anticlinal dome in contact-metamorphosed Middle to Upper Jurassic and Upper Triassic sandstone and siltstone, and Upper Jurassic and Cretaceous rhyolite and quartz diorite porphyrite dikes. Deposit ooccurs adjacent to an Upper Cretaceous granodiorite stock. Wallrocks altered to silica and sericite Yakovlev, 1975; Flerov and Shur, 1986.			
R54-04 69°49'N 138°30'E	Dalnee Yana-Polousnen	Pb, Zn Polymetallic vein	No data.
Consists of veins ranging from 0.05 to 1.0 m thick, up to 100 to 150 m long. Veins composed of quartz, manganosiderite, and galena veins with sphalerite and fahlore. Veins intrude Late Jurassic sandstone and shale that are contact-metamorphosed by Cretaceous granite stock. Epov and Sonin,written commun., 1964.			
R54-05 69°47'N 142°14'E	Altinskoe Yana-Polousnen	Pb, Zn Polymetallic vein	No data.
Consists of quartz-tourmaline veins that contain galena, sphalerite, pyrite, chalcopyrite, and arsenopyrite. Veins range up to 1 m thick and up to 350 m long. Veins intrude contact metamorphosed Middle Jurassic sandstone and Early Cretaceous granite. Epov and Sonin, written commun., 1964.			
R54-06 69°42'N 142°01'E	Odinokoe Chokurdak	Sn Sn greisen	Average grade of 0.93-3.4% Sn; up to 1% W; up to 0.1% Bi; up to 0.5% As.
Consists of disseminations and stringers. Main minerals are fluorite, topaz, siderophyllite, zinnwaldite, muscovite, quartz, kaolinite, and cassiterite. Ore minerals are bismuth, sphalerite, pyrrhotite, chalcopyrite, molybdenite, pyrite, löllingite, arsenopyrite, siderite, wolframite, galena, stannite, bornite, bismuthine, columbite, monazite, and scheelite. Sn minerals occur both in irregular, sub-equant pods and as thin, elongate, discontinuous layers. Deposit occurs near top of a stock of Cretaceous subvolcanic granite-porphyry that is about 0.4 km^2. Stock intrudes Upper Jurassic sandstone and shale. Deposit extends up to 300 m vertically. Located over the dome of the intrusion dome. Flerov and Shur, 1986; Kholmogorov, 1989.			

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R54-07 69°37'N 141°45'E	Polyarnoe Yana-Polousnen	Sn, W Sn greisen and vein	No data.

Consists of quartz and quartz-topaz veins that dip gently to moderately (5-40°) near within a stock of apogranite at the top of the major Cretaceous Omchikandin leucogranite batholith. Veins range from 0.1 to 3.5 m thick, up to 300 m long, and extend up to 260 m down-dip. Main minerals are quartz, topaz, fluorite, muscovite, zinnwaldite, wolframite, cassiterite, arsenopyrite, molybdenite, tourmaline, sphalerite, galena, pyrite, chalcopyrite, stibnite, bismuth, bismuthine, and bismuth sulfosalts. Deposit associated with quartz-topaz greisen.

Nekrasov, 1962; Epov and Sonin, written commun., 1964; Flerov, 1976.

R54-08 69°15'N 139°58'E	Deputatskoe Chokurdak	Sn Sn polymetallic vein(?)	Large. Average grade of 0.3-0.7 Sn. Up to 10% Sn.

Deposit includes about 150 separate ore bodies that occur in shear zones, veins, and linear stockwork zones. Deposit ranges up to 18 m thick and up to 1400 m long. Minerals are quartz, tourmaline, chlorite, axinite, fluorite, pyrrhotite, cassiterite, chalcopyrite, pyrite, siderite, ankerite, sphalerite, galena, marcasite, wolframite, stannite, franckeite, boulangerite, bismuth, bismuthine, topaz, apatite, scheelite, and sulfosalts. Main ore bodies occur in mineralized zones that are explored to depths of more than 350 m with adits and drillholes. Wallrocks altered to silica, tourmaline, chlorite, and less common greisen and sulfides. Deposit hosted in contact metamorphosed Middle Jurassic shale and in an unexposed granite stock that is penetrated by drilling at 377 m depth. Stock has K-Ar isotopic age of 108 Ma. Pre-deposit coeval and post-deposit dikes of mafic, intermediate, and felsic intrusive rocks are wide-spread. Many polymetallic veins occur in felsic and intermediate dikes.

Flerov, 1976.

R54-09 69°10'N 141°20'E	Djaktardakh Chokurdak	Sn Sn polymetallic vein	No data.

Consists of steeply-dipping veins, stockworks, and shear zones occur over an area of 0.25 km^2. Veins range from 0.2 to 8 m thick, and are up to 750 m long. Minerals are quartz, chlorite, tourmaline, arsenopyrite, pyrrhotite, cassiterite, pyrite, calcite, siderite, fluorite, wolframite, amphibole, and epidote. Deposit occurs in contact metamorhosed Upper Triassic clastic deposits that are intruded by Upper Cretaceous monzonite and lamprophyre dikes and by a stock of Lower Cretaceous granite porphyry. Polymetallic veins controlled by dikes. Deposit extends vertically to at least 180 m. Workings consist of an adit and drill holes.

Epov and Sonin, written commun., 1964; Flerov and Shur, 1986.

R54-10 68°59'N 139°44'E	Takalkan Yana-Polousnen	Sn Sn greisen	Average grade of 0.02-1.0% Sn.

Consists of a stockwork zone that strikes nearly north-south and ranges up to 700 m long and up to 170 m wide. Stockwork includes tourmaline-muscovite-quartz and topaz-muscovite-quartz veins and stringers that range up to 0.55 m thick. Main minerals are fluorite, arsenopyrite, wolframite, cassiterite, beryl. Rare topaz-muscovite-quartz greisen bodies range up to 1.4 m thick. Deposit hosted in Cretaceous leucocratic biotite granite pluton that is intensely altered to greisen.

