Tough Nut (434)

ALTERNATE NAMES		DISTRICT	COUNTY
			Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Conconully East	1:24,000	Oroville	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 34′ 46.84″ N	119° 44′ 55.56″ W	NW¼ sec. 31, 36N, 25E, elev. 3,200 ft	

LOCATION: elev. 3,200 ft

HOST ROCK: NAME	LITHOLOGY	AGE
metamorphic complex of Conconully	schist	pre-Jurassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Conconully pluton	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Cu Zn	galena chalcopyrite sphalerite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	Cretaceous?

PRODUCTION: Production prior to 1901 was valued at $9,000 (Moen, 1973).

TECTONIC SETTING: The Triassic sediments were deposited along an active margin associated with an island arc. The Conconully pluton is a directionless, post-tectonic body that was intruded into a major structural zone (Stoffel, K. L., DGER, 1990, oral commun.).

ORE CONTROLS: The quartz vein is in quartz-mica schist is 3-10 ft wide, strikes N25W, and dips 60SW (Moen, 1973, p. 28).

GEOLOGIC SETTING: The vein is in quartz-mica schist of the metamorphic complex of Conconully near the contact with the Conconully pluton of Cretaceous age (Stoffel, 1990, geol. map).

COMMENTS: The mine was developed by a 50-ft inclined shaft and a 250-ft adit with a 40-ft winze (Moen, 1973, p. 28).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Jones, E. L., Jr., 1917, Reconnaissance of the Conconully and Ruby mining districts, Washington. *In* Contributions to economic geology (short papers and preliminary reports), 1916-Part I, metals and nonmetals except fuels: U.S. Geological Survey Bulletin 640, p. 11-36.

Moen, W. S., 1973, Conconully mining district of Okanogan County, Washington: Washington Division of Mines and Geology Information Circular 49, 42 p.

Rinehart, C. D.; Fox, K. F., Jr., 1976, Bedrock geology of the Conconully Quadrangle, Okanogan County, Washington: U.S. Geological Survey Bulletin 1402, 58 p., 1 pl.

Stoffel, K. L., compiler, 1990, Geologic map of the Oroville 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 90-11, 58 p., 1 pl.

Triune (408)

ALTERNATE NAMES		DISTRICT	COUNTY
Crescent		Wannacut Lake	Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bullfrog Mtn	1:24,000	Oroville	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 53′ 58.15″ N	119° 32′ 21.10″ W	NE¼ sec. 10, 39N, 26E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Spectacle Formation of the Anarchist Group	argillite	Permian
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
Whisky Mountain pluton		Jurassic - Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	pyrite	quartz
Ag	galena	
Pb	chalcopyrite	
Cu	molybdenite	
Mo	free gold	
	malachite	
	azurite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Ore worth more than $300,000 was produced prior to 1938; also produced in 1939 (Huntting, 1956, p. 150).

TECTONIC SETTING: The Spectacle Formation was deposited along an active continental margin.

ORE CONTROLS: At least four quartz veins ranging in width from a stringer to 10 ft occur in argillite a short distance above granite. The granite is sericitized and kaolinized (Huntting, 1956, p. 150).

GEOLOGIC SETTING: The veins are in metasedimentary rocks of the Spectacle Formation above the contact with the Whisky Mountain pluton (Umpleby, 1911, p. 98; Rinehart and Fox, 1972, geol. map).

COMMENTS: Property consisted of a 140-ft shaft with an adit on the lower level together with more than 2,000 ft of drifts (Huntting, 1956, p. 150).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Rinehart, C. D.; Fox, K. F., Jr., 1972, Geology and mineral deposits of the Loomis quadrangle, Okanogan County, Washington: Washington Division of Mines and Geology Bulletin 64, 124 p., 3 pl.

Umpleby, J. B., 1911, Part I. Geology and ore deposits of the Myers Creek mining district; Part II—Geology and ore deposits of the Oroville-Nighthawk mining district: Washington Geological Survey Bulletin 5, 111 p.

Twin Pine (486)

ALTERNATE NAMES		DISTRICT	COUNTY
			Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Armstrong Creek	1:24,000	Omak	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 12′ 30.15″ N	119° 3′ 37.25″ W	secs. 4, 5, and 8, 31N, 30E, elev. 2,550 ft

LOCATION: secs. 4, 5, and 8, 31N, 30E, elev. 2,550 ft

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed metasedimentary and metavolcanic rocks	argillite, greenstone	Late Paleozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
porphyritic granodiorite of Manila Creek	(Paleocene ?)- Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	magnetite	quartz, garnet, epidote, calcite, actinolite, fluorite
Fe	sphalerite	
Cu	chalcopyrite	
Au	scheelite	
Ag	malachite	
	bornite	
	chalcocite	
	azurite	
	molybdenite(?)	
	hematite	

DEPOSIT TYPE	MINERALIZATION AGE
contact metamorphic vein	

PRODUCTION: Reported to have produced, but the amount is unknown (Huntting, 1956, p. 366).

TECTONIC SETTING: Late Paleozoic sediments were deposited along an active continental margin.

ORE CONTROLS: Sedimentary rocks in a roof pendant are mineralized. Huntting (1956, p. 366) suggests that the prospect is a promising zinc deposit.

GEOLOGIC SETTING: Argillite and greenstone of probable Late Paleozoic age are intruded by dikes of the porphyritic granodiorite of Manila Creek (Pardee, 1918; Gulick and Korosec, 1990, geol. map).

REFERENCES

Gulick, C. W.; Korosec, M. A., compilers, 1990, Geologic map of the Omak 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 90-12, 52 p., 1 pl.

Holder, R. W.; Holder, G. A. M., 1988, The Colville batholith—Tertiary plutonism in northeast Washington associated with graben and core complex (gneiss dome) formation: Geological Society of America Bulletin, v. 100, no. 12, p. 1971-1980.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Pardee, J. T., 1918, Geology and mineral deposits of the Colville Indian Reservation, Washington: U.S. Geological Survey Bulletin 677, 186 p., 1 pl.

Walker placer (492)

ALTERNATE NAMES		DISTRICT	COUNTY
		Myers Creek	Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chesaw	1:24,000	Oroville	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 58′ 7.98″ N	119° 6′ 52.16″ W	secs. 13 and 14, 40N, 29E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	stream gravels

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced an unknown amount of gold in 1930 (Huntting, 1956, p. 189).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

War Eagle (409)

ALTERNATE NAMES		DISTRICT	COUNTY
			Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Loomis	1:24,000	Oroville	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 50′ 5.08″ N	119° 37′ 44.09″ W	SE¼ sec. 36, 39N, 25E

LOCATION: on Palmer Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Palmer Mountain Greenstone	meta-andesite, metagabbro	Permian - Triassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold chalcopyrite?	quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced ore worth $150,000 prior to 1902 (Rinehart and Fox, 1972, p. 107).

TECTONIC SETTING: The Palmer Mountain Greenstone was deposited proximal to an island arc in a convergent continental margin.

ORE CONTROLS: Mineralization is in a 5-ft-wide quartz vein (Huntting, 1956, p. 150).

GEOLOGIC SETTING: The vein is in the Permian-Triassic Palmer Mountain Greenstone

COMMENTS: Development consists of a 100-ft adit and two 70-ft drifts (Rinehart and Fox, 1972, p. 107).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Rinehart, C. D.; Fox, K. F., Jr., 1972, Geology and mineral deposits of the Loomis quadrangle, Okanogan County, Washington: Washington Division of Mines and Geology Bulletin 64, 124 p., 3 pl.

Western Star (373)

ALTERNATE NAMES		DISTRICT	COUNTY
		Myers Creek	Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Buckhorn Mountain	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 57′ 20.29″ N	118° 58′ 56.95″ W	NW¼ sec. 24, 40N, 30E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed metamorphic rocks	hornfels, calc-silicate, quartzite	Permian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Buckhorn Mountain pluton	Jurassic - Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	garnet, epidote
Au	malachite	
Ag	pyrite	
	magnetite	

DEPOSIT TYPE	MINERALIZATION AGE
contact metamorphic	

PRODUCTION: In 1914-15 several carloads were shipped containing 8-10% Cu and several dollars per ton in Au and Ag (Huntting, 1956, p. 72).

TECTONIC SETTING: The Buckhorn Mountain pluton was probably emplaced in a magmatic arc.

ORE CONTROLS: Within the garnet-epidote-magnetite zone of the contact metamorphic deposit on Buckhorn Mountain (Moen, 1980, p. 54).

GEOLOGIC SETTING: Near the contact of Permian metasedimentary rocks and the Jurassic-Cretaceous biotite-hornblende Buckhorn Mountain pluton.

COMMENTS: Many prospect pits, open cuts, shafts, and adits were driven. This property is part of the Buckhorn Mountain project drilled by Crown Resources Corp. in 1989-90.

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Handy, F. M., 1916, An investigation of the mineral deposits of northern Okanogan County: State College of Washington Department of Geology Bulletin 100, 27 p.

Moen, W. S., 1980, Myers Creek and Wauconda mining districts of northeastern Okanogan County, Washington: Washington Division of Geology and Earth Resources Bulletin 73, 96 p., 6 pl.

Wheeler (427)

ALTERNATE NAMES	DISTRICT	COUNTY
Mineral Hill Frankie Boy Consolidated Columbia Washington Consolidated Seven Devils	Conconully Mineral Hill area	Okanogan

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Conconully West	1:24,000	Oroville	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 33′ 45.79″ N	119° 47′ 13.14″ W	near center sec. 2, 35N, 24E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Conconully pluton	granodiorite, quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Au Cu Mo	galena chalcopyrite tetrahedrite molybdenite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
shear zone vein	

PRODUCTION: Claims were staked in 1886, and some were patented in 1896. Small shipments of high-grade silver ore were made, but ore was found to be only of milling grade, and it could not be profitably shipped to smelters without milling. In 1937 a 20-ton/day flotation mill was built near the portal of the Columbia adit, and during 1938 and 1938 small amounts of lead-silver concentrates were produced (Moen, 1973, p. 22).

TECTONIC SETTING: The Conconully pluton is a directionless, post-tectonic pluton that was intruded into a major structural zone (Stoffel, K. L., DGER, 1990, oral commun.).

ORE CONTROLS: The 6 in.-3-ft thick vein strikes N10E and dips 60E. In parts of the vein, the ore minerals are concentrated in ore shoots as much as 1 ft wide that parallel the walls of the vein. The wallrock adjacent to the vein has been hydrothermally altered and subjected to post-mineralization shearing. The Frankie Boy vein is reported to be the richest vein. It strikes N35E, dips 60NW, and contains scattered grains and small lenses of sulfide minerals; the wall rock contains abundant sericite (Moen, 1973, p. 22).

GEOLOGIC SETTING: Several veins cut the biotite- and hornblende-bearing Conconully pluton of Cretaceous age (Stoffel, 1990).

COMMENTS: Underground workings consist of almost 3,000 ft of drifts, crosscuts, and shafts. The main adit follows the Columbia vein for 1,200 ft. Parts of the Frankie Boy vein were reported to contain as much as several hundred dollars per ton in Ag, Pb, and Au (Moen, 1973, p. 2).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Jones, E. L., Jr., 1917, Reconnaissance of the Conconully and Ruby mining districts, Washington. *In* Contributions to economic geology (short papers and preliminary reports), 1916-Part I, metals and nonmetals except fuels: U.S. Geological Survey Bulletin 640, p. 11-36.

Moen, W. S., 1973, Conconully mining district of Okanogan County, Washington: Washington Division of Mines and Geology Information Circular 49, 42 p.

Stoffel, K. L., compiler, 1990, Geologic map of the Oroville 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 90-11, 58 p., 1 pl.

Washington Division of Mines and Geology, 1971, Directory of Washington mining operations, 1969-70: Washington Division of Mines and Geology Information Circular 46, 88 p.

Whitestone (410)

ALTERNATE NAMES		DISTRICT	COUNTY
		Wauconda	Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt Bonaparte	1:24,000	Oroville	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 13.13″ N	119° 1′ 25.08″ W	N½ sec. 27, 39N, 30E

LOCATION: on the south slope of Strawberry Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Spectacle Formation of the Anarchist Group	phyllite, limestone	Permian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	galena	
Ag	sphalerite	
Pb	tetrahedrite	
Zn		
Sb		

DEPOSIT TYPE	MINERALIZATION AGE
disseminated stockworks	

PRODUCTION: Produced intermittently between 1918 and 1938 (Huntting, 1956, p. 150).

TECTONIC SETTING: Late Paleozoic sediments were deposited along an active continental margin.

ORE CONTROLS: Limestone beds with shallow dips are mineralized on their tops and bottoms; mineralized stringers also cut the beds (Huntting, 1956, p. 150).

GEOLOGIC SETTING: Ore is found in phyllite and limestone of the Spectacle Formation of the Permian Anarchist Group; rock locally grades into staurolite-garnet schist (Fox, 1978)

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Moen, W. S., 1980, Myers Creek and Wauconda mining districts of northeastern Okanogan County, Washington: Washington Division of Geology and Earth Resources Bulletin 73, 96 p., 6 pl.

Washington Division of Mines and Mining, 1941, Directory of Washington metallic mining properties: Washington Division of Mines and Mining Information Circular 7, 74 p.

Wolframite (484)

ALTERNATE NAMES	DISTRICT	COUNTY
Hatfield Ferris R. Ford Border Lord Boundary Group Wolframite Mountain	Gold Hill Mining	Okanogan

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Remmel Mtn	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 58′ 37.23″ N	120° 7′ 54.83″ W	SE¼ sec.7, S½ sec. 8, and SE¼ sec. 18 40N, 22E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Cathedral batholith	quartz monzonite	Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
basalt dikes near Cathedral Creek	Late Cretaceous - Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	wolframite	pyrite, quartz
Zn	scheelite	
Ag	sphalerite	
Cu	galenobismuthinite	
Bi		
Pb		

DEPOSIT TYPE	MINERALIZATION AGE
veins stockwork?	

PRODUCTION: Six carloads of handpicked ore were shipped in 1920. Thirty tons were shipped in 1936, and 1 ton of concentrate was shipped in 1942 (Huntting, 1956,p. 346).

TECTONIC SETTING: Quartz monzonite of Cretaceous age was emplaced as part of a magmatic arc.

ORE CONTROLS: Joint sets in the quartz monzonite trend northeast and dip 10-15NW. The ore at the mine appears to be in a zone of veins that parallel the joint set. The veins range from a fraction of an inch to as much as 2 ft wide, but are commonly between 5 and 10 in. in width. Wolframite makes up as much as 5% of the vein. Considerable silicification occurred on both sides of the vein, but it is more intense on the hanging wall (Culver and Broughton, 1945, p. 36-41).

GEOLOGIC SETTING: The veins are in quartz monzonite of the Cathedral batholith; basaltic dikes cut the batholith (Stoffel and McGroder, 1990, geol. map).

COMMENTS: The property is developed by eleven open cuts and by nine adits with a total of about 1,700 ft of drifts and crosscuts (Huntting, 1956).

REFERENCES

Culver, H. E.; Broughton, W. A., 1945, Tungsten resources of Washington: Washington Division of Geology Bulletin 34, 89 p., 23 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Staatz, M. H.; Weis, P. L.; Tabor, R. W.; Robertson, J. F.; Van Noy, R. M.; Pattee, E. C.; Holt, D. C., 1971, Mineral resources of the Pasayten Wilderness Area, Washington: U.S. Geological Survey Bulletin 1325, 255 p., 3 pl.

Stoffel, K. L.; McGroder, M. F., compilers, 1990, Geologic map of the Robinson Mtn. 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 90-5, 39 p., 1 pl.

Wyandotte (411)

ALTERNATE NAMES		DISTRICT	COUNTY
		Nighthawk	Okanogan
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Nighthawk	1:24,000	Oroville	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 56′ 54.89″ N	119° 40′ 24.90″ W	SE¼ sec. 22, 40N, 25E	

LOCATION: location is from primary quadrangle; Huntting (1956, p. 151) places it is SW¼ sec. 15 on the south side of Gilbert Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Kobau Formation	greenstone, quartzite (metachert)	Permian or Triassic (?)
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
Similkameen composite pluton		Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	quartz, graphite (?)
Ag	pyrite	

DEPOSIT TYPE

contact metamorphic?
vein

MINERALIZATION AGE

PRODUCTION: A few tons of ore were crushed in an arrastre, and one ton was shipped; realized $50 above freight and treatment charges. The ore came from near the summit of the mountain; most of the development work was done farther down the mountain (Hodges, 1897).

TECTONIC SETTING: The Kobau Formation was deposited along an active continental margin proximal to an island arc.

ORE CONTROLS: "The first ledge struck was iron pyrites between walls of porphyry and crystallized slate, running 40 degrees east of north" (Hodges, 1897, p. 102) and nearly vertical. A vein higher on the mountain was 2 ft wide and dips 45SE (Hodges, 1897).

GEOLOGIC SETTING: The deposit is at the contact(?) of the Jurassic Similkameen composite pluton and greenstone and schist of the Kobau Formation (Rinehart and Fox, 1972, geol. map).

REFERENCES

Hodges, L. K., 1897, Mining in the Pacific Northwest: Seattle Post Intelligencer, 116 p. [Facsimile reprinted 1967 in two volumes, Mining in eastern and central Washington, and, Mining in western Washington: Shorey Book Store, Seattle, Washington.]

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Rinehart, C. D.; Fox, K. F., Jr., 1972, Geology and mineral deposits of the Loomis quadrangle, Okanogan County, Washington: Washington Division of Mines and Geology Bulletin 64, 124 p., 3 pl.

Yakima (374)

ALTERNATE NAMES		DISTRICT	COUNTY
		Myers Creek	Okanogan

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chesaw	1:24,000	Oroville	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 57′ 14.19″ N	119° 3′ 5.74″ W	NW¼ sec. 21, 40N, 30E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Kobau Formation	greenstone, metadiorite	Permian or Triassic (?)
unnamed serpentinite	serpentine	Permian or Triassic (?)

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite
Au	galena	
Ag	sphalerite	
Pb		
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	
disseminated	

PRODUCTION: An unknown amount of ore was produced in 1908 (Moen, 1980, p. 41).

TECTONIC SETTING: The Kobau Formation was deposited in an island arc setting along a convergent continental margin.

ORE CONTROLS: Sulfides disseminated and in veins a few inches to 6 ft wide in serpentine. In a few places, sulfides form solid bands in a few places that strike east and dip 25S (Landes and others, 1902, p. 27).

GEOLOGIC SETTING: Mineralization is in the Permian or Triassic (?) Kobau Formation and in serpentinite in rocks that crosscut the Kobau Formation. The intrusive rock has a composition similar to that of the greenstones in the Kobau, suggesting that they were derived from the same magma (Stoffel, 1990, p. 35).

COMMENTS: Development on the property consists of one adit and several shafts.

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Landes, Henry; Thyng, W. S.; Lyon, D. A.; Roberts, Milnor, 1902, Annual report for 1901, in six parts; Part II-The metalliferous resources of Washington, except iron: Washington Geological Survey, 123 p.