Nekrasov, 1962; Epov and Sonin, written commun., 1964.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R54-11 68°53'N 140°18'E	Gal-Khaya Selennyakh River	Hg Carbonate-hosted Hg	No data.

Consists of a zone of quartz-carbonate breccia and veins that occurs along the contact of Lower Silurian limestone and calcareous shale. Zone is 600 m long, 60 to 80 m wide, dips 75°, and occurs concordant to host rock bedding. Breccia and veins occur in cylindrical ore shoots, mainly in carbonate breccia cemented with calcite and quartz-calcite. Main ore mineral is cinnabar. Also present are metacinnabarite, galkhaite (Hg, Cu, Zn, Tl) (As, Sb), stibnite, realgar, orpiment, pyrite, chalcopyrite, fluorite, barite, native gold, tennantite, sphalerite, bornite, chalcocite, covellite, malachite, and azurite. Gangue minerals are quartz, calcite, dolomite, barite, dickite, kaolinite, and bitumen (anthraxolite).

Babkin, 1975.

R54-12 68°24'N 141°14'E	Tommot Tommot River	REE, Ta, Nb Carbonatite-related REE (Ta, Nb)	Grab samples contain 0.1-0.2% Y; 0.1-0.5% Zr; 0.01-0.5% Nb.

Deposit occurs in fenite, metasomatic alkalic pegmatite, and aegirine granite that intrude early Paleozoic schist adjacent to a zoned Late Devonian (?) alkalic gabbroid-syenite pluton. Pluton exhibits center-to-periphery zoning: (1) gabbro with pyroxenite lenses; (2) monzonite; (3) sodium syenite; (4) quartz syenite and granite; and (5) fenitized metamorphic shale with metasomatic aegirine granite lenses. Deposit consists of 20 ore bodies, mainly metasomatic veins and lenses that range from several cm to 25 m thick and up to several hundred meters long. Most important elements are Y, Ce, La, Ta, and Nb. Lesser elements are Zr, Tb, U, Be, Hf, Yb, Dy, Tb, Pr, Sm, Eu, Pb, and Zn. Main ore minerals are chevkenite, yttrialite, monazite, and melanocerite-caryocerite group. Less common are yttrotitantite, hydrothorite, pyrochlore, fergusonite, gadolinite, and zircon. Wall rocks metasomatically altered adjacent to dikes. U-Pb isotopic age for syenite of 368 Ma (U-Pb dating) and Ar-Ar isotopic age of 306-293 Ma.

Nekrasov, 1962; L.M. Parfenov and P.W. Layer, written commun., 1994.

R54-13 68°18'N 141°24'E	Khatynnakh-Sala Selennyakh River	Au Au quartz vein	Average grade of 0.2-2 g/t Au.

Consists of 30 veins, lenses, lenticular bodies, and stockworks. Veins generally less than 1 m thick, range from 15 to 20 m long, and less than 30 to 40 m long. Two levels of intensely sulfidized shale, from 0.4-6 m thick and up to 250 m long, also occur in the deposit. Besides pyrite and pyrrhotite, main minerals are arsenopyrite, galena, fahlore, sphalerite, and gold. Gangue minerals constitute 95% of the deposit and include quartz, albite, ankerite, barite, and fluorite. Pyrite is altered to pyrrhotite, and metamorphic actinolite, zoisite, biotite, sphene replace gangue minerals along with recrystallization of quartz. Deposit hosted in anticlinal domes and is controlled by bedding-plane faults. Most of veins and and host rocks are isoclinally folded. Host rocks are Ordovician and Silurian amphibole-mica-carbonate shale and limestone locally metamorphosed to marble. Post-deposit, Late Jurassic to Early Cretaceous diabase and diorite porphyrite dikes intrude deposit. A Late Paleozoic age is interpreted for the deposit and associated metamorphism.

Nekrasov, 1959; Nekrasov, 1962; Epov and others, written commun., 1964.

R54-14 68°12'N 141°26'E	Chistoe Selennyakh River	Pb, Zn Pb-Zn vein	No data.

Consists of a galena vein that occurs in a shear zone in Ordovician limestone that is locally metamorphosed to marble. The vein varies from 10 to 20 m thick and is about ten meters long. Major mineral is galena with lesser also pyrite, sphalerite (cleiophane), chalcopyrite, cerussite, and smithsonite. Oxidized minerals are locally abundant.

N.A. Goryachev, written commun., 1993.

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Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R54-15 68°13'N 139°51'E	Chibagalakh Darpir	B, Sn Sn-B skarn	No data.

Consists of several tens of magnesium skarns that range from 0.2 up to 20 m thick and up to 260 m long. Skarns occur at the contact of an Early Cretaceous granitic pluton that intrudes Ordovician and Silurian dolomite and limestone. Skarn contains B ores, and adjacent limestone altered to skarn and greisen contain Sn ore. Main B minerals are suanite, ludwigite, kotoite, fluorite, magnetite, plagioclase, calcite, spinel, pyroxene, forsterite, phlogopite, clinohumite, talc, and serpentine. Sn skarn minerals are cassiterite, plagioclase, pyroxene, garnet, wollastonite, quartz, scheelite, fluorite, hornblende, epidote, calcite, chlorite, muscovite, axinite, tourmaline, pyrrhotite, arsenopyrite, magnetite, sphalerite, chalcopyrite, löllingite, and valleriite. Most skarns occur as beds, lenses, pockets, shoots, and veins. Skarns occur along contacts between the intrusion and carbonate country rock, in intrusion apophyses, along contacts between various sedimentary rocks, and in large carbonate xenoliths.

Flerov and others, 1974.

R55-01 69°30'N 149°19'E	Tuguchak-1 Yana-Polousnen	Mo Mo quartz vein	Average grade of 0.05-1.2% Mo; 0.1-0.3% As.

Consists of a set of Mo quartz veins that range from 100 to 500 m long and 0.1 to 1.3 m thick. Veins dip gently (20°) south. Veins cut Early Cretaceous granodiorite of the Ulakhan-Tass pluton.

Bakharev and others, 1988.

R55-01 69°30'N 149°19'E	Tuguchak-2 Yana-Polousnen	Au, W, Bi, Te Granitoid-related Au	Up to 10 g/t Au; up to 0.25% Bi; up to 0.08% Te.

Consists of steeply-dipping, cross-cutting quartz veins with tourmaline, muscovite, arsenopyrite, wolframite, bismuth, ikunolite, bismuthine, hedleyite, A and B joseite, and gold (fineness 400-1000). Veins range up to 1 m thick and 100 m long and strike north-south. Au quartz veins cut molybdenite-quartz veins that form Tuguchak-1 deposit. Deposit hosted in Early Cretaceous granodiorite and is associated with beresite alteration of granodiorite.

Bakharev and others, 1988.

R55-02 69°28'N 149°41'E	Arbatskoe Yana-Polousnen	Co Co skarn	Up to 1% Co; up to 0.2% Mo; up to 5% As; up to 0.5% Bi.

Consists of garnet-pyroxene and pyroxene skarn with disseminated and massive sulfoarsenite. Skarn occurs in country rock along the northern contact of the Early Cretaceous Ulakhan-Tass granite pluton, mainly along contacts between marmorized limestone and contact metamorphosed Permian sandstone and shale. Main minerals are arsenopyrite, pyrrhotite, löllingite, cobaltite, glaucodot, gersdorffite, niccolite, pyrite, molybdenite, sphalerite, and galena. Lesser minerals are epidote, hastingsite, and chlorite.

Nekrasov, 1962; Bakharev and others, 1988.

R55-03 69°24'N 149°44'E	Kandidatskoe Yana-Polousnen	Au, Co, As Au skarn	Up to 55 g/t Au; up to 3% Co; up to 20% As; up to 0.5% Bi; up to 3% Zn; up to 0.5%Ni; up to 0.1% Te.

Consists of zones of garnet-pyroxene, pyroxene-wollastonite, pyroxene, and epidote-pyroxene skarn that range up to 100 to 150 m long and up to 50 m thick. Zones occur in a block of Devonian carbonate and Permian clastic rocks that occur between granodiorite of the Lower Cretaceous Ulakhan-Tass pluton and monzonite of the mid-Cretaceous Kandidatsky stock. The main (No. 1) ore body occurs as a steeply-plunging, funnel-shaped pipe of massive and disseminated ore with an outcrop area of 150 m long and up to 20 m wide. Main minerals are arsenopyrite, löllingite, pyrrhotite, molybdenite, glaucodot, cobaltite, gold, bismuth, bismuthine, maldonite, hedleyite, and A and B joseites. Gold is fine-grained (98% less than 0.08 mm), with fineness of 650-1,000. At the adit level (50 m), thickness of the ore body is half of that at surface.

Nekrasov, 1962; Bakharev and others, 1988.

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Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R55-04 69°26'N 144°27'E	Dokhsun Yana-Polousnen	Pb, Zn, Cu Polymetallic vein	No data.

Consists of quartz-sulfide and chlorite-quartz veins that range from 0.15 to 1.4 m thick and up to 650 m long. Main minerals are galena, sphalerite, chalcopyrite, and chalcocite. Veins cut Lower-to-Middle Jurassic sandstone and shale. Sulfides usually comprise less than 5-10% of veins.

Epov and Sonin, written commun., 1964.

R55-05 69°19'N 149°49'E	Kondakovskoe Selennyakh River	Pb, Zn Southeast Missouri Pb-Zn	Up to 0.1% Cd, 0.05-1% Pb, 0.08-1.5% Zn, and 0.01-0.3% Sb.

Consists of broad disseminations and pockets of sulfides in Devonian limestone that is locally metamorphosed to marble. Deposit occurs along the southern contact of the Lower Cretaceous Ulakhan-Siss granodiorite pluton. Deposit forms a layer up to several hundred meters long and consists of galena-sphalerite with lesser common pyrite-tetrahedrite.

Bakharev and others, 1988.

R55-06 69°08'N 149°06'E	Polevaya Chokurdak	Au, Ag Au-Ag polymetallic vein	Up to 10 g/t Au; up to 10 g/t Ag; up 0.020-1% Pb; up 0.050-1% Zn; up 0.005-0.3% Cu; up to 0.5% Sn.

Consists of two thin, subparallel zones of intensely silicified and sericitized granodiorite and quartz diorite. Zones range from 1 to 2 m thick and up to 500 m long. Zones occur along and near the contact of an Early Cretaceous pluton that forms the core of a complex, Late Jurassic to Late Cretaceous volcanoplutonic structure. Major minerals are chalcedony-like cryptocrystalline quartz, calcite, pyrite, galena, sphalerite, chalcopyrite, and gold. Sulfide content about 2-3%.

Nekrasov, 1962; Bakharev and others, 1988.

R56-01 70°05'N 152°28'E	Khomustak Chokurdak	Sn Sn greisen	Up to 1% Sn; up to 0.2% Li; up to 1% As; up to 0.5 Bi.

Occurs in two forms. (1) Quartz-muscovite and topaz-quartz greisen with cassiterite, arsenopyrite, beryl, and fluorite that occur in altered dikes of Late Cretaceous granite. Dikes intrude contact metamorphosed Late Jurassic siltstone, are up to 15 m thick, and up to 100 m long. (2) Zones of siderophyllite-quartz, tourmaline-muscovite-quartz, siderophyllite-fluorite greisen with topaz, arsenopyrite, pyrite and cassiterite that occur in the Late Cretaceous Sredny granite pluton. Zones range from 0.5 to 5 m thick, up to 500 m long, and occur in an area of about 1 km^2. Albite-altered granite with fluorite locally forms 20% of the rock.

Bakharev and others, 1988.

R56-02 69°56'N 153°22'E	Primorskoe Chokurdak	Sn Pb, Zn, As Sn polymetallic vein	Up to 1% Sn; 0.01-5% Pb; 0.01-3% Zn; 0.005-3% As.