Moen, W. S., 1980, Myers Creek and Wauconda mining districts of northeastern Okanogan County, Washington: Washington Division of Geology and Earth Resources Bulletin 73, 96 p., 6 pl.

Stoffel, K. L., compiler, 1990, Geologic map of the Oroville 1:100,000 quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 90-11, 58 p., 1 pl.

Metaline district (1)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline Falls	1:24,000	Colville	Sandpoint
Metaline	1:24,000		
Boundary Dam	1:24,000		
Abercrombie Mtn.	1:24,000		

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE

LOCATION: near the town of Metaline Falls

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granitic rocks	Jurassic - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	pyrite, siderite, dolomite,
Zn	sphalerite	calcite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Numerous mines from the district have produced lead and zinc.

TECTONIC SETTING: Shallow-water marine sandstone, carbonate, and shale (miogeoclinal rocks) host different types of ore deposits in northeastern Washington. The most productive deposits are Mississippi Valley-type deposits and are found in the Middle Cambrian to Middle Ordovician Metaline Formation (Park and Cannon, 1943; Dings and Whitebread, 1965; Mills, 1977). Other deposit types are related to voluminous granitic rocks (commonly two-mica granites) of batholithic dimensions, which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988). The sedimentary rocks of the Metaline district are part of the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic miogeoclinal sedimentary rocks (Watkinson and Ellis, 1987).

ORE CONTROLS: Mississippi Valley-type deposits are known from two horizons in the Metaline Formation. The uppermost is called the Josephine horizon and is located near the top 200 or 300 feet of the Metaline Formation. Collapse features are common, and fragments of the overlying Ledbetter Slate are present in the breccia. The second horizon generally contains more pyrite and sphalerite and is called the Yellowhead horizon. It is a breccia collapse horizon in the middle member of the Metaline Formation (Park and Cannon, 1943; Mills, 1977). Some mineralization in the district is post-Mississippi Valley type and is possibly related to development of the Kootenay arc or intrusion of Jurassic to Tertiary granitic rocks (Dings and Whitebread, 1965).

GEOLOGIC SETTING: Mississippi Valley-type mineralization followed development of collapse features at two horizons in the Middle Ordovician to Middle Cambrian Metaline Formation (Mills, 1977; Dings and Whitebread, 1965; Addie, 1970).

REFERENCES

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Bella May (120)

ALTERNATE NAMES	DISTRICT	COUNTY
Blue Bucket Metaline West Contact	Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 50′ 53.32″ N	117° 24′ 16.23″ W	SW¼ sec. 29, 39N, 43E

LOCATION: derived from information on the primary quadrangle map

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag Cd	sphalerite galena uranium mineral	pyrite, marcasite, silicified limestone and dolomite, siderite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced 208,678 tons of ore between 1937 and 1943 (Huntting, 1956, p. 367).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: At least two ore bodies were found in hydrothermally altered Metaline Formation about 150 ft below the Ledbetter Slate-Metaline Formation contact. Uranium occurs as thin coatings (commonly yellow) along fault surfaces. The uranium mineralization apparently is not related to zinc-lead mineralization (Huntting, 1956, p. 366-367).

GEOLOGIC SETTING: Ore at the Bella May and adjacent mines occurs near the upper contact of the Metaline Formation, within about 300 ft of the contact with the Ledbetter Slate (McConnel and Anderson, 1968, p. 1461; Dings and Whitebread, 1965, p. 86-90).

COMMENTS: The Metaline mine was the name given to an adit used to mine the combined ore bodies of the Bella May, Blue Bucket, and West Contact deposits. (See individual entries for each of these deposits.)

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Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

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Blue Bucket (121)

ALTERNATE NAMES	DISTRICT	COUNTY
Kroll Bella May Metaline West Contact	Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metalline	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 50′ 37.57″ N	117° 23′ 53.66″ W	N½ sec. 32, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag	sphalerite galena smithsonite cerussite	calcite, siderite.

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced in 1906, 1907, 1916-1918, 1922-1926, and 1937-1950. Total production was 175,000 tons by 1942. Produced at a rate of 200 tons/day in 1942. The total produced between 1937 and 1943 was 56,131 tons (Huntting, 1956, p. 367).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Ore bodies of various sizes tend to lie along bedding zones, probably within the upper 350 ft of the Metaline Formation, and contain sphalerite and galena associated with silicified dolomite and calcite (Huntting, 1956, p. 367).

GEOLOGIC SETTING: Ore at the Blue Bucket and adjacent mines occurs within the upper 350 ft of the Metaline Formation (McConnel and Anderson, 1968, p. 1461; Dings and Whitebread, 1965, p. 86-90).

COMMENTS: The Metaline mine was the name given to an adit that was used to mine the combined ore bodies of the Bella May, Blue Bucket, and West Contact deposits. (See individual entries for each of these deposits.)

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

McConnel R. H.; Anderson, R. A., 1968, The Metaline district, Washington. *In* Ridge, J. D., ed., Ore deposits of the United States, 1933-1967; the Graton-Sales volume: American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 2, p. 1460-1480.

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Calispell (101)

ALTERNATE NAMES		DISTRICT	COUNTY
		Newport	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Skookum Creek	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 20′ 52.98″ N	117° 10′ 1.84″ W	SE¼NW¼ sec. 19, 33N, 45E

LOCATION: workings enter westward into Cook Mountain (Schroeder, 1952, p. 43)

HOST ROCK: NAME	LITHOLOGY	AGE
Revett Formation	quartzite	Proterozoic
Burke Formation	siltite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Some production reported (Huntting, 1956, p. 73).

TECTONIC SETTING: Voluminous granitic rocks of batholithic dimensions ranging in age from Jurassic to Tertiary intrude Proterozoic through Lower Mesozoic rocks in the region (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization (chalcopyrite) occurs in a quartz vein 4 to 6 ft wide (Huntting, 1956, p. 73).

GEOLOGIC SETTING: The location of the deposit is uncertain. Host rocks at the deposit may be either Revett Formation or Burke Formation of the Belt Supergroup. A north-northwest-trending fault also cuts through the area (Miller, 1974a, geol. map). Rocks at the mine are green quartz-rich sandstone and quartzite (Schroeder, 1952, p. 44).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Miller, F. K., 1974, Preliminary geologic map of the Newport number 1 quadrangle, Pend Oreille County, Washington and Bonner County, Idaho: Washington Division of Geology and Earth Resources Geologic Map GM-7, 1 sheet, scale 1:62,500, with 6 p. text.

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Cliff (122)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 57′ 27.87″ N	117° 21′ 16.47″ W	center, N½ sec. 22, 40N, 43E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag Au	galena sphalerite	silicified dolomite, calcite, jasperoid

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced prior to 1910, in 1923-1924, and in 1944 (848 tons) (Huntting, 1956, p. 367).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Ore occurs in silicified dolomite. The mineralized zone has been exposed for 150 ft on the surface and 112 ft in one adit (Huntting, 1956, p. 367). Sphalerite is irregularly disseminated, and it also occurs in small ore shoots and streaks (Dings and Whitebread, 1965, p. 71).

GEOLOGIC SETTING: The country rock is fine-grained limestone and crystalline dolomite believed to be within the upper 200 ft of the Metaline Formation (Dings and Whitebread, 1965, p. 71).

REFERENCES

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Comstock (108)

ALTERNATE NAMES		DISTRICT	COUNTY
Bead Lake			Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bead Lake	1:24,000	Chewelah	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 16′ .56″ N	117° 5′ 43.43″ W	N½NE¼ sec. 22, 32N, 45E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Purcell Sills	gabbro and diorite	Proterozoic
Prichard Formation	slaty quartzite	Middle Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz, calcite, siderite, barite
Ag	chalcopyrite	
Cu	sphalerite	
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Ore was shipped in 1917, 1922, 1923, 1927, 1929, and 1937 (Huntting, 1956, p. 225).

TECTONIC SETTING: The Purcell Sills are found in the Prichard Formation, the lowest member of the Proterozoic Belt Supergroup (Waggoner, 1990, p. 45-46).

ORE CONTROLS: Zones in diorite, near its contact with quartzite, contain irregularly mineralized quartz veins. Several zones are exposed by the workings (Huntting, 1956, p. 224).

GEOLOGIC SETTING: The mafic host rocks in the lower tunnel are metadiorite sills (Miller, 1974, geol. map) of the Purcell Sills. The upper tunnel is in slaty quartzite of the Prichard Formation (Miller, 1974, geol. map; Jenkins, 1924, p. 43).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Diamond R. (109)

ALTERNATE NAMES		DISTRICT	COUNTY
Diamond R		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 51′ 12.61″ N	117° 25′ 19.36″ W	near center, sec. 30, 39N, 43E	

LOCATION: 1 mi west of the old Bella May workings

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn	galena sphalerite smithsonite cerussite wulfenite	dolomite, coarse calcite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: A carload of ore was shipped in 1918 (Huntting, 1956, p. 225).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Mineralization occurs as small irregular streaks of galena in brecciated dolomitic limestone (Huntting, 1956, p. 225).

GEOLOGIC SETTING: Mineralization occurs at the Josephine horizon, 35 to 150 ft below the contact of the Metaline Formation with the overlying Ledbetter Slate (Dings and Whitebread, 1965, p. 96).

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

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Grandview (123)

ALTERNATE NAMES		DISTRICT	COUNTY
Mohawk		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline Falls	1:24,000	Colville	Sandpoint
Boundary Dam	1:24,000		

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 22.04″ N	117° 21′ 26.16″ W	secs. 14, 15, 22, and 30, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, marcasite, dolomite, coarse calcite, mountain leather (palygorskite), jasperoid, milky quartz
Pb	galena	
Ag	smithsonite	
Cd	cerussite	
	uranium mineral	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced in 1924-1926, 1928-1930, and 1940-1955 (Huntting, 1956, p. 368). Production from the Grandview was 2,347,974 tons through 1956 (Dings and Whitebread, 1956, p. 57). The mine closed in 1964 (data from USGS MRDS, 1990).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Three types of mineralization are recognized in the Mississippi-Valley-type deposits such as the Grandview deposit of northeastern Washington: open space, replacement, and vein-veinlet. Ore bodies are pods and lenses that range from a few feet to a few tens of feet wide and long to masses 100 ft thick, 3,000 ft long and 300 ft wide (Addie, 1970, p. 75). Mineralization occurs as flat-lying, irregular, massive replacements and disseminations of zinc-lead ore in dolomite. Non-commercial uranium mineralization occurs in black carbonaceous seams about 0.1 ft thick, in thin fault gouge zones, and as yellow secondary uranium minerals deposited from descending ground waters (Huntting, 1956, p. 368). Ore at the Grandview consists of irregular bodies of sphalerite and galena within a zone 35 to 150 ft below the upper contact of the Metaline Formation with the Ledbetter Slate. Ore minerals (sphalerite generally dominant) are most commonly in a faintly to strongly brecciated dolomite gangue (Dings and Whitebread, 1965, p. 77).

GEOLOGIC SETTING: Ore at the Grandview and adjacent mines occurs in a carbonaceous and locally siliceous breccia called the Josephine horizon of the Metaline Formation. The horizon occurs within about 35 to 300 ft (McConnel and Anderson, 1968, p. 1461) of the top of the Middle Cambrian to Middle Ordovician Metaline Formation.

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

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McConnel R. H.; Anderson, R. A., 1968, The Metaline district, Washington. *In* Ridge, J. D., ed., Ore deposits of the United States, 1933-1967; the Graton-Sales volume: American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 2, p. 1460-1480.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

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Hanley (124)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 6.81″ N	117° 21′ .87″ W	NE¼ sec. 10, 40N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag	galena sphalerite	dolomite, calcite, jasperoid, quartz

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced two carloads of high-grade lead-silver ore from an open cut in the 1880s (Huntting, 1956, p. 369).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: The deposit occurs in silicified limestone and is traceable for 300 ft on the surface (Huntting, 1956, p. 369).

GEOLOGIC SETTING: The upper contact of the Metaline Formation may lie 300 to 400 ft to the south, beneath till (Dings and Whitebread, 1965, p. 78).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Harvey Bar placer (102)

ALTERNATE NAMES		DISTRICT	COUNTY
			Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 56′ 51.61″ N	117° 19′ 52.85″ W	S½ sec. 23, 40N, 43E.	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Intermittent (Huntting, 1956, p. 189).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Highnoon (135)

ALTERNATE NAMES	DISTRICT	COUNTY
High Noon Highnoon Uranium		Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Timber Mtn.	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 36′ .40″ N	117° 25′ 18.39″ W	SW¼SW¼SE¼ sec. 19, 36N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed two-mica granite	two-mica granite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U Th Be	meta-autunite monazite xenotime thorite thorianite, complex uranium-bearing oxide autunite	beryl, garnet, green mica, limonite

DEPOSIT TYPE	MINERALIZATION AGE
authigenic uranium	Cretaceous

PRODUCTION: Produced 100 tons of ore by 1958 (DGER unpubl. data).

TECTONIC SETTING: Voluminous granitic rocks of batholithic dimensions ranging in age from Jurassic to Tertiary intrude rocks of the Kootenay arc and adjacent terranes in northeastern Washington (Rhodes and Hyndman, 1988).

ORE CONTROLS: Foliated two-mica quartz monzonite and granite cut by abundant pegmatite dikes host ore in a shear zone and its crosscutting fractures. Mineralized fractures are limonized. Some pegmatite dikes in the area contain beryl crystals (DGER unpubl. data).

GEOLOGIC SETTING: The Highnoon deposit is in an unnamed body of Cretaceous two-mica granite (Joseph, 1990, geol. map, p. 45).

REFERENCES

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Rhodes, B. P.; Hyndman, D. W., 1988, Regional metamorphism, structure, and tectonics of northeastern Washington and northern Idaho, IN Ernst, W. G., ed., Metamorphism and crustal evolution of the western United States: Prentice-Hall [Englewood Cliffs, N.J.], Rubey Volume VII, p. 271-295.

Hoage (125)

ALTERNATE NAMES		DISTRICT	COUNTY
Dreadnaught-Emily		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 56′ 57.35″ N	117° 21′ 17.88″ W	center, S½ sec. 22, 40N, 43E	

LOCATION: a few hundred feet northeast of Batay Lake (Upper Lead King Lake)

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, dolomite, coarse calcite
Pb	galena	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Thirty tons of hand-sorted ore was piled at the mine portal in 1945, and 200 tons of lower grade ore was stockpiled in 1951 (Huntting, 1956, p. 369). Dings and Whitebread (1965, p. 78) note about 50 tons of hand-sorted ore was reportedly shipped to the Pend Oreille smelter.

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Ore minerals are disseminated in silicified dolomite. Mineralized outcrops are exposed in several places along a 1,200-ft strike length (Huntting, 1956, p. 369). Sphalerite is more abundant than galena (Dings and Whitebread, 1965, p. 79).

GEOLOGIC SETTING: Mineralization at the Hoage, unlike that at the nearby Lead King deposit, occurs in gray limestone at a considerable distance stratigraphically below the Josephine horizon (Dings and Whitebread, 1965, p. 79).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., ed., Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

Josephine (126)

ALTERNATE NAMES	DISTRICT	COUNTY
Clark Hortense	Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 48.03″ N	117° 22′ 16.00″ W	N½SE¼ sec. 16, 39N, 43E

LOCATION: on the west side of the Pend Oreille River

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, marcasite, calcite, quartz, mountain leather (palygorskite).
Pb	galena	
Ag	cerussite	
Cd	smithsonite, anglesite	
	uranium mineral	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced 40,000 tons of ore valued at $275,000 prior to 1919, 243,000 tons between 1920 and 1935, and also from 1936 through 1955. Production in 1949 was 187,000 tons and in 1951, 273,520 tons (Huntting, 1956, p. 369).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Three types of mineralization are recognized in the Mississippi-Valley-type deposits such as at the Josephine mine of northeastern Washington: open space, replacement, and vein-veinlet (Addie, 1970, p. 75-76). Ore occurs as irregular bodies of sphalerite and galena in a zone 35 to 150 ft below the upper contact of the Metaline Formation. Ore minerals (sphalerite is generally dominant) are most commonly in brecciated dolomite gangue (Dings and Whitebread, 1965, p. 77). The ore is disseminated in silicified dolomite, especially in brecciated zones cemented by calcite. Known ore bodies, are similar in size to those at the Pend Oreille mine and range up to 5,000 ft long, 700 ft wide, and 100 ft thick (Huntting, 1956, p. 371).

GEOLOGIC SETTING: Ore at the Josephine mine and adjacent deposits occurs in a carbonaceous and locally siliceous breccia called the Josephine horizon of the Metaline Formation. The horizon occurs within about 35 to 200 ft of the top of the Middle Cambrian to Middle Ordovician Metaline Formation beneath the Ledbetter Slate (McConnel and Anderson, 1968, p. 1461).

COMMENTS: The Josephine is part of the mining properties of Pend Oreille Mines, and information is sometimes combined for the two deposits. The portal for the Pend Oreille mine is located on the east side of the Pend Oreille River and for the Josephine on the west side of the river.

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

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Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

McConnel R. H.; Anderson, R. A., 1968, The Metaline district, Washington. *In* Ridge, J. D., ed., Ore deposits of the United States, 1933-1967; the Graton-Sales volume: American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 2, p. 1460-1480.

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King Tut (110)

ALTERNATE NAMES		DISTRICT	COUNTY
Velvet Lode		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gypsy Peak	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 21.50″ N	117° 11′ 28.17″ W	secs. 2 and 11, 40N, 44E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	dolomite
Zn	sphalerite	
Ag		

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Some crude lead ore was shipped which yielded 83.4% Pb and 2.3 oz/ton Ag (Huntting, 1956, p. 226).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: The deposit occurs in silicified limestone and has been traced by open cuts for a length of 500 ft and a width of 8 ft (Huntting, 1956, p. 226).

GEOLOGIC SETTING: The King Tut is in dolomite of the Metaline Formation, of which some in the mine area is locally hydrothermally altered, mixed crystalline and bedded dolomite (Dings and Whitebread, 1965, geol. map).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Kootenai Conquest (111)

ALTERNATE NAMES	DISTRICT	COUNTY
Bead Lake Conquest Hoover		Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bead Lake	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 15′ 27.46″ N	117° 5′ 38.11″ W	near center, SE¼ sec. 22, 32N, 45E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Purcell Sills	gabbro and diorite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Cu Ag	galena chalcopyrite	arsenopyrite, pyrite, quartz, sericite, calcite, siderite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Ore was shipped in 1917, 1922, 1923, 1927, 1929, 1930 (32.2 tons), and 1937 (5 tons) (Huntting, 1956, p. 227).

TECTONIC SETTING: The Purcell Sills are found in the Prichard Formation, the lowest member of the Proterozoic Belt Supergroup (Waggoner, 1990, p. 45-46).

ORE CONTROLS: Mineralization occurs in irregular quartz veins and stringers in diorite near its contact with quartzite. One vein is 3 to 9 ft wide (Huntting, 1956, p. 227).

GEOLOGIC SETTING: Host rocks at the Kootenai Conquest are gabbro and metadiorite of the Proterozoic Purcell Sills (Miller, 1974a, geol. map; Schroeder, 1952, p. 46-49).

REFERENCES

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Waggoner, S. Z., compiler, 1990, Geologic map of the Chewelah 1:100,000 quadrangle, Washington-Idaho: Washington Division of Geology and Earth Resources Open File Report 90-14, 63 p., 1 pl.

Lead Hill (127)

ALTERNATE NAMES		DISTRICT	COUNTY
Bunker Hill		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gypsy Peak	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 58′ 12.68″ N	117° 11′ 49.44″ W	secs. 11, 12, 13, 22, 23, 27, and S½NE¼ sec. 14, 40N, 44E

LOCATION: on upper Slate Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz, dolomite, barite, jasperoid
Zn	sphalerite	
Ag	smithsonite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: One small carload of hand-picked galena was shipped in 1937. The mine also milled 1,230 tons of ore in 1951 and 9,570 tons in 1952 (Huntting, 1956, p. 370).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Galena and sphalerite are disseminated in dolomite and jasperoid. Ore zones are horizontal to gently dipping (Huntting, 1956, p. 369).

GEOLOGIC SETTING: The country rock is chiefly Metaline Formation and minor Ledbetter Slate, indicating the mine is near the Metaline-Ledbetter contact. The host dolomite is brecciated (Dings and Whitebread, 1965, p. 81-83).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

James, H. L.; Albers, J. P., 1944, Zinc-lead deposits of the Lead Hill area on Slate Creek, Metaline district, Pend Oreille County, Washington: U.S. Geological Survey Open-File Report, 13 p., 3 maps.

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Lead King (112)

ALTERNATE NAMES		DISTRICT	COUNTY
D. Aldrich			Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 16.27″ N	117° 21′ 13.36″ W	Near center, sec. 27, 40N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn Ag	galena sphalerite	dolomite, calcite, quartz, jasperoid

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Some small shipments were made in 1917-1918 and 1925-1926 (Huntting, 1956, p. 227).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Mineralization occurs in quartz and dolomite breccia, is of low grade, and is confined to the upper 100 ft of the Metaline Formation (Huntting, 1956, p. 227). Ore is irregularly distributed galena and sphalerite associated with jasperoid, dolomite, and calcite in breccia zones (Dings and Whitebread, 1965, p. 84).

GEOLOGIC SETTING: Mineralization is from a zone called the Josephine horizon, 35 to 150 ft below the contact of the Metaline Formation with the overlying Ledbetter Slate. At the Lead King the country rocks are fine-grained gray limestone and large irregular bodies of gray to black crystalline dolomite (Dings and Whitebread, 1965, p. 96).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

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Lead Queen (113)

ALTERNATE NAMES		DISTRICT	COUNTY
Scandinavian		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 58′ 46.38″ N	117° 19′ 37.05″ W	SE¼ sec. 11, 40N, 43E.

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	calcite, quartz
Zn	sphalerite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: The mine has produced (Huntting, 1956, p. 227).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Mineralization occurs in a silicified zone in dolomitic limestone. Churn drill holes 800 ft apart were in mineralization (Huntting, 1956, p. 227). Dings and Whitebread (1965, p. 97) report mineralization consists of sparse galena.

GEOLOGIC SETTING: Most prospecting was done in a zone of dolomite within 150 ft of an overlying gray limestone (Dings and Whitebread, 1965, p. 97).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., ed., Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

Lehigh No. 1 (106)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 2.59″ N	117° 24′ 14.16″ W	NE¼NE¼ sec. 30, 39N, 43E.

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe Pb	limonite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley residual iron cap	Early Paleozoic

PRODUCTION: Produced 800 tons of iron ore prior to 1941 (Huntting, 1956, p. 200).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Oxidation of pyrite bodies (Huntting, 1956, p. 200). The iron oxide was used in the manufacture of cement requiring a low amount of sulfide and aluminum-bearing clays (Park and Cannon, p. 78).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Lehigh No. 2 (107)

ALTERNATE NAMES		DISTRICT	COUNTY
			Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 51′ 31.75″ N	117° 24′ 52.07″ W	W½ sec. 29, 39N, 43E.	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	limonite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley residual iron cap	Early Paleozoic

PRODUCTION: Produced in 1936 and in 1936 (Huntting, 1956, p. 200).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Oxidation of pyrite bodies (Huntting, 1956, p. 200). The iron oxide was used in the manufacture of cement requiring a low amount of sulfide and aluminum-bearing clays (Park and Cannon, p. 78).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Lucky Strike (128)

ALTERNATE NAMES		DISTRICT	COUNTY
Buzzell		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 55′ 49.75″ N	117° 19′ 51.33″ W	NW¼NE¼ sec. 35, 40N, 43E	

LOCATION: on the east side of the Pend Oreille River

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	dolomite, coarse calcite
Pb	galena	
Fe	pyrite	
	smithsonite	
	chalcopyrite	
	limonite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced in 1922 and in 1925 (Huntting, 1956, p. 370).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Mineralization occurs in a breccia zone as much as 4 ft in width. Parts of the zone are nearly solid pyrite. There was probably less than 100 tons of limonite associated with the gossan part of the deposit (Huntting, 1956, p. 370). Mineralization at the Lucky Strike mine occurs in the Yellowhead horizon, about 1,000 ft from the contact of the Metaline Formation with the overlying Ledbetter Slate (Bending, 1983, p. 66). The mineralogy of Yellowhead horizon ore is the same as that of the Josephine; however, the proportions are quite different. In the Yellowhead pyrite is dominant along with galena and subordinate sphalerite. Ore samples indicate sulfide mineralization occurs in the matrix of a dolomite breccia (Morton, 1974, p. 102).

GEOLOGIC SETTING: Mineralization at the Yellowhead mine occurs about 1,000 ft below the contact of the Metaline Formation with the overlying Ledbetter Slate (Bending, 1983, p. 66; Morton, 1974, p. 96-103).

REFERENCES

Bending, D. A. G., 1983, A reconnaissance study of the stratigraphic and structural setting, timing, and geochemistry of mineralization in the Metaline district, northeastern Washington, U.S.A.: University of Toronto Master of Science thesis, 324 p.

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Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

Morton, J. A., 1974, The Yellowhead zinc-lead deposit—Origin, post-depositional history, and comparisons with similar deposits in the Metaline mining district, Washington: Washington State University Master of Science thesis, 159 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

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Metaline (129)

ALTERNATE NAMES	DISTRICT	COUNTY
Bella May Blue Bucket West Contact	Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 50′ 32.68″ N	117° 23′ 23.87″ W	NE¼ sec. 32, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag	sphalerite galena uranium mineral	pyrite , marcasite, silicified limestone, and dolomite.

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced 410,724 tons of ore valued at $2,573,294 in 1938-1947 (Huntting, 1956, p. 370).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Mineralization is in dolomitic limestone (Huntting, 1956, p. 370) and is in the Josephine horizon of the Metaline Formation (Dings and Whitebread, 1965, p. 86-90).

GEOLOGIC SETTING: Ore at the various properties of the Metaline mine occurs in the upper part of the Metaline Formation, within about 200 ft of its contact with the Ledbetter Slate (McConnel and Anderson, 1968, p. 1461; Dings and Whitebread, 1965, p. 86-90).

COMMENTS: The Metaline mine was the name given to an adit for mining the combined ore bodies of the Bella May, Blue Bucket, and West Contact deposits. (See individual entries for each of these deposits.)

REFERENCES

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Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

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Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

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Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., ed., Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

Molybdenite Mountain (119)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Scotchman Lake	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 42′ 35.24″ N	117° 17′ 7.59″ W	sec. 18, 37N, 44E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
granodiorite of Molybdenite Mountain	granodiorite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Mo	molybdenite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced $6,000 of ore prior to 1916 (Huntting, 1956, p. 271).

TECTONIC SETTING: Voluminous granitic rocks of batholithic dimensions ranging in age from Jurassic to Tertiary intrude Proterozoic through lower Mesozoic rocks in the region (Rhodes and Hyndman, 1988).

ORE CONTROLS: A quartz vein 3 ft wide and exposed for a length of 40 ft is sparsely mineralized with molybdenite and pyrite (Huntting, 1956, p. 271).

GEOLOGIC SETTING: The granodiorite of Molybdenite Mountain is a leucocratic, coarse-grained, porphyritic, foliated, muscovite-biotite granodiorite (Joseph, 1990, geol. map and p. 48).

REFERENCES

Colville Engineering Co., 1944?, Report on minerals in Pend Oreille County—Preliminary draft: Pend Oreille County Public Utility District, 75 p., 2 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p. Joseph, N. L., compiler, 1990, Geologic map of the Colville 1:100,000 quadrangle, Washington-Idaho: Washington Division of Geology and Earth Resources Open-File Report 90-13, 78 p., 1 pl.

Rhodes, B. P.; Hyndman, D. W., 1988, Regional metamorphism, structure, and tectonics of northeastern Washington and northern Idaho, IN Ernst, W. G., ed., Metamorphism and crustal evolution of the western United States: Prentice-Hall [Englewood Cliffs, N.J.], Rubey Volume VII, p. 271-295.

Oriole (130)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 36.69″ N	11° 24′ 46.42″ W	SE corner, sec. 19, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Monk Formation	dolomite	Late Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag Cu Au	sphalerite, galena, tetrahedrite, chalcopyrite, azurite, smithsonite, cerussite, bornite	pyrite, malachite, quartz, calcite, dolomite, sericite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1911, 1912, 1925, 1926, (total of 2,000 tons to 1942), and in 1953. Smelter returns on a carload of handpicked ore were 42.1 oz/ton Ag, 21.9% Zn, 15.3% Pb, and 1.12% Cu (Huntting, 1956, p. 371).

TECTONIC SETTING: Miogeoclinal rocks of northeastern Washington occur in the Kootenay arc, a northeast-trending (in Washington) structure containing multiply deformed, Proterozoic and Paleozoic miogeoclinal sedimentary rocks (Watkinson and Ellis, 1987). Voluminous granitic rocks of batholithic dimensions ranging in age from Jurassic to Tertiary intrude rocks of the Kootenay arc and adjacent terranes (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore is localized in a northwest-trending gouge-breccia seam. Ore bodies are a series of elongate-down-dip lenses along the fault plane; they are connected by narrow quartz stringers (Park and Cannon, 1943, p. 77).

GEOLOGIC SETTING: Mineralization occurs in the Proterozoic Monk Formation of the Windermere Group (Burmester and Miller, 1983, geol. map, p. 6).

REFERENCES

Burmester, R. F.; Miller, F. K., 1983, Preliminary geologic map of the Abercrombie Mountain area, Pend Oreille County, Washington: U.S. Geological Survey Open-File Report 83-600, 10 p., 1 pl., scale 1:48,000.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

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Patty, E. N., 1921, The metal mines of Washington: Washington Geological Survey Bulletin 23, 366 p.

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Pend Oreille (131)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 54.12″ N	117° 21′ 35.89″ W	N½ sec. 16, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, marcasite, dolomite, jasperoid, calcite
Pb	galena	
Ag	smithsonite	
Cd	cerussite	
-	uranium mineral	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: The Pend Oreille mine is a collective name for several properties. Production in 1915 was 3,111 tons valued at $8.76 per ton from the Clark property. Produced 123,751 tons of ore in 1948 and 186,955 tons in 1949. Yield from 186,197 tons of ore in 1950 was 9,850,731 lb Zn, 6,336,653 lb Pb, 18,000 oz Ag, and 30,000 lb Cu. Yield from 273,580 tons of ore in 1951 was 12,950,584 lb Zn, 6,045,914 lb Pb, and 16,041 oz Ag. Also produced between 1952 and 1955 (Huntting, 1956, p. 371). Through 1956, the Pend Oreille mine had produced 5,451,328 tons of ore (Dings and Whitebread, 1965, p. 57).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Three types of mineralization are recognized in the Mississippi-Valley-type deposits of northeastern Washington: open space, replacement, and vein-veinlet (Addie, 1970, p. 75-76). Most production was from irregularly shaped bodies of sphalerite and galena in a zone called the Josephine horizon, 35 to 200 ft below the contact of the Metaline Formation with the overlying Ledbetter Slate. Drilling for ore on the Yellowhead horizon began in the late 1960s, and the mine produced from both the Josephine and Yellowhead horizons until it closed in the late 1970s. The focus for re-opening of the mine (1990) is mineralization from the Yellowhead horizon, which is zinc rich and contains more pyrite than Josephine horizon ores. The Yellowhead ores occur about 1,000 ft below the upper contact of the Metaline Formation (Bending, 1983, p. 90-96). Ore minerals (sphalerite generally dominant) are most commonly in brecciated dolomite gangue (Dings and Whitebread, 1965, p. 77). Ore bodies range up to 5,000 ft long, 700 ft wide, and 100 ft thick. Gallium and germanium have been detected spectrographically in ore from the Chickahominy claim. Uranium mineralization is not related to the zinc-lead mineralization. It occurs in a small zone of the Josephine horizon dolomite in black carbonaceous beds 0.05 to 0.2 ft thick and as a "skin" on a fault (Huntting, 1956, p. 371).

GEOLOGIC SETTING: Ore at the Pend Oreille mine and adjacent mines occurs in a carbonaceous and locally siliceous breccia called the Josephine horizon of the Metaline Formation. The horizon lies within about 35 to 200 ft of the top of the Middle Cambrian to Middle Ordovician Metaline Formation beneath the Ledbetter Slate (McConnel and Anderson, 1968, p. 1461).

COMMENTS: The Pend Oreille mine is one of the properties of Pend Oreille Mines. Information for the several deposits is combined into this single mine record. Properties are on the east and west sides of the Pend Oreille River.

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Bending, D. A. G., 1983, A reconnaissance study of the stratigraphic and structural setting, timing, and geochemistry of mineralization in the Metaline district, northeastern Washington, U.S.A.: University of Toronto Master of Science thesis, 324 p.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

McConnel R. H.; Anderson, R. A., 1968, The Metaline district, Washington. *In* Ridge, J. D., ed., Ore deposits of the United States, 1933-1967; the Graton-Sales volume: American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 2, p. 1460-1480.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

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Red Top (114)

ALTERNATE NAMES	DISTRICT	COUNTY
Bailey-Hanson Bailey	Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gypsy Peak	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 52.22″ N	117° 11′ 2.69″ W	secs. 1 and 2, 40N, 44E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn	sphalerite galena smithsonite anglesite	dolomite, quartz, limonite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced 5 tons of crude lead ore (Huntting, 1956, p. 229).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: The deposit is in silicified dolomite and has been exposed in open cuts for 1,500 ft along the strike (Huntting, 1956, p. 229).

GEOLOGIC SETTING: The Red Top is in mixed dolomite probably near the contact with Ledbetter Slate (Dings and Whitebread, 1965, p. 69-70).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

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Ries (115)

ALTERNATE NAMES	DISTRICT	COUNTY
Gold Arrow Eagle Midas Golden Anchor Katydid		Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Newport	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 12′ 30.06″ N	117° 3′ 26.11″ W	N½NW¼ sec. 12, 31N, 45E

LOCATION: on the west bank of the Pend Oreille River

HOST ROCK: NAME	LITHOLOGY	AGE
Purcell Sills	gabbro	Proterozoic
Prichard Formation	quartzite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Ag Au Cu	galena chalcopyrite	pyrite and dull white and white quartz and amethyst

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Reportedly three carloads of ore were shipped (Huntting, 1956, p. 229).

TECTONIC SETTING: The Purcell Sills are found in the Prichard Formation, the lowest member of the Proterozoic Belt Supergroup (Waggoner, 1990, p. 45-46).

ORE CONTROLS: Mineralization occurs in a quartz vein in quartz diorite porphyry near its contact with quartzite. Vein reportedly is 6 ft wide (Huntting, 1956, p. 229).

GEOLOGIC SETTING: Host rocks are diorite of the Purcell Sills near its contact with quartzites of the Prichard Formation (Miller, 1974, geol. map).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Waggoner, S. Z., compiler, 1990, Geologic map of the Chewelah 1:100,000 quadrangle, Washington-Idaho: Washington Division of Geology and Earth Resources Open File Report 90-14, 63 p., 1 pl.

Schierding placer (103)

ALTERNATE NAMES		DISTRICT	COUNTY
			Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 59′ 31.87″ N	117° 20′ 54.18″ W	NE¼NE¼ sec. 10, 40N, 43E.	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1935 (Huntting, 1956, p. 189).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Schultz placer (104)

ALTERNATE NAMES		DISTRICT	COUNTY
			Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 37.70″ N	117° 24′ 39.87″ W	near SE corner, sec. 19, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Reportedly produced about 1900 (Huntting, 1956, p. 189).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Sterling (132)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 50′ 10.44″ N	117° 23′ 29.20″ W	E½ sec. 32, 39N, 43E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	galena	pyrite
Pb	sphalerite	
Ag		
Co?		
Mn?		

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced in 1918 and 1926 (Huntting, 1956, p. 372).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: The mine is located in the Yellowhead horizon (Huntting, 1956, p. 372).

GEOLOGIC SETTING: Mineralization occurs in the Metaline Formation (Dings and Whitebread, 1965, geol. map).

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

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Sullivan (116)

ALTERNATE NAMES		DISTRICT	COUNTY
Josephine		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Abercrombie Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 36.81″ N	117° 22′ 55.48″ W	N½SW¼ sec. 16, 39N, 43E

LOCATION: This is the location of the Sullivan patented claim.

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	pyrite, dolomite, calcite
Zn	sphalerite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Produced in 1926 (Huntting, 1956, p. 230).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Three types of mineralization are recognized in the Mississippi Valley-type deposits of northeastern Washington; open space, replacement, and vein-veinlet (Addie, 1970, p. 75-76). Most production was from irregular bodies of sphalerite and galena. Ore minerals (sphalerite generally dominant) are most commonly in brecciated dolomite gangue (Dings and Whitebread, 1965, p. 77).

GEOLOGIC SETTING: Mineralization is in the Josephine horizon, 50 to 200 ft below the contact of the Metaline Formation with the overlying Ledbetter Slate (Dings and Whitebread, 1965, p. 96).

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

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Sullivan Creek placer (105)

ALTERNATE NAMES		DISTRICT	COUNTY
O'Sullivan Placer			Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline Falls	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 51′ 36.49″ N	117° 21′ 39.01″ W	S½ sec. 22, 39N, 43E.	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Reportedly several hundred thousand dollars (Huntting, 1956, p. 189).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCES

Bethune, G. A., 1891, Mines and minerals of Washington-Annual report of G. A. Bethune, first state geologist: Washington State Printer, 122 p.