Consists of a set of three subparallel zones of quartz-chlorite altered areas and veins containing cassiterite, stannite, galena, sphalerite, chalcopyrite, arsenopyrite, scarce freibergite, canfieldite, muscovite, tourmaline, and fluorite. Zones range from 1-2 m thick and up to 300-500 m long. Deposit hosted in medium-grained, Early Cretaceous biotite granodiorite.

Bakharev and others, 1988.

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R56-03 69°50'N 151°48'E	Balyktaah, Ploskoe Yana-Polousnen	Sn Sn greisen	Up to 1% Sn; up to 1% Pb; up to 0.3% Cu.

Consists of two nearby deposits. Deposits consists of zones of quartz-muscovite and tourmaline-quartz greisen with fluorite, chlorite, cassiterite, galena, chalcopyrite, arsenopyrite, and pyrite. Deposits hosted in the apical portions of a Late Cretaceous granite pluton. Zones range up to 50 m thick and 100-150 m long. Sulfide content ranges up to 5%.

Bakharev and others, 1988.

R56-04 69°43'N 150°15'E	Chistoe Yana-Polousnen	Au W, Bi, Te Granitoid-related Au	Up to 20 g/t Au; up to 0.9% W; up to 0.5% Bi; up to 1% As.

Consists of a set of quartz veins that range from 10 to 50 m long and from 0.1 to 0.5 m thick. Veins occur in two steep-lying northeast-striking shear zones that range up to to 500 m long and are hosted in contact metamorphosed Upper Jurassic sandstone and in Lower Cretaceous granodiorite stocks. Main minerals are muscovite, quartz, tourmaline, arsenopyrite, cobaltite, calcite, wolframite, native bismuth, native gold (fineness 500-1000), bismuthine, joseite (A, B, M, L types), and maldonite. Veins are associated with greisen zones that range up to 1 to 2 m wide.

Bakharev and others, 1988.

R56-05 69°39'N 150°41'E	Verkhne-Naanchan Yana-Polousnen	Pb, Zn Polymetallic vein	Up to 1.5% Pb; up to 1.5% Zn; up to 0.1% Cd; up to 0.005% Sn.

Consists of a set of en-echelon zones of veins in a Lower Cretaceous granitic pluton that displays chlorite and silica alteration. Zones is 2 m thick and range up to about a hundred m long. Zones contain massive sulfide lenses with galena, sphalerite, pyrite, and chalcopyrite that are associated with with aureoles of disseminated sulfides and chlorite alteration.

Bakharev and others, 1988.

R56-06 69°31'N 150°42'E	Yuzhnoe Chokurdak	Pb, Zn Polymetallic vein	Up to 0.1% Pb; up to 1% Zn; 1-7 g/t Ag.

Consists of a shear zone with quartz-carbonate contains galena, pyrite, and limonite. Deposit is hosted in black Devonian limestone, adjacent to the southeast contact of a Late Cretaceous syenite intrusion. Deposit ranges up to 2 m thick and 250 m long.

Bakharev and others, 1988.

R58-01 69°41'N 163°11'E	Ichatkin Eastern Asia-Arctic: Chaun	Sn W, Zn, Pb, Sb Sn silicate-sulfide vein	Small. Low-grade ores.

Metasomatic quartz-tourmaline veins up to 100 m long and 4-5 m thick, and morphologically complex zones up to 40 m wide, contain arsenopyrite, chalcopyrite, sphalerite, pyrrhotite, galena, scheelite, stibnite, magnetite, and cassiterite. Tin mineralization (cassiterite) is not easily recognized in hand specimen. Deposit occurs within the Early Cretaceous Ichatkin granitic body. Alteration includes kaolinization, tourmalinization, and lesser silicification, sulfidization, and greisenization. Quartz-tourmaline veins often grade into quartz-sulfide veins along strike. Deposit not explored below a depth of 50 m.

Zivert, written commun., 1951; Korolev, written commun., 1953

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R58-02 69°19'N 164°04'E	Kanelyveen Eastern Asia-Arctic: Anuyi-Beringovsky	Au As Granitoid-related Au	Medium. Average grade of 4.3 to 19.5 g/t Au.

Quartz and sulfide-quartz veins, stockworks, and mineralized brecciated zones contain gold, pyrite, arsenopyrite, chalcopyrite, and stibnite. Veins, stockworks, and mineralized zones occur in contact-metamorphosed Triassic shales and sandstones in contact with Early Cretaceous diorite intrusions. Gold is commonly disseminated in arsenopyrite. Quartz-sulfide veins with tourmaline, tetradymite, chalcopyrite, molybdenite, proustite (Ag_3AsS_3) and pyrargyrite are less common. Individual veins vary in thickness and strike. Most veins extend for no more than 60 or 70 m, but some are up to 200 m long.

Sadovsky, written commun., 1970

R58-03 68°23'N 167°48'E	Yassnoe Eastern Asia-Arctic: Chaun	Hg Clastic sediment-hosted Hg or hot-spring Hg?	Small. Up to 3% Hg.

Cinnabar occurs in bands and lenses 0.2-0.8 m thick in zones of brecciated, silicified, and kaolinized rocks along a northeast-striking fault. Deposit occurs in sedimentary rocks that include Upper Triassic siltstone and shale and Lower Cretaceous sandstone that are intruded by Early Cretaceous diorite, lamprophyre, and rhyolite stocks and dikes.

Babkin, 1969

R58-04 68°15'N 165°56'E	Ozernoe Chukotka	Au Au quartz vein	Small. Average grade of 19.2 to 48.1 g/t Au.

Consists of steeply-dipping, northwest-trending quartz veins, 0.5-1.5 m thick and from 50 m to 230 m long that contain disseminated gold, arsenopyrite, and galena. Sulfide content of veins is less than 1-2%. Gold (814 fine), occurs as separate inclusions, up to 4 mm in size, and as intergrowths in sulfides. Gold content is rather high. Wallrock alteration includes silicification, carbonatization, and the development of epidote, zoisite, and albite. Veins occur in an Upper Triassic sedimentary sequence intruded by granite bodies and diorite porphyry dikes.