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Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Washington (117)

ALTERNATE NAMES	DISTRICT	COUNTY
Washington Rock Gem Davenport-Troyer	Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metaline Falls	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 5.37 N	117° 22′ 26.96 W	NE¼ sec. 21, 39N, 43E

LOCATION: on the west bank of the Pend Oreille River on top of Washington Rock. The Gem is the same or a nearby property and is here included with the Washington deposit.

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	limonite	pyrite, dolomite
Zn	galena	
Ag	sphalerite	
Fe		

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley residual iron cap	Early Paleozoic

PRODUCTION: Some production of lead-silver-zinc ore. Limonite was mined by the Lehigh Portland Cement Co. for use in the manufacture of portland cement in 1936 (Huntting, 1956, p. 230).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Said to be a body of solid pyrite mixed with galena. Ore occurs in dolomite of the Josephine horizon along a fracture zone between two faults. Limonite formed by oxidation of pyrite (Huntting, 1956, p. 230).

GEOLOGIC SETTING: Mineralization is from a zone called the Josephine horizon, 50 to 200 ft below the contact of the Metaline Formation with the overlying Ledbetter Slate (Dings and Whitebread, 1965, p. 96).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

West Contact (134)

ALTERNATE NAMES	DISTRICT	COUNTY
Blue Bucket Bella May Metaline	Metaline	Pend Oreille

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Metalline	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 7.91″ N	117° 24′ 56.81″ W	E½ sec. 30, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag	sphalerite galena smithsonite cerussite	calcite, siderite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Production included with that of the Metaline mine.

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Ore bodies lie along bedding zones near the upper contact of the Metaline Formation. Mineralization consists of sphalerite and galena associated with silicified dolomite and calcite (Dings and Whitebread, 1965, p. 86-90).

GEOLOGIC SETTING: Ore at the West Contact and adjacent Bella May and Blue Bucket mines occurs near the contact of the Metaline Formation with the overlying Ledbetter Slate (McConnel and Anderson, 1968, p. 1461; Dings and Whitebread, 1965, p. 86-90).

COMMENTS: The Metaline mine was the name given to an adit that was used to mine the combined ore bodies of the Bella May, Blue Bucket, and West Contact deposits. (See individual entries for each of these deposits.)

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

McConnel R. H.; Anderson, R. A., 1968, The Metaline district, Washington. *In* Ridge, J. D., ed., Ore deposits of the United States, 1933-1967; the Graton-Sales volume: American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 2, p. 1460-1480.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., ed., Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

Yellowhead (133)

ALTERNATE NAMES		DISTRICT	COUNTY
		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 59.97″ N	117° 22′ 14.32″ W	NE¼ sec. 16, 39N, 43E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, dolomite, calcite, quartz, talc, palygorskite
Pb	galena	
Ag	cerussite	
	smithsonite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	Early Paleozoic

PRODUCTION: Prior to 1956 production totaled about 12,000 tons (Dings and Whitebread, 1965, p. 100).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Three types of mineralization are recognized in the MississippiV alley-type deposits of northeastern Washington: open space, replacement, and vein-veinlet (Addie, 1970, p. 75-76). Unlike mineralization on the Josephine horizon at the adjacent Josephine deposit, mineralization at the Yellowhead mine occurs on the Yellowhead horizon, about 1,000 ft from the upper contact of the Metaline Formation (Bending, 1983, p. 66). The mineralogy is the same as that at the Josephine; however, the proportions are quite different. Pyrite and sphalerite are the dominant minerals, and galena is subordinate in Yellowhead horizon ores (Morton, 1974, p. 22-95; Dings and Whitebread, 1965, p. 100-101).

GEOLOGIC SETTING: Mineralization at the Yellowhead mine occurs in the Yellowhead horizon which is about 1,000 ft from the contact of the Metaline Formation with the overlying Ledbetter Slate (Bending, 1983, p. 66).

REFERENCES

Addie, G. G., 1970, The Metaline district, Pend Oreille County, Washington. *In* Weissenborn, A. E.; Armstrong, F. C.; Fyles, J. T., eds., Lead-zinc deposits in the Kootenay arc, northeastern Washington and adjacent British Columbia: Washington Division Mines and Geology Bulletin 61, p. 65-78.

Bending, D. A. G., 1983, A reconnaissance study of the stratigraphic and structural setting, timing, and geochemistry of mineralization in the Metaline district, northeastern Washington, U.S.A.: University of Toronto Master of Science thesis, 324 p.

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

McConnel R. H.; Anderson, R. A., 1968, The Metaline district, Washington. *In* Ridge, J. D., ed., Ore deposits of the United States, 1933-1967; the Graton-Sales volume: American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 2, p. 1460-1480.

Morton, J. A., 1974, The Yellowhead zinc-lead deposit—Origin, post-depositional history, and comparisons with similar deposits in the Metaline mining district, Washington: Washington State University Master of Science thesis, 159 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., ed., Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

Z Canyon (118)

ALTERNATE NAMES		DISTRICT	COUNTY
Silverado		Metaline	Pend Oreille
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary Dam	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 58′ 41.60″ N	117° 20′ 33.95″ W	NW¼NW¼ sec. 11, 40N, 43E

LOCATION: on the east side of the Pend Oreille River

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	dolomite, coarse calcite, jasperoid, white quartz
Zn	sphalerite	
Au	smithsonite	
	greenockite	

DEPOSIT TYPE: Mississippi Valley

MINERALIZATION AGE

PRODUCTION: Produced a small amount in 1926 (Huntting, 1956, p. 231).

TECTONIC SETTING: Mississippi Valley-type deposits are found in Lower Paleozoic miogeoclinal rocks. (See Metaline district for additional details.)

ORE CONTROLS: Ore minerals are disseminated in dolomite and breccia. The mineralized zone has been exposed for a length of 800 ft on the surface (Huntting, 1956, p. 231).

GEOLOGIC SETTING: The mine is in coarse-grained dolomite, dolomitic limestone, and strongly sheared limestone that is probably within the upper 200 to 400 ft of the Metaline Formation (Dings and Whitebread, 1965, p. 103).

REFERENCES

Dings, M. G.; Whitebread, D. H., 1965, Geology and ore deposits of the Metaline zinc-lead district, Pend Oreille County, Washington: U.S. Geological Survey Professional Paper 489, 109 p., 6 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 pl.

Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., ed., Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

Silver Creek (625)

ALTERNATE NAMES		DISTRICT	COUNTY
		Summit	Pierce
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Norse Peak	1:24,000	Mt Rainer	Yakima
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
46° 55′ 50″ N	121° 29′ 35″ W	sec. 25, 17N, 10E	

LOCATION: at the headwaters of Silver Creek and its tributaries

HOST ROCK: NAME	LITHOLOGY	AGE
Ohanapecosh Formation	basaltic-andesitic tuff	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Cu Zn Pb	chalcopyrite sphalerite galena	pyrite, pyrrhotite, marcasite, arsenopyrite, quartz, calcite

DEPOSIT TYPE	MINERALIZATION AGE
vein stockwork	

PRODUCTION: Produced 100 tons of ore prior to 1945 and 3 oz Au, 14 oz Ag, and 100 lb Pb in 1941 (Huntting, 1956, p. 153).

TECTONIC SETTING: The Ohanapecosh Formation is part of the Cascade magmatic arc.

ORE CONTROLS: The deposit occurs along narrow joints in altered and silicified andesite that in places is heavily impregnated with pyrite (Huntting, 1956, p. 153).

GEOLOGIC SETTING: The Ohanapecosh Formation consists of a diverse assemblage of dacitic to basaltic-andesite volcaniclastic rocks (Schasse, 1987, p. 19-20). The formation also contains some welded ash-flow tuff units (Fiske and others, 1963, p. 4-20).

COMMENTS: The location is not precisely known, and latitude and longitude used here are from USBM MILS.

REFERENCES

Fiske, R. S.; Hopson, C. A.; Waters, A. C., 1963, Geology of Mount Rainer National Park, Washington: U.S. Geological Survey Professional Paper 444, 93 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Schasse, H. W., compiler, 1987, Geologic map of the Mount Rainier quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 87-16, 43 p., 1 pl.

Silver Creek Gold & Lead (626)

ALTERNATE NAMES		DISTRICT	COUNTY
Silver Creek Gold and Lead		Summit	Pierce
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Norse Peak	1:24,000	Mt Rainer	Yakima

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
46° 58′ 40″ N	121° 29′ 45″ W	sec. 12, 17N, 10E

LOCATION: north of the Silver Creek property on Silver Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Ohanapecosh Formation	basaltic-andesitic tuff	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	chalcopyrite	arsenopyrite, pyrite, quartz, calcite
Ag	galena	
Pb	sphalerite	
Zn		
Cu		

DEPOSIT TYPE	MINERALIZATION AGE
fault zone vein	

PRODUCTION: Reportedly 20 tons produced in 1945 contained $89.75 per ton in Au, Ag, Pb, and Cu. An unknown amount of placer gold has been produced from stream gravels on Silver Creek (Huntting, 1956, p. 153).

TECTONIC SETTING: The Ohanapecosh Formation is part of the Cascade magmatic arc.

ORE CONTROLS: Mineralization is in a 1-4-ft-wide fault zone in rhyolite and consists of limy gouge that contains bands of quartz with sulfides (Huntting, 1956, p. 153).

GEOLOGIC SETTING: The Ohanapecosh Formation consists of a diverse assemblage of dacitic to basaltic-andesite volcaniclastic rocks (Schasse, 1987, p. 19-20). The formation also contains some welded ash-flow tuff units (Fiske and others, 1963, p. 4-20).

COMMENTS: The location is not precisely known, and latitude and longitude used here are from USBM MILS.

REFERENCES

Fiske, R. S.; Hopson, C. A.; Waters, A. C., 1963, Geology of Mount Rainer National Park, Washington: U.S. Geological Survey Professional Paper 444, 93 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Schasse, H. W., compiler, 1987, Geologic map of the Mount Rainier quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 87-16, 43 p., 1 pl.

Silver Creek placer (627)

ALTERNATE NAMES		DISTRICT	COUNTY
		Summit	Pierce
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Norse Peak	1:24,000	Mt. Rainer	Yakima
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
46° 55′ 52.84″ N	121° 28′ 33.78″ W	sec. 25, 17N, 10E	

LOCATION: near the headwaters of Silver Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	

PRODUCTION: Produced between 1920 and 1930; recoveries were about $1.25 per yard. Considerable coarse gold reportedly has been recovered (Huntting, 1956, p. 189).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Hamilton (523)

ALTERNATE NAMES		DISTRICT	COUNTY
Iron Mountain			Skagit
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Day Lake	1:24,000	Sauk River	Concrete
Hamilton	1:24,000		

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 29′ 48.83″ N	121° 57′ 28.05″ W	secs. 23, 24, 35N, 6E, and sec. 30, 35N, 7E, and eastward in secs. 20 and 21, 35N, 7E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Shuksan Greenschist	metabasite and carbonaceous and quartzose metapelite	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	hematite	glaucophane, garnet
Mn	magnetite	

DEPOSIT TYPE	MINERALIZATION AGE
exhalative iron and manganese	Jurassic

PRODUCTION: About 5,000 tons have been mined (Huntting, 1956, p. 200).

TECTONIC SETTING: The Shuksan suite is considered to be a mid-ocean ridge protolith that was accreted to the continent. Iron and manganese occur in quartzose sediments of the Shuksan suite (Tabor and others, 1988, p. 24-25; Brown and others, 1982, p. 1088-1089).

ORE CONTROLS: Hematite and magnetite are present as discontinuous lenses or beds in quartzose sediments. Five lenses, which are more or less parallel, are known in the 6 mi between Hamilton and Birdsview. The beds range from a few feet to 30 ft thick (Huntting, 1956, p. 200). The iron mineralization may be sea-floor exhalative iron and associated manganese.

GEOLOGIC SETTING: Ocean-floor basaltic rocks and sediments were accreted to the continent.

REFERENCES

Brown, E. H.; Wilson, D. L.; Armstrong, R. L.; Harakal, J. E., 1982, Petrologic, structural, and age relations of serpentinite, amphibolite, and blueschist in the Shuksan suite of the Iron Mountain-Gee Point area, North Cascades, Washington: Geological Society of America Bulletin, v. 93, no. 11, p. 1087-1098.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

Johnsburg (524)

ALTERNATE NAMES		DISTRICT	COUNTY
		Cascade	Skagit
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Cascade Pass	1:24,000	Sauk River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 28′ 49.13″ N	121° 6′ 6.49″ W	secs. 27 and 34, 35N, 13E, unsurveyed

LOCATION: located relative to the Diamond (Midas) mine shown on the topographic map

HOST ROCK: NAME	LITHOLOGY	AGE
Cascade River Schist	mica schist and amphibolite	Triassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	calcite, leached and silicified schist
Ag	cerussite	
Cu	anglesite	
Zn	chalcopyrite	
Au	sphalerite	
	mimetite	
	malachite	
	azurite	

DEPOSIT TYPE	MINERALIZATION AGE
mineralized shear zone	

PRODUCTION: Produced 19,638 lb of ore in 1953 and 18,056 lb of ore in 1955 (Huntting, 1956, p. 232).

TECTONIC SETTING: A shear zone in schist contains the mineralization. Deformation and mineralization may have occurred at any time between the Triassic and early Tertiary (Tabor and others, 1988, p. 36).

ORE CONTROLS: Mineralization is present in schist. Dimensions of one lens of galena were 50 ft long by 4-30 in. wide as exposed at one place on the vein (Huntting, 1956, p. 231-232).

GEOLOGIC SETTING: Shear zone mineralization occurs in the Cascade River Schist of Misch, which is a thick sequence of clastic rocks and minor volcanic rocks (Tabor and others, 1988, p. 4).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Misch, Peter, 1966, Tectonic evolution of the northern Cascades of Washington State—A west-cordilleran case history. *In* Canadian Institute of Mining and Metallurgy; and others, A symposium on the tectonic history and mineral deposits of the western Cordillera in British Columbia and neighboring parts of the United States: Canadian Institute of Mining and Metallurgy Special Volume 8, p. 101-148, 1 pl.

Tabor, R. W., 1961, The crystalline geology of the area south of Cascade Pass, northern Cascade mountains, Washington: University of Washington Doctor of Philosophy thesis, 205 p., 1 pl.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

Mount Vernon (525)

ALTERNATE NAMES	DISTRICT	COUNTY
Devils Mountain Pacific		Skagit

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Conway	1:24,000	Port Townsend	Victoria

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 22′ 8.16″ N	122° 17′ 29.63″ W	S½ sec. 4, NE¼ sec. 9, N½ sec. 10, and NW¼ sec. 11, 33N, 4E

LOCATION: on Devils and Scott Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Haystack terrane rocks	serpentinite	Mesozoic
Haystack terrane rocks	greenstone	Mesozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ni	chromite	pyrite, quartz, chalcedony, carbonates
Au	gold	
Cr	nickeliferous ankerite	
	bravoite	

DEPOSIT TYPE	MINERALIZATION AGE
fault zone	

PRODUCTION: Test shipments only (Huntting, 1956, p. 278).

TECTONIC SETTING: Haystack terrane serpentinite is widespread and commonly separates blocks of different lithologies (Whetten and others, 1988, map explanation).

ORE CONTROLS: Huntting (1956, p. 278) reports mineralization is present in a breccia and fault zone between serpentinite and sandstone. The breccia zone contains extensive amounts of silica-carbonate rock, which has a central zone containing small lenses of sulfide-bearing breccia. The silica-carbonate zone is 2 mi long and ranges from 100 ft to 400 ft wide. The fault zone contains more than 50,000,000 tons of rock of which drilling explored about 15,000,000 tons that contain more than 0.2% Ni and 0.02 oz/ton Au.

GEOLOGIC SETTING: The silica-carbonate rock breccia zone occurs at the contact between sandstone and serpentinite (Huntting, 1956, p. 278). The rocks are part of the Haystack terrane of Whetten and others (1988, geol. map), one of many accreted terranes in northwestern Washington.

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Whetten, J. T.; Carroll, P. I.; Gower, H. D.; Brown, E. H.; Pessl, Fred, Jr., 1988, Bedrock geologic map of the Port Townsend 30- by 60-minute quadrangle, Puget Sound region, Washington: U.S. Geological Survey Miscellaneous Investigations Series Map I-1198-G, 1 sheet, scale 1:100,000.

Ready Cash (522)

ALTERNATE NAMES		DISTRICT	COUNTY
			Skagit
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Cypress Island	1:24,000	Bellingham	Victoria
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 34′ 55.79″ N	122° 43′ 16.61″ W	NE¼NE¼ sec. 30, 36N, 1E	

LOCATION: on a steep west slope of Cypress Island

HOST ROCK: NAME	LITHOLOGY	AGE
Fidalgo Complex	dunite	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cr	chromite	serpentine, kotschubeite (chromium chlorite), chromium-bearing limonite, and chromium-bearing hornblende

DEPOSIT TYPE	MINERALIZATION AGE
magmatic segregation, disseminated	Jurassic

PRODUCTION: Produced 25 tons in 1917 and 50 tons in 1918 (Huntting, 1956, p. 39).

TECTONIC SETTING: The serpentinized dunite on Cypress Island is part of an ophiolite and arc-volcanic sequence. The rocks are part of the Decatur terrane, which is structurally the highest unit of the San Juan thrust system (Brandon and others, 1988, p. 31-34).

ORE CONTROLS: The chromite in the deposit occurs as irregular veinlets an inch or more thick and in bunches and pockets a foot or more in diameter. The surrounding serpentinite also contains disseminated chromite (Huntting, 1956, p. 39).

GEOLOGIC SETTING: The chromite-bearing serpentinized dunite is part of a Jurassic ophiolite in an accreted terrane (Brandon and others, 1988, p. 31-34).

REFERENCES

Brandon, M. T.; Cowan, D. S.; Vance, J. A., 1988, The Late Cretaceous San Juan thrust system, San Juan Islands, Washington: Geological Society of America Special Paper 221, 81 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

McLellan, R. D., 1927, The geology of the San Juan Islands: University of Washington Publications in Geology, v. 2, 179 p., 1 pl.

Pardee, J. T., 1922, Chromite ores in Washington. *In* Contributions to economic geology (short papers and preliminary reports); Part I-Metals and nonmetals except fuels: U.S. Geological Survey Bulletin 725, p. 61-65.

Stephens (527)

ALTERNATE NAMES		DISTRICT	COUNTY
Fidalgo			Skagit
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Deception Pass	1:24,000	Port Townsend	Victoria
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 29′ 43″ N	122° 38′ 48″ W	N½ sec. 26, 35N, 1E	

LOCATION: within Anacortes city limits, about one mi east of airport, by Cranberry Lake

HOST ROCK: NAME	LITHOLOGY	AGE
Fidalgo Complex	granodiorite	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite	pyrite, serpentine

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	

PRODUCTION: One shipment was sent to the Tacoma smelter (Huntting, 1956, p. 76).