Kopytov and Vyalov, written commun., 1961

R58-05 68°11'N 166°09'E	Karalveem Chukotka	Au W Au quartz vein	Medium. Prospected and developed preparatory to mining.

Consists of numerous longitudinal, transverse, and diagonal, steeply-dipping ladder quartz veins up to several meters thick that occur in Triassic gabbro-diabase sills, especially near their contacts with Triassic sandstone and shale. The sedimentary rocks and sills are strongly contorted into narrow, steep, northwest-trending folds. Gold ore bodies are controlled by strike-slip faults associated with the folding. Host rocks exhibit greenschist facies metamorphism. Silica-carbonate alteration and sulfidization occur adjacent to ore zones. Veins are 95-97% quartz with segregations of arsenopyrite and lenses of scheelite, albite, ankerite, and muscovite. Calcite, dolomite, potassium mica, galena, native gold (780-812 fine), topaz, aquamarine, sphalerite, pyrite, and pyrrhotite are wide-spread. Gold is mainly associated with bluish-gray quartz veinlets in a matrix of coarse-grain quartz and arsenopyrite, in the upper horizons of the deposit. Near the surface, quartz veins often host druse-like intergrowths of large, well-crystallized quartz and isometric gold crystals. Coarse-grained masses of gold, and less common dendritic gold, up to 1 cm in size are characteristic of the deposit. At depth, the gold occurs mainly as fine, dispersed masses in arsenopyrite.

Olshevsky, 1974, 1976, 1984; Davidenko, 1975, 1980; Skalatsky and Yakovlev, 1983

R59-01 69°49'N 171°52'E	Kekur Eastern Asia-Arctic: Chaun	Sn Bi, As, Cu Sn silicate-sulfide vein	Small. Average grade of 0.3 to 2.0% Sn.

Steeply dipping, quartz-tourmaline and quartz-topaz veins contain chlorite, muscovite, fluorite, cassiterite, pyrite, marcasite, arsenopyrite, chalcopyrite, galena, and bismuthinite. Veins vary in thickness and are related to domes of the Severny biotite granite.

Peltsman, written commun., 1988

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R59-02 69°39'N 170°12'E	Valkumei Eastern Asia-Arctic: Chaun	Sn Sn silicate-sulfide vein	Large. Discovered in 1935, mined from 1941 to present. Average grade 0.4-1.2% Sn.

Simple and complex veins, mineralized zones, and less common linear stockworks, occur mainly within the marginal zone of the Late Cretaceous Pevek granite-adamellite-grandiorite pluton, and to a lesser degree in the Cretaceous sandstone and shale which host the pluton. Mineralization occurs in a north-northwest trending zone alone the contact of the pluton. Ore bodies commonly consist of a conjugate system with major north-south veins and feathered veinlets, and a zone of veins with approximately east-west and northwest trends. Seventy minerals are known from the deposit, but the majority of the veins are composed dominantly of tourmaline, with quartz, chlorite, albite, arsenopyrite, cassiterite, pyrrhotite, chalcopyrite, stannite, sphalerite, stibnite, fluorite, and various carbonates. Ore bodies are vertically extensive. Cassiterite-quartz-tourmaline veins are replaced by sulfide veins at depth.

Lugov, Makeev, and Potapova, 1972; Lugov, 1986

R59-03 69°33'N 171°57'E	Pyrkakai Eastern Asia-Arctic: Chaun	Sn, W Au, Ag, Zn, Cu, Pb, Bi, In, Cd Porphyry Sn	Large. Prospected and developed preparatory to mining. Average grade 0.21% Sn.

Deposit is a linear stockwork composed of subparallel, steeply dipping sulfide-quartz veinlets. Three ore zones occur in Upper and Middle Triassic shale and subordinate sandstone. The major ore structures are north-striking fissure zones. Magmatic sequence associated with the veins includes numerous Upper to Lower Cretaceous dikes of quartz syenite, granodiorite and monzonite porphyry, diorite porphyry, and lamprophyre. Tin-bearing stockworks occur along the periphery of a deep-level granitic intrusion (the lower zone of mineralization), and above its apical portion (the upper zone). Mineralized zone is bounded by a steeply dipping contact of the pluton that extends for about 30 km along strike. Deposit has a vertical range of at least 300 m. More than 60 primary and supergene minerals are known. Quartz, muscovite, pyrrhotite, arsenopyrite, pyrite, fluorite, cassiterite, wolframite, sphalerite, and sometimes topaz and albite, are the most common minerals. In altered rocks, quartz, tourmaline, sericite, and chlorite are common. The veinlets contain 6 to 9% sulfides. Gold occurs mainly in arsenopyrite; silver is mainly associated with galena, sphalerite, and pyrite; zinc, copper, lead, indium, cadmium and bismuth also are present. Latest-formed mineralization is similar to epithermal gold-silver deposits associated with volcanic rocks.

Tsvetkov and Epifanov, 1978; Epifanov and Tsvetkov, 1980; Tsvetkov, 1984, 1990

R59-04 69°14'N 172°56'E	Sredne-Ichuveem Chukotka	Au W Au quartz vein	Small. Indiviudal samples contain from 0.2 to 400 g/t Au.

Deposit consists of sulfide-quartz, carbonate-quartz, and quartz veins, and vein-stockwork zones that generally trend north-south, but less commonly east-west. Veins are confined to a dome of a small anticline composed of Upper Triassic shale, siltstone, and sandstone. Mineralization is controlled by an east-west-trending broken zone marked by rhyolite dikes. Gold-bearing veins are confined to shale. About 60 veins and zones of ore bodies occur in an area of approximately 6 km^2. Individual veins are 20 to 100 m long with varying thickness and orientation. Zones with veins and veinlets are up to hundreds of meters long and up to 15 m thick. Sulfides make up 6-10% of the veins and consist mainly of pyrite, arsenopyrite, galena, sphalerite, and chalcopyrite; with minor but wide-spread wolframite and scheelite. Gold (850-950 fine) is disseminated as masses 2 mm up to 1.5 cm in size, and commonly associated with galena. Gold content of the veins is uneven with local high-grade concentrations.