TECTONIC SETTING: The serpentinized dunite on Cypress Island is part of an ophiolite and arc-volcanic sequence. The rocks are part of the Decatur terrane, which is structurally the highest unit of the San Juan thrust system (Brandon and others, 1988, p. 31-34).

ORE CONTROLS: Mineralization is localized in a 10-ft-wide by at least 600-ft-long shear zone in granodiorite that displays weak mineralization and serpentinization (Huntting, 1956, p. 76).

GEOLOGIC SETTING: The Fidalgo Complex is part of accreted terranes of the San Juan Islands of Washington (Brandon and others, 1988, geol. map, p. 31-34). The relation of the granodiorite to mineralization at the Stephens deposit is unknown. The granodiorite may be part of the complex or possibly a later magmatic event.

REFERENCES

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Willis and Everett (526)

ALTERNATE NAMES		DISTRICT	COUNTY
Willis E. Everett			Skagit
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Forbidden Peak	1:24,000	Mt Baker	Concrete
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 31′ 21.27″ N	121° 0′ 59.12″ W	sec. 7, 35N, 14E	

LOCATION: on Skagit Queen Creek

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed granite	granite and porphyritic granite	Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Au	galena	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Minor production in the 1890s (Moen, 1976, p. 163).

TECTONIC SETTING: The granitic rocks at the Willis and Everett mine are most likely part of the Chilliwack composite batholith (Staatz and others, 1972, geol. map). This magmatism is of Tertiary age and is probably part of early magmatism of the Cascade magmatic arc.

ORE CONTROLS: Three veins are identified. One is 8-12 ft wide, and another is 4-10 ft wide. The 4-10-ft-wide vein is localized at the contact between granite and porphyry (Huntting, 1956, p. 316). Mineralization probably took place during emplacement of the batholithic rocks.

GEOLOGIC SETTING: Mineralization occurs in Tertiary batholithic rocks of the northern Cascades.

REFERENCES

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Staatz, M. H.; Tabor, R. W.; Weis, P. L.; Robertson, J. F.; Van Noy, R. M.; Pattee, E. C., 1972, Geology and mineral resources of the northern part of the North Cascades National Park, Washington: U.S. Geological Survey Bulletin 1359, 132 p., 2 pl.

Black Jack (638)

ALTERNATE NAMES		DISTRICT	COUNTY
		Washougal	Skamania
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gumboot Mtn	1:24,000	Vancouver	Vancouver

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
45° 46′ 20.18″ N	122° 11′ 59.43″ W	center sec. 4, 3N, 5E

LOCATION: near the intersection of Copper Creek and Trout Creek, 12 mi southeast of Yacolt

HOST ROCK: NAME	LITHOLOGY	AGE
tourmaline-bearing breccia	altered quartz diorite fragments in a tourmaline-rich matrix	Miocene
Silver Star pluton	quartz diorite porphyry	

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granodiorite phase of the Silver Star pluton	19.6 ± 0.7 m.y.

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Mo Ag Au	chalcopyrite bornite chalcocite molybdenite sphalerite galena	sericite, quartz, tourmaline, pyrite, magnetite, calcite; sericitization, silicification, potassic alteration

DEPOSIT TYPE	MINERALIZATION AGE
breccia pipe porphyry system	

PRODUCTION: This deposit has not produced.

TECTONIC SETTING: Tourmaline-bearing breccia pipes are associated with dikes and plugs of quartz diorite porphyry, which intruded the granodiorite phase of the Silver Star pluton.

ORE CONTROLS: The Black Jack breccia pipe is associated with dikes and plugs of quartz diorite porphyry. The angular breccia fragments are partially to totally replaced by sericite and quartz and occur in a matrix of tourmaline and chalcopyrite. The breccia pipe has an elliptical cross section and is elongate north-south (500 ft by 800 ft). The mineralized breccia is 800 ft deep and is underlain by potassic alteration. Reserves, based on drilling, consist of 2.9 million tons of rock grading 1.62% Cu, 0.035% Mo, and 0.35 oz/ton Ag.

GEOLOGIC SETTING: The Black Jack deposit is in a hydrothermally altered, tourmaline-bearing breccia pipe associated with porphyritic phases of the Silver Star pluton.

COMMENTS: The deposit has been outlined by 14 drill holes, three short adits, and a 20-ft shaft. Amoco Minerals Co. completed 12 holes from 1974 to 1977. Plexus Resources Corporation held the property from 1983 to 1990 and completed two holes in 1984. The owners (1990) of the claims are Lawrence McCuistion and family from Trout Creek, Washington.

REFERENCES

Birk, R. H., 1980, Petrology, petrography, and geochemistry of the Black Jack breccia pipe, Silver Star plutonic complex, Skamania County, Washington: Western Washington University Master of Science thesis, 107 p., 2 pl.

Northern Miner Press Limited, 1988, Canadian Mines Handbook 1988-89: Northern Miner Press Limited, p.371.

Joseph, N. L., 1990, Washington's mineral industry in 1989: Washington Geologic Newsletter, v. 18, no. 1, p. 3-22.

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Phillips, W. M., compiler, 1987, Geologic map of the Vancouver quadrangle, Washington: Washington Division of Geology and Earth Resources Open File Report 87-10, 27 p., 1 pl.

Shepard, R. J., 1980, Geology and mineralization of the southern Silver Star stock, Washougal mining district, Skamania County, Washington: Oregon State University Master of Science thesis, 113 p.

Camp Creek placer (637)

ALTERNATE NAMES		DISTRICT	COUNTY
			Skamania
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
McCoy Peak	1:24,000	Mt Adams	Yakima
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
46° 21′ 45.16″ N	121° 48′ .61″ W	approximately 10N, 8E, unsurveyed	

LOCATION: on Camp Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1939 and 1940 (Huntting, 1956, p. 189).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Margaret (639)

ALTERNATE NAMES	DISTRICT	COUNTY
Germania Earl Samson Goat Mountain	St. Helens	Skamania

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit Lake East	1:24,000	Mt St. Helens	Hoquiam

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
46° 21′ 22.65″ N	122° 4′ 50.74″ W	S½ sec. 8 and N½ sec. 17, 10N, 6E

LOCATION: 14 mi southwest of Randle

HOST ROCK: NAME	LITHOLOGY	AGE
Spirit Lake pluton, main phase	quartz diorite	Miocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Mo Ag Au	chalcopyrite bornite chalcocite covellite copper malachite azurite chrysocolla molybdenite sphalerite galena	pyrite, quartz, sericite, tourmaline, biotite, kaolinite, chlorite, epidote, calcite, magnetite, arsenopyrite; propylitic, phyllic, and potassic alteration

DEPOSIT TYPE	MINERALIZATION AGE
stockworks disseminated porphyry system	

PRODUCTION: This deposit has not produced.

TECTONIC SETTING: The Spirit Lake pluton was emplaced along a series of north-trending Tertiary dikes, plugs, and plutons. The pluton is also on the southwest extension of a pronounced topographic linear that extends from Bumping Lake through Packwood.

ORE CONTROLS: The Margaret deposit exhibits concentric patterns of alteration and mineralization. There is a low-grade core of potassic-alteration surrounded by a phyllic-altered copper-molybdenum zone, then a phyllic-altered copper zone, and then an outer zone of propylitic-alteration. The phyllic-altered copper zone contains tourmaline-bearing veinlets and breccia. The deposit is 3,000 ft wide, 5,000 ft long, and open at depth. Proven and probable reserves have been calculated at 577 million tons grading 0.36% Cu, 0.011% Mo, 0.007 oz/ton Au, and 0.046 oz/ton Ag. For a proposed 82,000 ton/day operation, the overall stripping ratio would be 1:1.8. The higher grade portion contains drill-indicated reserves of 221 million tons at 0.434% Cu, 0.015% Mo, 0.008 oz/ton Au, and 0.056 oz/ton Ag. A smaller scale operation was also considered; it would use open pit and block caving methods. Average ore grade would be 0.9% Cu for this 16,000 ton/day operation. The total amount of potential ore is 750 million tons to a depth of 1,000 ft, which contains 0.6% equivalent Cu.

GEOLOGIC SETTING: The Margaret deposit is a classic porphyry copper deposit emplaced in quartz diorite of the Spirit Lake pluton. The quartz diorite was dated by K-Ar methods at 20.6-22 m.y. The deposit is located near the contact of a quartz monzonite phase of the Spirit Lake pluton. Fracture systems, stockworks, and veinlets have localized the deposit. Brecciation is minor.

COMMENTS: Adits were driven on the property in about 1900. No work had been done on the property until Duval Corporation acquired the claims in 1969. The deposit has been outlined by 105 diamond drill holes totalling 68,010 ft. The drilling was conducted by Duval Corp. from 1969 through 1979. In 1980 the Margaret property consisted of the Earl (Samson), Index, and Germania group of patented claims (36 total), as well as 237 unpatented Duval claims. The Margaret property is within the Mount St. Helens National Volcanic Monument.

UNPUBLISHED INFORMATION: Taylor, J. D., 1980, Margaret project status report: Duval Corporation report. This report is in the DGER files.

REFERENCES

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Moen, W. S., 1977, St. Helens and Washougal mining districts of the southern Cascades of Washington: Washington Division of Geology and Earth Resources Information Circular 60, 71 p.

Phillips, W. M., compiler, 1987, Geologic map of the Mount St. Helens quadrangle, Washington and Oregon: Washington Division of Geology and Earth Resources Open File Report 87-4, 59 p., 1 pl.

Sweden (636)

ALTERNATE NAMES	DISTRICT	COUNTY
Coe St. Helens	St. Helens	Skamania

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit Lake East	1:24,000	Mount St. Helens	Hoquiam

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
46° 17′ 49.39″ N	122° 6′ 40.44″ W	NW¼NW¼ sec. 6, 9N, 6E

LOCATION: under or near the northeast shore of Spirit Lake

HOST ROCK: NAME	LITHOLOGY	AGE
Spirit Lake pluton	hornblende granodiorite	Miocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag Zn	chalcopyrite sphalerite galena	pyrite, pyrrhotite, quartz, talc, gouge, and fragments of granodiorite.

DEPOSIT TYPE	MINERALIZATION AGE
vein fracture zone	Miocene

PRODUCTION: The mine produced 14 tons of ore in 1905 and 76 tons of ore in 1929 (Moen, 1977, p. 33).

TECTONIC SETTING: The area is underlain by intrusive and extrusive rocks of the Cascade magmatic arc.

ORE CONTROLS: Mineralization occurs along a persistent fracture zone which ranges from several inches to 6 ft in width. Copper, gold, and silver values vary considerably along the strike of the vein (Moen, 1977, p. 33).

GEOLOGIC SETTING: Mineralization is in and adjacent to the Spirit Lake granodiorite and quartz monzonite pluton (Phillips, 1987, geol. map, p. 43-47).

COMMENTS: The Sweden mine was near the shore of Spirit Lake prior the 1980 eruption of Mount St. Helens. The mine is now near the present shore or under the lake and debris from Mount St. Helens.

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Moen, W. S., 1977, St. Helens and Washougal mining districts of the southern Cascades of Washington: Washington Division of Geology and Earth Resources Information Circular 60, 71 p.

Phillips, W. M., compiler, 1987, Geologic map of the Mount St. Helens quadrangle, Washington and Oregon: Washington Division of Geology and Earth Resources Open File Report 87-4, 59 p., 1 pl.

Bonanza Queen (528)

ALTERNATE NAMES		DISTRICT	COUNTY
		Silverton	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Silverton	1:24,000	Sauk River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 5′ 56.80″ N	121° 33′ 48.02″ W	secs. 7, 8, 17, and 18, 30N, 10E

LOCATION: on Deer Creek about 0.5 mi north of Silverton

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	greenstone and metasedimentary rocks	middle Cretaceous - Paleocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag Te As	chalcopyrite sylvanite realgar	pyrite, pyrrhotite, arsenopyrite, quartz, calcite and altered diorite

DEPOSIT TYPE	MINERALIZATION AGE
fault zone	

PRODUCTION: Approximately 830 tons by 1918 averaging 3.5% Cu, 0.04 oz/ton Au, and 2-3 oz/ton Ag (Huntting, 1956, p. 80).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Mineralization occurs in a 10-75-ft-wide fracture zone exposed over a 3,000-ft strike length. Massive sulfides occur in lenses in a shear zone in argillite; the largest lens is 60 ft long and 5-10 ft wide and is known to be at least 100 ft deep (Huntting, 1956, p. 80).

GEOLOGIC SETTING: Host rocks are part of the Eastern melange belt and consist of greenstone with graywacke, argillite, phyllitic argillite, chert, and highly sheared marble (Tabor and others, 1988, p. 23).

COMMENTS: This should be examined as a possible disrupted exhalative or volcanogenic massive sulfide deposit.

REFERENCES

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McIntyre, A. W., 1907, Copper deposits of Washington: American Mining Congress, 9th Annual Session, Report of Proceedings, p. 238-250.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

Buckeye (529)

ALTERNATE NAMES		DISTRICT	COUNTY
		Index	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Index	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 46′ 54.80″ N	121° 31′ 35.57″ W	SE¼ sec. 33, 27N, 10E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith	granodiorite and tonalite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Ag Au	chalcopyrite bornite cuprite chalcocite	quartz, calcite, crushed and altered granodiorite

DEPOSIT TYPE: shear zone

MINERALIZATION AGE:

PRODUCTION: Several tons of high-grade ore were packed out on horses to the Tacoma smelter prior to 1912 (Broughton, 1942, p. 14-15).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Two mineralized zones identified; these range from narrow to 6 ft wide and contain small lenses of ore (Broughton, 1942, p. 14-15).

GEOLOGIC SETTING: Granodiorite and tonalite of the Index batholith intrude older metamorphic rocks in the Index area (Tabor and others, 1982, p. 10). Both the older metamorphic rocks and granodiorite are cut by aplite and lamprophyre dikes, and all are unconformably overlain by interbedded andesite and arkose (Broughton, 1942, p. 14).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Copper Belle (530)

ALTERNATE NAMES		DISTRICT	COUNTY
Bunker Hill		Index	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Index	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 50′ 54.92″ N	121° 36′ 47.20″ W	secs. 1, 2, 11, and 12, 27N, 9E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith	granodiorite and tonalite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, quartz, calcite, crushed and altered granodiorite
Au	bornite	
Ag	magnetite	
W	hematite	

DEPOSIT TYPE: shear zone

MINERALIZATION AGE:

PRODUCTION: Produced several hundred pounds of copper matte prior to 1910. A 200-ton/day mill was under construction in 1955 (Huntting, 1956, p. 82).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Lens-shaped ore bodies occur in shear zones in granodiorite of the Index batholith (Huntting, 1956, p. 81). Mafic minerals are altered to chlorite and feldspars to sericite and kaolin (Patty, 1921, p. 291). Magnetite, biotite, hornblende, and tourmaline are found near the margin of the batholith (Campbell, 1921, p. 5). No veins are reported in the host rocks (which is quartzite) to the batholith.

GEOLOGIC SETTING: Granodiorite and tonalite of the Index batholith intrude older metamorphic rocks in the Index area (Tabor and others, 1982, p. 10). Both the granodiorite and the older metamorphic rocks (which the granodiorite intrudes) are cut by aplite and lamprophyre dikes, and all are unconformably overlain by interbedded andesite and arkose (Broughton, 1942, p. 14).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Campbell, R. E., 1921, A geological study of the ore bodies of the Copper Bell mine: University of Washington Bachelor of Science thesis, 32 p.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Patty, E. N., 1921, The metal mines of Washington: Washington Geological Survey Bulletin 23, 366 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Ethel (531)

ALTERNATE NAMES		DISTRICT	COUNTY
Ethel Consolidated		Index	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Baring	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 52′ 16.01″ N	121° 29′ 42.89″ W	secs. 34 and 35, 28N, 10E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith	granodiorite and tonalite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite bornite chalcocite fluorite	pyrite, quartz, calcite, decomposed granodiorite

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	

PRODUCTION: About 400 tons (Huntting, 1956, p. 83).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Ore occurs in a shear zone that ranges from a few inches to 27 ft wide (Broughton, 1942, p. 15). Weaver (1912, p. 76) describes the mineralization as irregularly distributed in lenses accompanied by considerable amounts of crumbly granite resembling arkose.

GEOLOGIC SETTING: The country rock is granodiorite of the Index batholith (Tabor and others, geol. map, p. 10) which is cut by narrow dikes of granodiorite porphyry (Weaver, 1912, p. 76).

REFERENCES

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Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Weaver, C. E., 1912, Geology and ore deposits of the Index mining district: Washington Geological Survey Bulletin 7, 96 p.

Florence Rae (532)

ALTERNATE NAMES		DISTRICT	COUNTY
Rudebeck-Florence Rae		Sultan	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 58′ 15.71″ N	121° 29′ 30.86″ W	secs. 26, 27, 34, and 35, 29N, 10E

LOCATION: The mine is located near the terminus of the Sultan Basin road as shown on the Monte Cristo 7.5-minute quadrangle map.

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	migmatite gneiss, amphibolite, and	pre-Tertiary
Index batholith	quartz diorite granodiorite and tonalite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, pyrrhotite, magnetite, specular hematite, quartz, calcite, amphibole, serpentine
Ag	sphalerite	
Au	galena	
Ni	chromite	
Pb	scheelite	
Zn		
W		

DEPOSIT TYPE	MINERALIZATION AGE
vein	
magmatic segregation	
podiform chromite	

PRODUCTION: Produced just over 600 tons from 1918 to 1919 and 1937 to 1941. The 1938-41 shipments contained 0.01 oz/ton Au, 2.36 oz/ton Ag, 12.40% Cu, 0.8% Zn, and 0.07% Ni (Huntting, 1956, p. 83).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Lenses of chromite are as much as 4 by 5 ft. There are four principal vein systems in metamorphic rocks, peridotite, and quartz diorite (Huntting, 1956, p. 83). Broughton (1942, p. 46-47) reports the main vein is a mineralized shear zone in limestone and granodiorite and contains an average of 3 ft of chalcopyrite on the hanging wall.

GEOLOGIC SETTING: The unit called migmatite gneiss (Tabor and others, 1982, p. 15-16) in the Eastern melange belt in the mine area also includes quartz diorite, peridotite, and limestone (Huntting, 1956, p. 83; Broughton, 1942, p. 46-47).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Carithers, Ward; Guard, A. K., 1945, Geology and ore deposits of the Sultan Basin, Snohomish County, Washington: Washington Division of Mines and Geology Bulletin 36, 90 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Forty Five (551)

ALTERNATE NAMES	DISTRICT	COUNTY
Magus 45 "45"	Sultan	Snohomish

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Silverton	1:24,000	Sauk River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 3′ 25.89″ N	121° 33′ 1.60″ W	S½ sec. 29, 30N, 10E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	greenstone, graywacke, argillite, chert, marble	Middle Cretaceous - Paleocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Au Zn Cu W	galena pyrargyrite sphalerite chalcopyrite scheelite tetrahedrite	arsenopyrite, pyrite, pyrrhotite, quartz, calcite

DEPOSIT TYPE	MINERALIZATION AGE
mineralized shear zone vein	

PRODUCTION: From 1896 to 1902 the mine produced 3,185 tons of ore, which yielded 300,000 oz Ag and 2,356 oz Au (Moen, 1976, p. 152).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Mineralization is in shear zones in schist, argillite, and quartzite. One of the shear zones averages 2 ft in width and appears to extend at least 3,000 ft along strike. High-grade ore contained as much as 171 oz/ton Ag, and the average was about 93 oz/ton Ag and 0.74 oz/ton Au (Moen, 1976, p. 152).

GEOLOGIC SETTING: Mineralization probably occurred either late during development of the melange or after melange development. Ages of rocks in the Eastern melange belt range from Late Mississippian (metatonalite) to Jurassic (Tabor and Booth, 1985, p. 412).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Carithers, Ward; Guard, A. K., 1945, Geology and ore deposits of the Sultan Basin, Snohomish County, Washington: Washington Division of Mines and Geology Bulletin 36, 90 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Moen, W. S., 1976, Silver occurrences of Washington: Washington Division of Geology and Earth Resources Bulletin 69, 188 p.

Patty, E. N., 1921, The metal mines of Washington: Washington Geological Survey Bulletin 23, 366 p.

Tabor, R. W; Booth, D. B., 1985, Folded thrust fault between major melange units of the western North Cascades, Washington, and its relationship to the Shuksan thrust [abstract]: Geological Society of America Abstracts with Programs, v. 17, no. 6, p. 412.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

Glacier Peak (554)

ALTERNATE NAMES	DISTRICT	COUNTY
Miners Ridge Calumet	Sampson Glacier Peak Miller River	Snohomish

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Suiattle Pass	1:24,000	Twisp	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 11′ 51.61″ N	120° 58′ 44.60″ W	sec. 9, 10, and 11, 31N, 15E

LOCATION: on the south and east slopes of Plummer Mountain approximately 1.75 mi west of Suiattle Pass in the Glacier Peak Wilderness

HOST ROCK: NAME	LITHOLOGY	AGE
Cloudy Pass batholith	granodiorite	Miocene
late-stage intrusive	quartz diorite	
Totem Pass migmatite	quartz biotite gneiss	Jurassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
post-ore andesite and basalt dikes	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Mo W Ag Au	chalcopyrite chalcocite covellite cuprite native copper malachite, azurite enargite tennantite molybdenite scheelite galena sphalerite	quartz, pyrite, marcasite, pyrrhotite, arsenopyrite, limonite, realgar, ankerite, siderite, tourmaline, epidote; potassic alteration, chloritization, sericitization, secondary biotite

DEPOSIT TYPE	MINERALIZATION AGE
veins stockworks porphyry system	21.0 ± 0.8 m.y.

PRODUCTION: This deposit has not produced.

TECTONIC SETTING: The deposits occur on the northwest projection of the Entiat fault that was intruded by the Cloudy Pass pluton. A post-Cloudy Pass quartz diorite plug and associated mineralization were emplaced into a major shear zone. This shear zone trends east to northeast and is located 400 ft south of the gneiss-Cloudy Pass granodiorite contact. The stockwork porphyry deposits are spatially related to fracturing intensity and east-west sheeted fissures.

ORE CONTROLS: The Glacier Peak stockwork porphyry copper-molybdenum system consists of three deposits known as the main deposit, the northeast deposit, and the eastern area. These deposits are localized in a major shear zone cutting the Cloudy Pass granodiorite. The mineralized zone is 10,000 ft long and 2,000 ft wide and averages 1,200 ft thick. It contains 1.9 billion tons of rock averaging 0.334% Cu and 0.015% MoS_2. A quartz diorite plug intruded the shear zone in the main deposit. Both the surrounding granodiorite and the younger quartz diorite were fractured and then mineralized. In the northeast part of the main deposit there is a quartz plug 130 ft in diameter. At a depth of 630 ft, it splays out into a series of quartz veins. The main deposit contains a higher grade core of 25.4 million tons averaging 0.735% Cu and 0.036% MoS_2 or 56.0 million tons averaging 0.45% Cu and 0.025% MoS_2. The adjoining tabular northeast deposit contains 16.0 million tons grading 0.67% Cu and 0.062% MoS_2. On the basis of data from 13 drill holes, the eastern area contains 800 million tons averaging 0.10% Cu equivalent (October 1980 prices). (See Stotelmeyer, 1981, p. 84-105.)

GEOLOGIC SETTING: The Cloudy Pass batholith granodiorite was sheared and then intruded by a quartz diorite plug approximately 400 ft south of the gneiss contact. Fracturing, stockwork systems, and veining developed in the quartz diorite and adjacent granodiorite. Mineralization flooded the fracture systems; the majority of the ore is in quartz diorite; lesser amounts of ore are in granodiorite, and ore extends locally into the gneiss. Mineral zonation and alteration are consistent with porphyry copper-type models.

COMMENTS: The deposits have been outlined by 78 drill holes totaling 56,472 ft and six adits totaling 900 ft. In 1968 Ridge Mining Corp. (a wholly owned subsidiary of Kennecott Copper Corp.) controlled 18 patented claims, 98 unpatented lode claims, and 180 mill site and placer claims. Since the creation of the Glacier Peak Wilderness area, Ridge Mining Corp. has retained ownership of the 18 patented claims only. Prior to Bear Creek's option (1954), the following groups explored the property: Sampson Mining Co. (1900); Glacier Peak Mining and Smelting Co. (1907-1959) as owners; Minerals Separation Co. or Vogelsang Bros. (1917-1918); Hanna Coal and Ore Corp. (1937-1951); International Smelting and Refining Co., a subsidiary of The Anaconda Co. (1942-1943); Earl B. Crane (1952-1954); and Bear Creek Mining Co. until 1959 when Ridge Mining Corp. (Kennecott Copper Corp.) purchased the property.

UNPUBLISHED INFORMATION: Stotelmeyer, R. B., 1981, Mineral resources of the Glacier Peak Wilderness and adjacent areas, Chelan, Skagit, and Snohomish counties, Washington: U.S. Bureau of Mines unpublished report, 368 p., 3 pl., 27 figs. This report is in the DGER library.

REFERENCES

Grant, A. R., 1982, Summary of economic geology data for the Glacier Peak Wilderness, Chelan, Snohomish, and Skagit counties, Washington: U.S. Geological Survey Open-File Report 82-408, 36 p.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Helena (533)

ALTERNATE NAMES		DISTRICT	COUNTY
		Silverton	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Helena Ridge	1:24,000	Sauk River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 8′ 28.47″ N	121° 34′ 10.49″ W	SW¼ sec. 30, 31N, 10E

LOCATION: about 5 mi north of Silverton on the divide between Deer and Clear Creeks

HOST ROCK: NAME	LITHOLOGY	AGE
Barlow Pass volcanic rocks	sandstone	late Eocene - Oligocene
unnamed tonalite and granodiorite	tonalite and granodiorite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite	pyrite, quartz, sheared granite

DEPOSIT TYPE	MINERALIZATION AGE
vein shear zone	

PRODUCTION: 150 tons shipped to Tacoma smelter (Huntting, 1956, p. 85).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Large low-grade bodies of ore occur in at least two sulfide-bearing quartz veins in shear zones (Huntting, 1956, p. 85).

GEOLOGIC SETTING: Broughton (1942, p. 40) described the Helena as being in shear zones in granite. Tabor and others (1988, geol. map, p. 17-18) show the rocks of the area are Barlow Pass volcanic rocks of Vance (1957); however, the unit may be of possible late Eocene, Chuckanut affinity. The unit is mostly feldspathic subquartzose sandstone and pebble conglomerate that contains minor interbeds of argillite and siltstone and rare tuffaceous sandstone and tuff (Tabor and others, 1988, p. 16).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

Vance, J. A., 1957, The geology of the Sauk River area in the northern Cascades of Washington: University of Washington Doctor of Philosophy thesis, 312 p., 1 pl.

Horseshoe Bend placer (547)

ALTERNATE NAMES		DISTRICT	COUNTY
		Sultan	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Lake Champlain	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 55′ 42.70″ N	121° 48′ 29.51″ W	sec. 8, 28N, 8E	

LOCATION: on the Sultan River 5 mi north of Sultan

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Several thousand dollars of production (Huntting, 1956, p. 190).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Index Gold (543)

ALTERNATE NAMES		DISTRICT	COUNTY
Index Gold Mines, Inc		Silver Creek	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 54′ 20.54″ N	121° 27′ 4.04″ W	secs. 18 and 19, 28N, 11E	

LOCATION: The property consists of five unpatented claims; patented mining claims lie in the eastern half of section 19. The road in the western part of secs. 18 and 19 on the common section line between the two sections is a tentative location for the mine.

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith	granodiorite and tonalite	Oligocene
Swauk Formation	sandstone and conglomerate	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	galena	arsenopyrite, quartz
Ag	sphalerite	
Pb		
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Ten tons of ore per day reported shipped in 1939 (Huntting, 1956, p. 160)

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Reported vein was more than 18 in. wide (Huntting, 1956, p. 160)

GEOLOGIC SETTING: The mine location is approximate; however, the setting is similar to that of deposits to the northwest, where the veins trend across the contact between Index batholith rocks and Swauk Formation (Tabor and others, 1982, geol. map).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Iowa (534)

ALTERNATE NAMES		DISTRICT	COUNTY
Mint		Sultan	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 58′ 38.86″ N	121° 29′ 46.75″ W	NW¼ sec. 27, 29N, 10E

LOCATION: A truck road along the north fork of Sultan River crosses the property.

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	migmatite gneiss, amphibolite, and quartz diorite	pre-Tertiary
Index batholith	granodiorite and tonalite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, quartz, calcite, chlorite
Au	scheelite	
Ag	powellite	
	molybdenite	
	sphalerite	
	bornite	
	malachite	

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	
vein	

PRODUCTION: 104 tons of ore prior to 1937 and 96 tons in 1937-41 (Huntting, 1956, p. 86).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Mineralized fracture zones are found in diorite and metamorphic rocks (Huntting, 1956, p. 86). Broughton (1942, p. 47) reported the presence of limestone and that the vein is an extension of the Florence Rae vein.

GEOLOGIC SETTING: Unit called migmatite gneiss (Tabor and others, 1982, p. 15-16) in the Eastern melange belt in the mine area also includes quartz diorite, peridotite, and limestone (Huntting, 1956, p. 83; Broughton, 1942, p. 46-47).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Jefferson (549)

ALTERNATE NAMES		DISTRICT	COUNTY
			Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Arlington East	1:24,000	Port Townsend	Victoria
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 14′ 13.03″ N	122° 3′ 38.75″ W	NW¼NE¼ sec. 29, 32N, 6E	

LOCATION: 4 mi northeast of Arlington

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary	residual iron	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	iron oxide	

DEPOSIT TYPE	MINERALIZATION AGE
bog iron	Quaternary

PRODUCTION: About 6,000 tons of ore removed from an area of 3-4 acres (Huntting, 1956, p. 201).

TECTONIC SETTING: Stagnant (paludal) environment, resulting in the formation of a bog iron deposit.

ORE CONTROLS: Stagnant or paludal environment for concentration of iron.

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Shedd, Solon; Jenkins, O. P.; Cooper, H. H., 1922, Iron ores, fuels, and fluxes of Washington: Washington Division of Geology Bulletin 27, 160 p., 1 pl.

Justice (544)

ALTERNATE NAMES		DISTRICT	COUNTY
Golden Chord		Monte Cristo	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 58′ 47.52″ N	121° 22′ 44.73″ W	sec. 27, 29N, 11E	

LOCATION: There are three claims for this mine; the Thomas claim is just north of the border between secs. 22 and 27.

HOST ROCK: NAME	LITHOLOGY	AGE
Barlow Pass volcanic rocks	basalt, rhyolite, and andesite	late Eocene - Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	arsenopyrite	arsenopyrite, pyrite, quartz
Ag	pyrite	

DEPOSIT TYPE	MINERALIZATION AGE
mineralized shear zone vein	

PRODUCTION: A considerable amount of ore was produced between 1903 and 1905 (Huntting, 1956, p. 161).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: A shear zone which ranges from 1 to 3 ft wide in the andesite contains orebodies that range from 70 to400 ft long (Huntting, 1956, p. 161).

GEOLOGIC SETTING: The mine is in Barlow Pass volcanic rocks (Heath, 1971, p. 116-122; Vance, 1957, p. 275-287), which were called "older andesites" by Spurr (1901, geol. map). Spurr (geol. map) shows the vein ending abruptly against the Darrington Phyllite (Tabor and others, 1982, geol. map).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Heath, M. T., 1971, Bedrock geology of the Monte Cristo area, northern Cascades, Washington: University of Washington Doctor of Philosophy thesis, 164 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Spurr, J. E., 1901, The ore deposits of Monte Cristo, Washington: U.S. Geological Survey 22nd Annual Report, pt. 2, p. 777-865.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Vance, J. A., 1957, The geology of the Sauk River area in the northern Cascades of Washington: University of Washington Doctor of Philosophy thesis, 312 p., 1 pl.

Kromona (535)

ALTERNATE NAMES	DISTRICT	COUNTY
Scriber Jones	Sultan	Snohomish

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mount Stickney	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 54′ 57.82″ N	121° 35′ 34.44″ W	near center sec. 13, 28N, 9E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith unnamed gneiss	granodiorite and tonalite gneiss	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Ag Au Mo W	chalcopyrite molybdenite scheelite powellite bornite malachite	pyrite, pyrrhotite, marcasite, quartz, calcite, [and shattered wall rock]

DEPOSIT TYPE	MINERALIZATION AGE
shear zone vein	

PRODUCTION: Two-ton test shipment in 1952; produced in 1953 (102 tons of concentrates), 1954 (average assay 24.33% Cu, 4.2 oz/ton Ag, and 0.5 oz/ton Au), and 1955 (Huntting, 1956, p. 87).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: The mineralized shear zone cuts the contact between quartz diorite and older metamorphic rocks. Mineralization occurs in veins and veinlets in and adjacent to the shear zone (Carithers and Guard, 1945, p. 76).

GEOLOGIC SETTING: Granodiorite and tonalite of the Index batholith intrude older metamorphic rocks in the area (Tabor and others, 1982, p. 10).

REFERENCES

Carithers, Ward; Guard, A. K., 1945, Geology and ore deposits of the Sultan Basin, Snohomish County, Washington: Washington Division of Mines and Geology Bulletin 36, 90 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Lake Serene (536)

ALTERNATE NAMES	DISTRICT	COUNTY
Index-Independent Wilbur Index Index Pride of Index	Index	Snohomish

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Index	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 47′ 33.64″ N	121° 34′ 50.76″ W	SW¼ sec. 30, 27N, 10E

LOCATION: about 2 mi south of Index

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith	granodiorite and tonalite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	bornite chalcopyrite chalcocite azurite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Four carloads prior to 1901; also shipped in 1949 (Huntting, 1956, p. 87).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Mineralization occurs in a shear zone in granodiorite (Broughton, 1942, p. 15).

GEOLOGIC SETTING: Granodiorite and tonalite of the Index batholith intrude older metamorphic rocks in the area (Tabor and others, 1982, p. 10).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Lockwood Pyrite (550)

ALTERNATE NAMES		DISTRICT	COUNTY
		Sultan	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Wallace Lake	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 57′ 46.50″ N	121° 43′ 0.00″ W	NE¼ sec. 36, 29N, 8E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Western melange belt	argillite and phyllitic greenstone	pre-Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	sphalerite	pyrite, barite
Zn	chalcopyrite	
Cu	pyrite	
Fe		
S		
Ag		

DEPOSIT TYPE	MINERALIZATION AGE
volcanogenic massive sulfide, mafic volcaniclastic sequence	pre-Tertiary
volcanogenic massive sulfide, ophiolite assemblage	

PRODUCTION: The property was explored in the late 1980s as a massive sulfide prospect. Previously, the property was extensively evaluated as an iron and sulfur resource.

TECTONIC SETTING: The deposit is in a mafic-ultramafic sequence of the Western melange belt of Tabor and others (1982, geol. map and p. 14-15).

ORE CONTROLS: The Lockwood Pyrite, is a syngenetic massive sulfide deposit (private report by J. R. Woodcock). Fine-grained sphalerite occurs in thin discontinuous bands or lenses commonly accompanied by chalcopyrite. The majority of the deposit is pyritic massive sulfide (Woodcock, private report, 1987, p. 10-11).

GEOLOGIC SETTING: Rocks of the Western melange belt are Mesozoic and Paleozoic rocks and consist of greenstone, gabbro, and graywacke. Near the mine, the rocks are mapped as slatey argillite to phyllite, semischist, and phyllitic greenstone that has a well-developed schistosity which is commonly parallel to bedding (Tabor and others, 1982, p. 3, 14-15, geol. map).

UNPUBLISHED INFORMATION: Woodcock, J. R., 1987, The Lockwood sulfide deposit, Snohomish County, Washington State: Private report for Island Arc Mining Corporation, 20 p. This report is in DGER files.

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Carithers, Ward; Guard, A. K., 1945, Geology and ore deposits of the Sultan Basin, Snohomish County, Washington: Washington Division of Mines and Geology Bulletin 36, 90 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Mackinaw (537)

ALTERNATE NAMES		DISTRICT	COUNTY
Weden Creek		Monte Cristo	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 58′ 53.15″ N	121° 26′ 31.28″ W	SE¼SW¼ sec. 19, 29N, 11E

LOCATION: on the west fork of Weden Creek about 3 mi from Monte Cristo

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	chert, argillite, greenstone, graywacke	pre-Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, pyrrhotite, quartz, calcite, serpentine
Ni	malachite	
Co	chrysocolla	
Au	garnierite	
Ag	erythrite	
U	chloanthite	
	cubanite	
	pentlandite	

DEPOSIT TYPE	MINERALIZATION AGE
vein shear zone	

PRODUCTION: A few tons of ore were shipped in 1900-1910. The USBM conducted metallurgical tests (Huntting, 1956, p. 87-88).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Mineralization is in a fracture zone that can be traced for 3,000 ft and a known depth of 125 ft. The ore body ranges from 11 to 30 ft wide and is as much as 90 ft long. The fracture zone separates serpentine from arkosic rocks. Ore is in lens-shaped shoots, and it is disseminated and in blebs in the serpentine; locally, it may constitute 20% of the rock (Huntting, 1956, p. 87).