Poznyak, written commun., 1959; Sidorov, 1966; Sosunov, written commun.,1977

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R59-05 69°01'N 172°09'E	Palyan Eastern Asia-Arctic: Chukotka	Hg Clastic sediment-hosted Hg or hot-spring Hg?	Estimated 10,117 t Hg in ore containing 0.53% Hg.

Stockworks and podiform mercury occurrences are in upper Cretaceous sandstone and shale overlying a deeply eroded, volcanic dome; now exposed as a block of volcaniclastic rock with an intrusive core. Mercury mineralization occurred in several stages and deposits formed at the intersections of major north-south and east-west faults. Localization of the ore bodies is greatly influenced by extensive layering in the volcanic rocks, and zones of tectonic disruption and explosive brecciation. More than 30 minerals are characteristic of the veinlets and disseminated ore bodies, including: quartz, dickite, dolomite, siderite, calcite, cinnabar, marcasite, pyrite, galena, sphalerite, native arsenic, realgar, and nickel minerals. Wall-rock alteration has not been identified.

Syromyatnikov, 1972; Babkin, 1975; Syromyatnikov, Dubinin, 1978

R59-06 69°02'N 173°44'E	Maiskoe Eastern Asia-Arctic: Anuyi-Beringovsky	Au, As, Sb, Ag Disseminated Au-sulfide	Medium to large? Proven reserves of 23 million tonnes with average grade 12 g/t Au.

Deposit is associated with linear shear zones that generally trend north-south, have variable strike and dip, and that are marked by distinctive cleavage, fissuring, contortion, and boudinage. Mineralization consists of veinlets and disseminated zones of gold-bearing pyrite and arsenopyrite. Ore zones are confined to the more plastic rocks such as siltstone, and silty shale, and shale in a Middle(?)- and Upper-Triassic flysch sequence. Folding and zones of plastic flowage are discordant to a plicated structure within a horst-like block, which occurs in a large domal uplift. Sedimentary rocks are intruded by dikes of quartz-feldspar porphyry, granite, granosyenite porphyry, Early Cretaceous lamprophyre (kersantite and minette), Late Cretaceous rhyolite, as well as by vein-like bodies of intrusive breccia of Okhotsk-Chukota volcanic-plutonic belt. Magmatic rocks are beresitized and kaolinized. Carbonaceous rocks are metamorphosed to phyllite. There is also weak sericitization, carbonatization, graphitization, and irregular silicification. Ore consists mainly of disseminated high-grade gold in acicular arsenopyrite and arsenic-rich pyrite. A later quartz-stibnite (with native arsenic) stage of mineralization is also widespread within the ore zones. Beyond the ore zones, veins occur mainly in sandstone dikes and consist of molybdenite-quartz and rare metal-polysulfide-quartz ore bodies accompanied by cassiterite, scheelite, wolframite, bismuth minerals, tetrahedrite-tennantite, and lead and silver sulfosalts. Gold mineralization is vertically and areally extensive.

Sidorov and others, 1978; Gavrilov, Novozhilov, and Sidorov, 1986; Olshevsky and Mezentseva, 1986; Sidorov, 1966, 1987; Benevolskyi and others, 1992

R59-07 68°59'N 172°57'E	Gora Sypuchaya Eastern Asia-Arctic: Anuyi-Beringovsky	Au Sb, As Au quartz vein and Au-sulfide disseminated	Medium. Average grade of 1 to 12,356 g/t Au.

Mineralized fractured zones, and zones of contortion and brecciation, contain axial quartz veins in deflections and limbs of small synclines and flexures. Ore bodies are confined to parallel, slight dislocations, which are mainly conformable to the Upper Triassic laminated sandstone hosting the deposit. Veins and zones of veinlets contain gold, pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, tetrahedrite, and lead sulfosalts. Stibnite is associated with disseminated gold-sulfide mineralization which contains gold-bearing pyrite and fine, acicular arsenopyrite in fractured and folded zones. Low and moderate grade deposit.

Sidorov, 1966; Fadeev and others, 1986; Volkov, 1990

R59-08 68°54'N 167°60'E	Kyttamlai Eastern Asia-Arctic: Chukotka	Hg, Sb Clastic sediment-hosted Hg or hot-spring Hg?	Small.

Mineralized zones in brecciated sandstone and sandy shale are confined to faults trending approximately east-west and northwest, which splay off a major northeast trending fault. Deposit occurs in Early Cretaceous clastic sedimentary rocks deformed into northwest-trending folds. Mercury-bearing zone, which is 200 km long and 20-30 m wide, trends northwest. Few magmatic rocks occur in the area. Mercury-bearing zones form parallel chains of ore bodies, several tens of meters apart, up to 50-100 m long and 0.4-0.5 m thick. Cinnabar and stibnite is present in quartz-carbonate, quartz, and carbonate-kaolinite vein material that cements the matrix. Disseminated ores are the most wide-spread; disseminated veinlets and cockade ore are less common.

Babkin, 1975

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R59-09 68°53'N 173°48'E	Promezhutochnoe Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Sb Au-Ag epithermal vein	Small. Grade ranges from traces to 887 g/t Au and up to 10,357 g/t Ag.

Ore bodies consist of: (1) quartz breccia veins with disseminated arsenopyrite, pyrite, marcasite, and silver sulfosalts; (2) quartz veins with segregations of stibnite, silver sulfosalts, and gold; (3) auriferous quartz veins with chalcopyrite, galena, sphalerite; and (4) auriferous stibnite-quartz veins. Individual ore bodies are several hundred meters long and up to 10 m thick. Veins are characterized by brecciated structures with banded quartz coating sedimentary rock clasts. Host rock is shale interbedded with fine-grained sandstone, and occurs on the limb of a broad syncline that is cut by a set of east-west trending, Late Cretaceous trachyandesite and andesite dikes, which are cut by the veins.