GEOLOGIC SETTING: Rocks at the Mackinaw mine are part of Tabor and others (1982, p. 15-16) Eastern melange belt and consist of chert, argillite, greenstone, and graywacke. These rocks are the principal host rocks for mineral deposits of the Monte Cristo area (Broughton, 1942, p. 19).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Monte Cristo (545)

ALTERNATE NAMES	DISTRICT	COUNTY
Mystery Pride	Monte Cristo	Snohomish

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Blanca Lake	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 58′ 52.06″ N	121° 22′ 7.03″ W	sec. 26, 29N, 11E

LOCATION: 1 mi east of Monte Cristo

HOST ROCK: NAME	LITHOLOGY	AGE
Grotto batholith	granodiorite and granite	Oligocene
Darrington Phyllite	sericite-quartz phyllite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	chalcopyrite	arsenopyrite, pyrite, quartz, calcite, epidote, blue soda-amphibole
Ag	galena	
Pb	sphalerite	
Zn	jamesonite	
Cu	realgar	

DEPOSIT TYPE	MINERALIZATION AGE
mineralization in shear zone vein	

PRODUCTION: Produced 300,000 tons of ore, mainly from the Mystery and Pride claims from above the 700-ft level (Huntting, 1956, p. 162).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Ore is in lenses in a shear zone in gneiss and tonalite that range from 100 to 300 ft in diameter and 1 to 15 ft thick. Mineralization also is in smaller, associated fractures (Huntting, 1956, p. 162). In the mines of the Monte Cristo area, the straightest veins are the richest. On the Mystery and Pride claims, galena is found to a depth of 50-250 ft; lead can be detected to about 300 ft, but it is absent below that depth. Arsenopyrite, pyrite, and chalcopyrite are dominant below 300 ft (Spurr, 1901, p. 819-821, 841).

GEOLOGIC SETTING: Spurr (1901, geol. map) shows the veins of the Monte Cristo mine in tonalite and schist.

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Heath, M. T., 1971, Bedrock geology of the Monte Cristo area, northern Cascades, Washington: University of Washington Doctor of Philosophy thesis, 164 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Spurr, J. E., 1901, The ore deposits of Monte Cristo, Washington: U.S. Geological Survey 22nd Annual Report, pt. 2, p. 777-865.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

O and B (538)

ALTERNATE NAMES		DISTRICT	COUNTY
		Monte Cristo	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 59′ 3.02″ N	121° 24′ 9.45″ W	SW¼ sec. 21, 29N, 11E

LOCATION: about 0.5 mi southwest of Monte Cristo on the slope of Silvertip Peak

HOST ROCK: NAME	LITHOLOGY	AGE
Barlow Pass volcanic rocks	basalt, rhyolite, and andesite	late Eocene - Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite galena sphalerite realgar	pyrite, arsenopyrite, quartz, calcite

DEPOSIT TYPE	MINERALIZATION AGE
vein shear zone	

PRODUCTION: About 12 carloads of hand-sorted ore were shipped to the Everett smelter prior to 1901 (Huntting, 1956, p. 89).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Ore bodies as much as 4 ft wide occur in a 2-50-ft-wide fracture zone (Huntting, 1956, p. 89). The host volcanic rocks at the O and B mine are late Eocene-Oligocene, but mineralization is similar to that in nearby Middle Tertiary rocks. Mineralization probably took place during Middle Tertiary or later magmatism and deformation (Tabor and others, 1982, geol. map).

GEOLOGIC SETTING: The Barlow Pass volcanic rocks (Vance, 1957, p. 275-287; Heath, 1971, p. 116-122) are a series of basalts, andesites, and rhyolites and local sedimentary rock interbeds.

REFERENCES

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Heath, M. T., 1971, Bedrock geology of the Monte Cristo area, northern Cascades, Washington: University of Washington Doctor of Philosophy thesis, 164 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Vance, J. A., 1957, The geology of the Sauk River area in the northern Cascades of Washington: University of Washington Doctor of Philosophy thesis, 312 p., 1 pl.

Rainy (546)

ALTERNATE NAMES		DISTRICT	COUNTY
Ben Lomond		Monte Cristo	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47 59 12.38 N	121 23 20.13 W	sec. 22, 29N, 11E	

LOCATION: 0.25 mi northeast of Monte Cristo

HOST ROCK: NAME	LITHOLOGY	AGE
Darrington Phyllite	sericite-quartz phyllite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	arsenopyrite	arsenopyrite, pyrite
Ag	pyrite	

DEPOSIT TYPE	MINERALIZATION AGE
shear zone vein	

PRODUCTION: Produced 20,000 tons of ore. A shipment of 862 tons averaged 0.638 oz/ton Au, 2.20 oz/ton Ag, and 19.6% As (Huntting, 1956, p. 163).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Main ore-body dimensions were 300 ft in diameter and 8 in.-5 ft wide (Huntting, 1956, p. 163).

GEOLOGIC SETTING: The vein cuts schist and andesite (Huntting, 1956, p. 163). A sketch in Spurr (1901, p. 814) shows a tonalite dike adjacent to an arsenopyrite vein.

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Spurr, J. E., 1901, The ore deposits of Monte Cristo, Washington: U.S. Geological Survey 22nd Annual Report, pt. 2, p. 777-865.

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Silverton mines (539)

ALTERNATE NAMES	DISTRICT	COUNTY
Ore Recoveries Copper Independent Cleveland Hoodoo Virginia Eclipse	Silverton	Snohomish

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Silverton	1:24,000	Sauk River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 4′ 32.93″ N	121° 34′ 3.61″ W	sec. 19, 30N, 10E

LOCATION: at Silverton

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	greenstone, graywacke, argillite, chert, marble	Mississippian - Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag As Sn	chalcopyrite galena stannite native mercury	pyrite, pyrrhotite, arsenopyrite, quartz, calcite

DEPOSIT TYPE

vein

MINERALIZATION AGE

PRODUCTION: The largest known producer at Silverton was the Ore Recoveries mine; it produced about 200 tons of ore, which was concentrated and shipped to the smelter in 1940 (Huntting, 1956, p. 89). Descriptions of other mines can be found in Huntting (1956): Copper Independent (p. 157), Cleveland (p. 81), Hoodoo (p. 85), Virginia (p. 91), and Eclipse (p. 158).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Mineralization at the Silverton mines occurs in intersecting veins; several ore bodies are as much as 2 ft wide. At the Hoodoo, the veins are in conglomerate and slate. At the Copper Independent, ore bodies are lens-shaped shoots, 100-200 ft in diameter and 2-3 ft thick, in a shear zone in granite. The Eclipse contains some mercury mineralization (Huntting, 1956, p. 81, 85, 91, 157, 158).

GEOLOGIC SETTING: Protolith ages of rocks in the Eastern melange belt range from Late Mississippian (metatonalite) to Jurassic (Tabor and Booth, 1985, p. 412). The rocks are largely mafic volcanic rocks, chert, and ultramafic rocks (Tabor and others, 1988, p. 6-7).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

St. Louis and Jackson (552)

ALTERNATE NAMES		DISTRICT	COUNTY
St. Louis		Silverton	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Silverton	1:24,000	Sauk River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 6′ 50.47″ N	121° 35′ 16.88″ W	near center sec. 1, 30N, 9E

LOCATION: on Deer Creek about 3 mi north of Silverton

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	greenstone and metasedimentary rocks	Middle Cretaceous - Paleocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, sheared granite, quartz
Au	scheelite	
Ag	tetrahedrite	
W		

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	

PRODUCTION: Produced small amounts prior to 1901 and in 1909 (Huntting, 1956, p. 90).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Deposit is a well mineralized quartz vein that is 1-6 in. wide and is in a shear zone in granite (Huntting, 1956, p. 90).

GEOLOGIC SETTING: Host rocks are part of the Eastern melange belt and consist of greenstone, graywacke, argillite and phyllitic argillite, chert, and highly sheared marble (Tabor and others, 1988, p. 23).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

Sultan King (540)

ALTERNATE NAMES	DISTRICT	COUNTY
Sultan Queen Hicks	Sultan	Snohomish

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Monte Cristo	1:24,000	Skykomish River	Wenatchee

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 57′ 6.82″ N	121° 28′ 8.51″ W	S½ sec. 36, 29N, 10E, and N½ sec. 1, 28N, 10E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith	granodiorite and tonalite	Oligocene
Swauk Formation	sandstone and conglomerate	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag Mo	chalcopyrite molybdenite sphalerite	pyrite, pyrrhotite, arsenopyrite, magnetite, specular hematite, marcasite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein breccia pipe	

PRODUCTION: Twenty-four tons of ore reportedly valued at $42 per ton were shipped to the Tacoma smelter in 1920 (Huntting, 1956, p. 91).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: The contact between the granodiorite and conglomerate is a breccia zone and contains specular hematite, pyrite, and pyrrhotite. The veins cut this contact (Carithers and Guard, 1945, p. 52). One vein ranges from 1 ft to 6 ft in width and is at least 1,000 ft long (Huntting, 1956, p. 91). Skerl (1968, private report in DGER files) notes the presence of a breccia pipe just north of the Sultan King veins.

GEOLOGIC SETTING: The veins cut the contact between the Index batholith and the Swauk Formation (Carithers and Guard, 1945, p. 52; Tabor and others, 1982, geol. map).

COMMENTS: A breccia pipe 1,200 ft long and as much as 700 ft wide occurs about 1,000 ft north of the Sultan King veins. It contains pyrite, hematite, tourmaline, and minor chalcopyrite. Drill hole, average intercepts (Skerl, 1968, private report in DGER files): 130-160 feet - granite breccia - 0.075% Cu, 0.002 oz/ton Au, and 0.01 oz/ton Ag; 160-250 ft - barren dike; 250-300 ft - 0.31% Cu, Tr Au and Ag; 300-363 ft - entirely barren; 363-622 ft - 0.02% Cu, Tr Au, 0.016 oz/ton Ag; and 622-727 ft - quartzite breccia - no reported mineralization.

UNPUBLISHED INFORMATION: Skerl, A. C., 1968, Summary report on exploration, Sultan Basin, Washington: Private report for Brenmac Mines, Ltd. s, Sultan King mine. This report is in DGER file

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Carithers, Ward; Guard, A. K., 1945, Geology and ore deposits of the Sultan Basin, Snohomish County, Washington: Washington Division of Mines and Geology Bulletin 36, 90 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Sultan placer (548)

ALTERNATE NAMES		DISTRICT	COUNTY
		Sultan	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Sultan	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 51′ 38.10″ N	121° 49′ 2.91″ W	NW¼ sec. 5, 27N, 8E	

LOCATION: on Skykomish River just south of Sultan

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced $200 prior to 1934 and $1,408 in 1934 (Huntting, 1956, p. 191).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Sunrise (553)

ALTERNATE NAMES		DISTRICT	COUNTY
		Sultan Basin	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Silverton	1:24,000	Skykomish River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 0′ 31.19″ N	121° 30′ 12.48″ W	S½, sec. 10 and N½ sec 15, 29N, 10E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Eastern melange belt	argillite, migmatite gneiss, amphibolite	pre-Tertiary
Sunrise breccia pipe	argillite and quartz diorite fragments	pre-Tertiary and Oligocene

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granodiorite and tonalite of the Vesper Peak stock; a whole-rock K-Ar age is 32.7 m.y.	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz, sericite, biotite, orthoclase, chlorite, pennine, epidote; propylitic and potassic alteration
Mo	molybdenite	
Au	scheelite	
Ag		
W		

DEPOSIT TYPE	MINERALIZATION AGE
breccia pipe porphyry system	

PRODUCTION: The deposit has not produced.

TECTONIC SETTING: The Sunrise breccia pipe is elliptical in plan and is elongate northwest. The pipe cuts Eastern Melange rocks (Tabor and others, 1988) consisting of Jurassic greenstone, greywacke, and argillite. The breccia pipe lies 1,000 ft south of the Vesper Peak stock and is thought to be genetically related to that stock. Emplacement of the breccia pipe is thought to have been controlled by an east-northeast-trending system of fracturing and sheeting (Glacier Peak belt).

ORE CONTROLS: Fragments in the Sunrise breccia pipe are 1 in. to several feet across; ore minerals line interstices. Mineralization (mainly chalcopyrite and molybdenite) also occurs as disseminations in fragments and in fractured wall rocks adjacent to the pipe. The amount of disseminated chalcopyrite increases in quartz diorite with increasing depth. Fragments in breccia and country rock are hornfelsed. Two periods of brecciation are recognized; late east-northeast-trending high-angle faults offset breccia contacts. The Sunrise breccia pipe contains 71 million tons of measured, indicated, and inferred ore reserves averaging 0.319% Cu and 0.071% MoS_2 (1972 data). Underground drilling (1,322 ft) indicated an average grade of 0.062% WO_3; thirty chip samples ranged 0.04%-0.07% WO_3. Assays ranged from 0.002 to 0.006 oz/ton Au and from 0.049 to 0.088 oz/ton Ag. A copper-molybdenite concentrate assayed 0.40% Pb, 0.80% Zn, and 0.18% Bi.

GEOLOGIC SETTING: The Sunrise breccia pipe is genetically related to Oligocene intrusive rocks, which crop out north of the pipe. Quartz diorite fragments increase in abundance with depth. The elliptical pipe was delineated by drilling and underground exploration. The exposed vertical extent of the pipe extends from an elevation of 5,000 ft to 3,000 ft (the elevation of the exploration adit). At an elevation of 5,000 ft, the pipe is 200 ft by 700 ft; at 3,000 ft, the dimensions are 350 ft by 900 ft. The cross-sectional area of the pipe continues to increase with depth. The pipe plunges at an angle of minus 70 degrees to the south.

COMMENTS: The property has been explored extensively and includes 17,338 ft of diamond drilling, 800 ft of percussion drilling, 3,728 ft of underground adits, 557 ft of drifts, and 1,256 ft of cross-cuts. Metallurgical testing of bulk samples was completed in 1971. The most recent evaluation was done by Brenmac. Companies that explore the pipe prior to Brenmac include Century Explorations Inc., Bear Creek Mining Co., and Malaspina Mining Co. The property consists of four lode claims and surrounding state leases. The four claims are the Elderado (sometimes called Eldorado), Oxdental (sometimes referred to as Oxedental, Occidental, or Oxidental), the Quaker City, the Wall Street, and the Sultan Basin Mining Co. mill site.

UNPUBLISHED INFORMATION: Garrett, C. R. Jr., 1969, Report of mineral examination, Job Nos. 83 and 99, U.S. Department of Agriculture Forest Service. Glass, J. R., 1971, Sunrise breccia pipe ore reserve report. Hedderly-Smith, D. A., 1972, Geology of the Sunrise breccia pipe, Sultan Basin, Snohomish County, Washington. These reports are in DGER files.

REFERENCES

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Grant, A. R., 1969, Chemical and physical controls for base metal deposition in the Cascade Range of Washington: Washington Division of Mines and Geology Bulletin 58, 107 p.

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Tabor, R. W.; Booth, D. B.; Vance, J. A.; Ford, A. B.; Ort, M. H., 1988, Preliminary geologic map of the Sauk River 30 by 60 minute quadrangle, Washington: U.S. Geological Survey Open-File Report 88-692, 50 p., 2 sheets.

Sunset (541)

ALTERNATE NAMES		DISTRICT	COUNTY
		Index	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Baring	1:24,000	Skykomish River	Wenatchee
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 51′ 25.78″ N	121° 27′ 45.60″ W	sec. 1, 27N, 10E; sec. 6, 27N, 11E	

LOCATION: on the north side of Trout Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Index batholith	granodiorite and tonalite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite bornite molybdenite silver copper	pyrite, quartz, calcite, marcasite, serpentine, talc, chlorite, kaolinite, in a gangue of altered granodiorite

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	

PRODUCTION: Produced from 1902 to 1905, in 1907, and 1916 to 1930; from 1926 to 1929, the total production was 193,112 tons. Total production is 1,500 oz Au, 156,000 oz Ag, and 12,912,000 lb Cu from 263,500 tons of ore (Huntting, 1956, p. 91).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Ore occurs as lenses of chalcopyrite and bornite and quartz with pyrite gangue in a shear zone in granodiorite. The shear zone has a well-developed footwall (where ore is generally found) and a diffuse hanging wall. Chalcopyrite and bornite are the principal ore minerals (Patty, 1921, p. 285-287).

GEOLOGIC SETTING: The Sunset mine occurs in a shear zone in the Index batholith (Patty, 1921, p. 285; Tabor and others, 1982, geol. map).

REFERENCES

Broughton, W. A., 1942, Inventory of mineral properties in Snohomish County, Washington: Washington Division of Geology Report of Investigations 6, 64 p., 1 pl.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Patty, E. N., 1921, The metal mines of Washington: Washington Geological Survey Bulletin 23, 366 p.

Tabor, R. W.; Frizzell, V. A., Jr.; Booth, D. B.; Whetten, J. T.; Waitt, R. B.; Zartman, R. E., 1982, Preliminary geologic map of the Skykomish River 1:100,000 quadrangle, Washington: U.S. Geological Survey Open-File Report 82-747, 31 p., 1 pl.

Weaver, C. E., 1912, Geology and ore deposits of the Index mining district: Washington Geological Survey Bulletin 7, 96 p.

Wayside (542)

ALTERNATE NAMES		DISTRICT	COUNTY
		Index	Snohomish
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Granite Falls	1:24,000	Sauk River	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 5′ 44.24″ N	121° 56′ 4.29″ W	S½ S½ sec. 8, 30N, 7E

LOCATION: 1.5 mi northeast of Granite Falls

HOST ROCK: NAME	LITHOLOGY	AGE
Western melange belt	graywacke and argillite	middle Cretaceous - Paleocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, cherty quartz
Au	galena	
Ag	sphalerite	
Pb	bornite	
Zn		
V		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Approximately $500,000 in high-grade ore shipped (Huntting, 1956, p. 91).

TECTONIC SETTING: Rocks of the area include various accreted (melange) terranes and batholithic rocks representing early igneous activity of the Cascade magmatic arc.

ORE CONTROLS: Vein is 6-18 in. wide and is in slate and siliceous limestone (Huntting, 1956, p. 91)

GEOLOGIC SETTING: The rocks near the Wayside mine are part of the Western melange belt and consist mostly of pervasively foliated gray to black lithofeldspathic and volcanolithic subquartzose sandstone and semischist and locally abundant cobble conglomerate (Tabor and others, 1988, p. 21). Huntting (1956, p. 91) also reports the presence of siliceous limestone.

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C. I. Smith (296)

ALTERNATE NAMES	DISTRICT	COUNTY
Smith Painted Desert	Mount Spokane area	Spokane

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt. Kit Carson	1:24,000	Spokane	Spokane

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 55′ 24.03″ N	117 11 9.91 W	E½SW¼ sec. 13, 28N, 44E

LOCATION: in the Mount Spokane area, 2 mi south of the Dahl property

HOST ROCK: NAME	LITHOLOGY	AGE
granitic rocks of the Mount Spokane area	alaskite, pegmatite, granite	Cretaceous - Tertiary

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
alaskite and pegmatite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	autunite	

DEPOSIT TYPE	MINERALIZATION AGE
authigenic uranium stockwork	

PRODUCTION: At least one carload of ore was produced in 1956 (Huntting, 1956, p. 355).

TECTONIC SETTING: Cretaceous granitic rocks of batholithic dimensions intrude high-grade metamorphic rocks of the Mount Spokane area (Rhodes and Hyndman, 1988).