Sidorov, 1966, 1978

R59-10 68°34'N 168°34'E	Draznyaschy, Upryamy Eastern Asia-Arctic: Anuyi-Beringovsky	Au As, Pb, Zn Au-Ag epithermal vein	Small. Grade ranges from 15.4 to 164 g/t Au and to 10 g/t Ag.

Discontinuous, ankerite-quartz veins, less than 100 m long, and vein-like breccia bodies cemented by quartz, form an en-echelon mineralized zone that extends for about 500 m. Ore bodies occur adjacent to a sedimentary rock of Upper Jurassic and Lower Cretaceous volcaniclastic and clastic sedimentary rock. Ore bodies are controlled by linear zones of fissuring and deformation that trend both northwest and northeast. Majority of the veins occur domed anticlines. Two productive mineral assemblages: (1) a deeper assemblage with microcrystalline quartz, ankerite, sericite, pyrite, arsenopyrite, sphalerite, galena, bournonite, tetrahedrite-tennantite, and gold; and (2) an upper assemblage marked by finely crystalline crustified quartz, pyrite, stibnite, and gold. In quartz-cemented breccias, Ag dominates over Au.

Zhukov and Pole, 1974

R59-11 68°20'N 168°34'E	Elveney Eastern Asia-Arctic: Anuyi-Beringovsky	Au, As Au sulfide-disseminated	Prospective medium-size deposit with low-grade ores.

Linear mineralized shear zones in Upper Triassic sandstone contain fine-grained, disseminated gold-arsenopyrite mineralization. Tungsten veins and stockworks also occur in the vicinity of the deposit.

Rozenblum and Fadeev, 1990

R59-12 68°08'N 168°51'E	Pelvuntykoinen Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Bi, Te Granitoid-related Au	Small.

Quartz veins containing disseminated pyrite, arsenopyrite, native bismuth, tetradymite, and gold occur in Upper Triassic sedimentary rocks and Lower Cretaceous extrusive volcanic rocks adjacent to a granitic pluton.

Naiborodin, 1966

R60-01 69°33'N 176°02'E	Dvoinoi Chukotka	Au Au quartz vein	No data.

Quartz, carbonate-quartz, and sulfide-quartz veins occur along silicified and sulfidized breccia zones. Veins contain gold, pyrite, chalcopyrite, galena, sphalerite, cassiterite, ilmenite, and magnetite over an area about 30 km by 20 km. Veins generally strike east-west. Most of the ore bodies occur in Devonian sandstone and shale adjacent to the Early Cretaceous Velitekenai granitic pluton. Veins and mineralized fracture zones are confined to structures radiating out from major faults which trend northwest. Gold-bearing mineralized zones are 100 to 150 m wide and up 1 km long. Sulfide content of the veins is less than 1-2% (sulfide poor).

Piankov, written commun., 1981

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R60-02 69°21'N 178°19'E	Ryveem Chukotka	Au Au quartz vein	Small occurrences. Minor prospecting.

Summary and References

Deposit consists of low-sulfide quartz-carbonate veins with disseminated pyrite, arsenopyrite, chalcopyrite, galena, sphalerite, and fine-grained gold in metamorphosed mid-Paleozoic clastic sedimentary and carbonate rocks. Ore bodies are 200-500 m long and range greatly in thickness. Mineralized area is about 1700 km^2, but the extent of mineralization is poorly known.

Pole, written commun., 1977

R60-03 69°08'N 174°05'E	Kukenei Eastern Asia-Arctic: Chaun	Sn, Ag Cu, Pb Sn polymetallic vein	Large. Considerable prospecting.

Tin ore bodies are associated with a Cretaceous epizonal granitic pluton exposed in the middle of an intrusive dome. Host rock is mainly Upper Triassic sandstone with minor shale, intruded by granite porphyry and lamprophyre dikes. Wall rocks are intensely sericitized, tourmalinized, chloritized, and pyritized. Tin occurs mainly in veins, mineralized fractures, and northwest-trending broken zones. Both cassiterite-quartz and cassiterite-sulfide mineral assemblages are present. A cassiterite-sulfide association comprises up to 70-90% of the richest ore bodies and includes arsenopyrite, fine acicular cassiterite, pyrite, marcasite, sphalerite, chalcopyrite, stannite, galena, gold, and sulfosalts of Pb and Ag. Silver occurs as argentite, and also as native metal and as inclusions in most of the sulfides. Near the intrusion, Sn-Ag mineralization changes to predominantly tin mineralization. Sn ore zones coincide with disseminated gold-sulfide minerals. Last stage of mineralization is marked by a stibnite-quartz assemblage.

Sidorov, 1966; Volkov and Dobrotin, 1990; Goncharov and others, 1990.

R60-04 68°58'N 174°03'E	Sopka Rudnaya Eastern Asia-Arctic: Anuyi-Beringovsky	Au, Ag Sb, As Au-Ag epithermal vein	Small. Grade ranges from 8 to 17 g/t Au and 26 to 510 g/t Ag.

Disseminated veinlets of adularia-hydromica-quartz composition contain kaolinite, dolomite and fine-grained, disseminated electrum, miargyrite, pyrargyrite, galena, sphalerite, chalcopyrite and argentite. Chalcedony-quartz veins contain disseminated and intergrowths and aggregates of arsenopyrite, marcasite, stibnite, and rare gold. Laminated and rhythmically-banded vein structures are typical. Ore-bearing area is composed of Lower and Upper Cretaceous felsic volcanic rocks that overlie Upper Triassic sandstone and shale. Volcanic rocks are broken by a set of northwest, and approximately east-west and north-south trending faults which are intruded by Late Cretaceous andesite-basalt hypabyssal plutons. A vertical alteration pattern is reflected in a zone of argillization and kaolinite with lenses of stibnite, that is over-printed by gold-bearing, quartz-adularia-hydromica zones and ore-bearing zones of low-temperature propylitization.

Sidorov, 1966

R60-05 68°49'N 174°49'E	Lunnoe Eastern Asia-Arctic: Chaun	Sn, W As, Zn Sn silicate-sulfide vein	Medium.

Tin-bearing stockworks, mineralized zones, and veins occur in Middle and Upper Triassic, tourmalinized, silicified, sulfidized, sericitized, and chloritized sandstone and siltstone that overlie a buried granitic intrusion. Individual ore bodies, which are several hundred meters long, occur along fissures of diverse attitude. Ore bodies are composed of quartz, albite, tourmaline, chlorite, sericite, muscovite, fluorite, pyrite, arsenopyrite, cassiterite, stannite, galena, sphalerite, chalcopyrite, pyrrhotite, wolframite, and other minerals. Cassiterite-quartz ore bodies are the most important economically, but small amounts of wolframite, chlorite, muscovite, and tourmaline occur widely.

Lugov, 1986

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude Summary and References	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
R60-06 68°46'N 178°53'E	Kuekvun Eastern Asia-Arctic: Chaun	Au, Bi, Te, Sn, W Granitoid-related Au	Small.

Scattered quartz veins, 0.2 to 2.5 m thick and 100 to 800 m long, occur in Triassic gabbro and diabase which intrude carboniferous schist and Triassic shale; adjacent to an intermediate granitic intrusion. Veins contain tourmaline, sericite, albite, carbonates, arsenopyrite, pyrite, pyrrhotite, chalcopyrite, galena, sphalerite, tetrahedrite, cassiterite, scheelite, native bismuth, and tellurides of bismuth, gold, and silver.

Gorodinsky, Gulevich, and Nailborodin, written commun., 1977

R60-07 68°44'N 174°23'E	Shurykan Eastern Asia-Arctic: Chaun	Mo, Cu Porphyry Cu-Mo	Small.

Group of ore deposits that consist of stockworks of northeast-trending quartz, quartz-tourmaline, quartz-chlorite, and quartz-fluorite-calcite veinlets, with disseminated molybdenite, chalcopyrite, and pyrite. Ore bodies occur in hydrothermally altered diorite, granodiorite porphyry, and dacite of the Shurykan hypabyssal intrusion that is cut by north-east trending mineralized fractures. Fine-grained disseminated sulfides are also widespread in the quartz-sericite rocks adjacent to the pluton.

Zhuravlev, written commun., 1981

R60-08 68°21'N 177°12'E	Plamennoe Eastern Asia-Arctic: Chukotka	Hg, Sb Volcanic-hosted Hg	Medium. Produced 442 tonnes Hg from high grade ore.

Conformable lenses and pods with cinnabar occur in brecciated, silicified, and sericitized rhyolite which forms a number of extrusive domes along faults. Main ore body is a sheet-like deposit about 40 m wide that extends northwest for about 180 m. Rhyolitic ignimbrite forms the hanging wall and is commonly altered to a quartz-rich rock that obscures the deposits. Ores are massive or in disseminated veinlets in areas of intense alteration. Strong mineralization extends to a depth of at least 30 m, and some mercury ore bodies extend to 100 m in depth. Cinnabar is associated with quartz, chalcedony, stibnite, pyrite, and marcasite. Stibnite dominates locally. Lower Cretaceous volcanic rocks form a dome about 4 by 5 km in size which is intruded by a Late Cretaceous diorite stock and comagmatic hypabyssal bodies and dikes of basalt, andesite, and diorite porphyry. Ore zone about 4 km by 0.5-1 km, and is bounded by a system of steeply dipping faults trending northwest and east-west.

Kopytin, 1972; Babkin, 1975

R60-09 68°06'N 176°30'E	Mramornoe Eastern Asia-Arctic: Chaun	Sn, Ag As, Cu, Pb, Zn Sn polymetallic vein	Medium.

Deposit consists of mineralized zones and stockworks with quartz, chlorite, sericite, tourmaline, and sulfides; and quartz-chlorite veins with disseminated, crystalline, and colloform cassiterite and stannite. Sulfide minerals include pyrite, marcasite, pyrrhotite, sphalerite, galena, chalcopyrite, and sparse arsenopyrite and chalcocite. Silver-sulfide and tetrahedrite-tennantite is wide-spread. Stibnite and cinnabar are present locally. Cassiterite and stannite occur with wolframite, bismuthinite, bismuth, and molybdenite in the rich ores. Ore occurrences are associated with a dome approximately 18 km in diameter composed mainly of Albian and Cenomanian ignimbrites and tuffs. Zones of veins and veinlets are controlled by northeast trending faults, closely associated with Late Cretaceous granite porphyry dikes and stocks. Ore bodies are up to 800 m long.

Rozenblyum, oral commun., 1991

Significant Lode Deposits of Russian Far East, Alaska, and Canadian Cordillera

Deposit No. Latitude Longitude	Deposit Name Metallogenic Belt	Major Metals Minor Metals Deposit Type	Grade and Tonnage
S54-01 72°14'N 140°18'E	Chokurdakh Chokurdak	Sn Sn silicate tourmaline, Sn silicate-sulfide vein	Average grade of 0.1-3.35% Sn; up to 3% As; up to 2% Cu; up to 1% Pb; up to 0.3% Zn.

Consists of shear zones that range up to 1,500 m long and up to 15-20 m thick that strike northeast and dip steeply. Zones contain quartz-tourmaline breccias and veins with cassiterite (to 15%), arsenopyrite, chalcopyrite, pyrite, albite and sericite, siderite, and Ag sulfosalts. Zones contain alternating stringers and breccia. Distances between zones range from a few to 200 m. Deposit occupies 1.5 km^2 area. Zones associated with silica, sericite, and tourmaline alteration. Deposit hosted in Early Cretaceous sedimentary and in Early and Late Cretaceou volcanic rocks, granodiorite, diorite porphyry, and in granite-porphyry dikes.

Sorokov and Voitsekhovsky, written commun., 1961; Prokhorova, Ivanov, 1973; Nekrasov and Pokrovsky, 1973.