ORE CONTROLS: Autunite occurs in grus of weathered alaskite and in shears and fractures in alaskite and pegmatite (DGER unpubl. data). Commercial-grade ore was found in six of ten wagon-drill holes. Reported reserves were 6,650 tons of ore to a depth of 60 ft (Huntting, 1956, p. 355).

GEOLOGIC SETTING: Uranium mineralization of the C. I. Smith mine is in Cretaceous-Tertiary alaskite of the Mount Spokane area (Weisenborn and Weis, 1976, geol. map text).

REFERENCES

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Dahl (295)

ALTERNATE NAMES	DISTRICT	COUNTY
Dahl Uranium Lehmbecker lease		Spokane

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt. Kit Carson	1:24,000	Spokane	Spokane

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 57′ 13.14″ N	117° 11′ 12.99″ W	SE¼SE¼NW¼ sec. 1, 28N, 44E

LOCATION: 1.25 mi northeast of the original discovery on the Dahl (Daybreak) uranium property; in the western foothills of Mount Spokane

HOST ROCK: NAME	LITHOLOGY	AGE
granitic rocks of the Mount Spokane area	alaskite, pegmatite, granite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	autunite	
Th	monazite	
	xenotime	
	meta-autunite	

DEPOSIT TYPE	MINERALIZATION AGE
authigenic uranium	

PRODUCTION: A few carloads of ore were reported to have been produced in 1956 (Huntting, 1956, p. 354).

TECTONIC SETTING: Cretaceous granitic rocks of batholithic dimensions intrude high-grade metamorphic rocks of the Mount Spokane area (Rhodes and Hyndman, 1988).

ORE CONTROLS: Meta-autunite is associated with fractures in alaskite and pegmatite. At the Lehmbecker lease, the autunite fills fractures in pegmatite and granite; there are trace amounts of monazite (DGER unpubl. data). High-grade autunite-bearing ore was exposed in two places more than 100 ft apart. One drill hole intersected ore from 22 ft to 35 ft deep, and a second hole about 340 ft south of the first intersected ore at a depth of 35 ft. A vein 21 in. wide and 17 ft long, contains as much as 2% U_3O_8 (Huntting, 1956, p. 354).

GEOLOGIC SETTING: Uranium mineralization at the Dahl mine is in Cretaceous-Tertiary alaskite and pegmatite of the Mount Spokane area (Weisenborn and Weis, 1976, geol. map text).

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Daybreak (294)

ALTERNATE NAMES		DISTRICT	COUNTY
Dahl lease			Spokane
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt. Kit Carson	1:24,000	Spokane	Spokane
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 56′ 38.32″ N	117° 11′ 48.73″ W	E½NE¼ sec. 11, 28N, 44E	

LOCATION: about 18 mi northeast of Spokane, in the Mount Spokane area

HOST ROCK: NAME	LITHOLOGY	AGE
alaskite of Mount Spokane area	alaskite	Cretaceous - Tertiary

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
quartz monzonite of Mount Spokane area	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	meta-autunite uraninite	

DEPOSIT TYPE	MINERALIZATION AGE
authigenic uranium stockwork disseminated	

PRODUCTION: Five ore bodies were worked by open pit. Production began in August 1955. A total of 5,196 tons was produced through September 1956; the ore averaged 0.3346% U_3O_8 (Huntting, 1956, p. 354).

TECTONIC SETTING: Cretaceous granitic rocks of batholithic dimensions intrude high-grade metamorphic rocks of the Mount Spokane area (Rhodes and Hyndman, 1988).

ORE CONTROLS: Five ore bodies occur in an area 250 ft by 900 ft (Huntting, 1956, p. 354). Aplite, alaskite, and pegmatite are slightly altered and weathered. All rock types are highly fractured and are in layers and lenses. Meta-autunite was deposited in joints, fractures, and open spaces. The uranium was transported by and precipitated from circulating ground waters. Some meta-autunite crystals are of museum quality (DGER unpubl. data).

GEOLOGIC SETTING: Uranium mineralization of the Daybreak mine is in Cretaceous-Tertiary alaskite of the Mount Spokane area (Weisenborn and Weis, 1976, geol. map text).

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Herem-Moore (291)

ALTERNATE NAMES		DISTRICT	COUNTY
Bear Creek uranium			Spokane
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt. Kit Carson	1:24,000	Spokane	Spokane
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 56′ 51.63″ N	117°Δ 12′ 27.52″ W	SE¼SE¼SW¼ sec. 2, 28N, 44E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
granitic rocks of Mount Spokane area	alaskite, pegmatite, granite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	meta-autunite	

DEPOSIT TYPE: authigenic uranium

MINERALIZATION AGE:

PRODUCTION: Produced U_3O_8 in 1956 (DGER unpubl. data).

TECTONIC SETTING: Cretaceous granitic rocks of batholithic dimensions intrude high-grade metamorphic rocks of the Mount Spokane area (Rhodes and Hyndman, 1988).

ORE CONTROLS: Fine- to medium-grained alaskite is extensively weathered and fractured; uranium occurs in joints, fractures, and grus derived from the alaskite (DGER unpubl. data).

GEOLOGIC SETTING: Uranium mineralization of the Herem-Moore property is found in Cretaceous-Tertiary alaskite of the Mount Spokane area (Weisenborn and Weis, 1976, geol. map text).

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Huffman (292)

ALTERNATE NAMES		DISTRICT	COUNTY
North Star Uranium			Spokane
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt. Kit Carson	1:24,000	Spokane	Spokane

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 57′ .47″ N	117° 10′ 46″.99 W	SE¼NW¼SE¼ sec. 1, 28N, 44E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
granitic rocks of Mount Spokane area	alaskite, pegmatite, granite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	autunite	clay

DEPOSIT TYPE: authigenic uranium

MINERALIZATION AGE:

PRODUCTION: Seven carloads of ore were shipped in 1956 (Huntting, 1956, p. 354).

TECTONIC SETTING: Cretaceous granitic rocks of batholithic dimensions intrude high-grade metamorphic rocks of the Mount Spokane area (Rhodes and Hyndman, 1988).

ORE CONTROLS: Autunite is associated with light-green and brown clay in weathered alaskite and pegmatite (DGER unpubl. data).

GEOLOGIC SETTING: Uranium mineralization at the Huffman deposit is in alaskite of the Mount Spokane area (Weisenborn and Weis, 1976, geol. map text).

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Silver Hill (293)

ALTERNATE NAMES	DISTRICT	COUNTY
		Spokane

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spokane SE	1:24,000	Spokane	Spokane

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 33′ 33.22″ N	117° 19′ 31.50″ W	secs. 23 and 24, 24N, 43E

LOCATION: on Silver Hill

HOST ROCK: NAME	LITHOLOGY	AGE
gneiss of the Spokane dome of the Priest River complex	graphitic gneiss and interlayered quartzite	Precambrian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
biotite quartz monzonite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Sn	scheelite	quartz, feldspar, andalusite, sillimanite
W	wolframite	
Ag	cassiterite	
Pb	argentiferous galena	

DEPOSIT TYPE	MINERALIZATION AGE
metamorphic segregation vein	

PRODUCTION: Produced 125 tons of tin ore, which was not shipped (Huntting, 1956, p. 340).

TECTONIC SETTING: Cretaceous or Tertiary quartz monzonite intrudes Precambrian gneiss of the Spokane dome of the Priest River core complex (Joseph, 1990).

ORE CONTROLS: Eight coarse-grained (pegmatitic) veins in schist and quartzite average 160 ft in length, 3 ft in width, and 40 ft in depth (Huntting, 1956, p. 340). The mineralogy of the different types of coarse-grained metamorphic-segregation-type veins is (1) sillimanite-andalusite, (2) feldspar-quartz, (3) quartz, and (4) later quartz veins. Cassiterite occurs only with the sillimanite-andalusite metamorphic-segregation-type veins. Scheelite and wolframite or galena occur in later quartz veins (Page, 1942, p. 180-188).

GEOLOGIC SETTING: Cretaceous or Tertiary granitic rocks (quartz monzonite) cut older diorite dikes, all of which intrude Precambrian gneisses that probably are Archean (Page, 1942, p. 180-189; Joseph, 1990).

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A and C (182)

ALTERNATE NAMES	DISTRICT	COUNTY
Smoky Bullion Bruce Creek	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gillette Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 44′ 30.21″ N	117° 52′ 27.10″ W	NE¼ sec. 3, 37N, 39E, and SW¼ sec. 34, 38N, 39E

LOCATION: on the divide between Clugston Creek and the east branch of Bruce Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, upper unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Spirit pluton, quartz monzonite	Cretaceous
granite and aplite dikes	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, pyrrhotite, tremolite
Zn	sphalerite	
Pb	galena	
Ag	molybdenite	
Au		
Mo		

DEPOSIT TYPE	MINERALIZATION AGE
shear zone vein	

PRODUCTION: Produced in 1941 (96 tons), 1943, and 1944. Value from 96 tons in 1941 was $1,919 (Huntting, 1956, p. 92).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore minerals that replace limestone in a zone 2 to 12 ft wide are 6 ft from a granite contact (Huntting, 1956, p. 92). The mineralized zone trends east and appears to dip steeply. Ore minerals observed in an open cut include dark brown to black sphalerite and fine-grained galena. Molybdenite was found on joint surfaces in tremolitic limestone marble as well as disseminated in granite (Mills, 1977, p. 83).

GEOLOGIC SETTING: The A and C deposit is in the upper unit of the Metaline Formation. It is near the Spirit pluton. A granitic dike with chilled margins truncates mineralization in the open cut (Mills, 1977, p. 83).

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Admiral (144)

ALTERNATE NAMES	DISTRICT	COUNTY
	Chewelah	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Stensgar Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 9′ 48.83″ N	117° 54′ 43.22″ W	NW¼ sec. 28 and NE¼ sec. 29, 31N, 39E

LOCATION: near the junction of Deer and Meadow Creeks.

HOST ROCK: NAME	LITHOLOGY	AGE
McHale Slate	slate	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diorite dike	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz
Ag	chalcocite	
Pb	tenorite	
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced at various times from 1915 through 1932. Huntting, (1956, p. 92) estimates the total value of ore produced was probably $10,000.

TECTONIC SETTING: Part of the known western margin of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein is parallel to the bedding of the schist and argillite and ranges from 2 in. to 14 in. in width (Weaver, 1920, p. 182-184). Weaver further reports that the mineralized zone occurs along a fissure parallel to the schistosity.

GEOLOGIC SETTING: The Admiral mine is in the McHale Slate of the Middle Proterozoic Deer Trail Group (Evans, 1987, geol. map).

REFERENCES

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Admiral Consolidated (273)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 55′ 42.07″ N	117° 34′ 28.61″ W	center W1/2 sec 36, 40N, 41E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	dolomite
Pb	galena	
Ag		
Cd		

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Total production from 1902 to 1956 was 43,533 lb Pb, 1,596,183 lb Zn, and 668 oz Ag (Mills, 1977, p. 83). Production in 1947 through 1949 was 1,441 tons; in 1950, 406,166 lb Zn, 10,866 lb Pb, and 135 oz Ag; in 1951, 15,000 tons of ore yielded 308,750 lb Zn, 8,500 lb Pb, and 125 oz Ag (Huntting, 1956, p. 375).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization occurs in a 5-10-ft-wide zone and consists of veinlet and disseminated sphalerite in dolomite (Huntting, 1956, p. 375).

GEOLOGIC SETTING: Host rocks are white, light-gray, and dark-gray limestone and slightly siliceous gray dolomite breccia of the upper limestone unit of the Metaline Formation (Mills, 1977, p. 83).

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Aichan Bee (142)

ALTERNATE NAMES	DISTRICT	COUNTY
Austin Mineral Hill H & B	Deer Trail Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Hunters	1:24,000	Coulee Dam	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 0′ 56.27″ N	118° 7′ 57.84″ W	center NE¼ sec. 15, 29N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Stensgar Dolomite	dolomite and argillite	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Zn Cu	sphalerite galena chalcopyrite	pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein disseminated	

PRODUCTION: A small amount of zinc ore was shipped about 1943. A 4-ft sample ran 1.9% Pb, 2.2% Zn, and 1.75 oz/ton Ag (Huntting, 1956, p. 323).

TECTONIC SETTING: Part of the known western margin of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is disseminated along a fault; the ore is in quartzite near the contact with granite (Jenkins, 1924, p. 136-137).

GEOLOGIC SETTING: The Aichan Bee mine is in the Stensgar Dolomite of the Deer Trail Group (Campbell and Raup, 1964, geol. map).

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Amazon (183)

ALTERNATE NAMES		DISTRICT	COUNTY
		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 19′ 19.05″ N	117° 39′ 46.95″ W	secs. 29 and 32, 33N, 41E.	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Wallace Formation, lower part	dark, laminated argillite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic
mafic dikes	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	limonite, quartz
Ag	azurite	
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced between 1911 and 1918 and yielded 6 oz Au, 2,191 oz Ag, and 29,540 lb Cu from 665 tons of ore (Moen, 1976, p. 66).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The quartz vein ranges from 2 to 16 ft wide along bedding faults in argillite and quartz mica schist (Huntting, 1956, p. 93; Moen, 1976, p. 66).

GEOLOGIC SETTING: The Amazon deposit is in argillite of the lower part of the Wallace Formation. It also is near a major shear zone (Miller and Clark, 1975, geol. map).

REFERENCES

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Anaconda (150)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 53.54″ N	117° 33′ 24.37″ W	NW corner sec. 30, 40N, 42E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Maitlen Phyllite, Reeves Limestone Member	limestone	Cambrian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
lamprophyre dikes	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz, calcite
Zn	sphalerite	
Ag	tetrahedrite	
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 30 tons of ore in 1902 (Huntting, 1956, p. 237).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein is 2-4 ft wide and occurs between limestone and schist. It consists of alternating bands of partly replaced country rock and ore minerals. A solid band of galena 6 in. wide was noted in one place (Huntting, 1956, p. 237). Bancroft (1914, p. 57) reports the ore minerals are distributed through the vein in distinct bands.

GEOLOGIC SETTING: The host rock is probably the Reeves Limestone member of the Maitlen Phyllite (Mills, 1977, p. 133).

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O'Keefe, M. E., 1980, Structural geology and mineral deposits of Red Top Mountain, Stevens County, Washington: Washington State University Master of Science thesis, 152 p., 1 pl.

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Antelope (207)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bossburg	1:24,0000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 51′ 53.93″ N	118° 0′ 26.79″ W	sec. 20, 39N, 38E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	andesite	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	chalcopyrite	pyrrhotite, pyrite
Cu	melanterite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Fifty tons of ore are said to have been mined (Huntting, 1956, p. 166; Weaver, 1920, p. 251).

TECTONIC SETTING: These volcanic rocks are part of the Jurassic Rossland Group, which was deposited in island arcs. The Rossland Group is part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic (Monger and others, 1982).

ORE CONTROLS: Massive pyrrhotite, pyrite, and chalcopyrite are present in a 2.5-4-ft-wide, north-trending vein in volcanic rocks of the Rossland Group. Small amounts of melanterite occur in pockets in the vein (Weaver, 1920 p. 251).

GEOLOGIC SETTING: The vein is in volcanic rocks of the Jurassic Rossland Group (Hyde, 1985).

COMMENTS: An inclined shaft was sunk on the vein at a slope of 30 degreessays as high as $65/ton were reported by Weaver (1920, p. 251).

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B and B (184)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Waits Lake	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 13′ 43.34″ N	117° 48′ 28.90″ W	SE¼ sec. 31, 32N, 40E

LOCATION: 1/2 mi south of Browns Lake

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	cuprite	quartz, calcite, limonite
Au	malachite	
Ag	azurite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1917 (Huntting, 1956, p. 93).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization consists of a quartz-calcite vein in dolomite (Huntting, 1956, p. 93).

GEOLOGIC SETTING: The B and B deposit is in Edna Dolomite of the Middle Proterozoic Deer Trail Group (Waggoner, 1990, geol. map, p. 25).

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Waggoner, S. Z., compiler, 1990, Geologic map of the Chewelah 1:100,000 quadrangle, Washington-Idaho: Washington Division of Geology and Earth Resources Open File Report 90-14, 63 p., 1 pl.

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Bechtol (149)

ALTERNATE NAMES	DISTRICT	COUNTY
W. J. Bryan Woohaa	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Deep Lake	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 57.58″ N	117° 35′ 39.61″ W	secs. 23 and 26, 39N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, intraformational breccia	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Ag Fe	galena cerussite anglesite	siderite, dolomite, calcite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Reportedly produced 90 tons of galena ore prior to 1924. Produced 6.034 tons in 1917 and 5.307 tons in 1918, which was shipped by wagon to the Northport smelter. Shipments also were reported in 1925, 1937, 1939, 1940 (77 tons), and 1943 (Huntting, 1956, p. 237). Total recorded production is 249,230 lb Pb and 198 oz Ag (Mills, 1977, p. 86).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987).

ORE CONTROLS: Galena and cerussite occur as nodules in a matrix of soft limonite, clay, and decomposed dolomite along faults of diverse orientation (Huntting, 1956, p. 237). Campbell (1949, p. 2-3) reports mineralization occurs along a brecciated fault zone. Yates (1964, geol. map) shows the mine is in dolomitic intraformational breccia.

GEOLOGIC SETTING: The mine is in intraformational breccia of the Metaline Formation (Yates, 1964, geol. map).

REFERENCES

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Yates, R. G., 1964, Geologic map and sections of the Deep Creek area, Stevens and Pend Oreille Counties, Washington: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-412, 1 sheet, scale 1:31,680.

Beecher (208)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Laurier	1:24,0000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 55′ 20.50″ N	118° 9′ 38.66″ W	near center sec. 31, 40N, 37E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	andesite, schist	Jurassic
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
diabase diorite (?) dike		Eocene ?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	pyrite, limonite, quartz, calcite
Ag	sylvanite	
Cu	galena	
Pb	chalcopyrite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Two shipments aggregating 22 tons were reported for the period prior to 1913; these were reported to carry slightly more than 1 oz/ ton Au and a trace of Ag (Bancroft, 1914, p. 88).

TECTONIC SETTING: Meta-andesites and basaltic andesite of the Jurassic Rossland Group were originally deposited in an island arc setting. These rocks are part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic (Monger and others, 1982). Regional east-west extension during the Eocene resulted in the formation of metamorphic core complexes, intrusion of acidic plutonic and hypabyssal rocks, and extrusion of dacitic to andesitic lavas (Holder and others, 1982).

ORE CONTROLS: Two steeply dipping quartz veins trending N42E; one vein is 4-24 in. wide, the other is as much as 8 ft wide. Country rock is schist and volcanic rocks cut by a diabase dike (Huntting, 1956, p. 166).

GEOLOGIC SETTING: In Rossland Group volcanic and sedimentary rocks; cut by a diabase dike.

COMMENTS: Workings consisted of a shaft and underground workings.

REFERENCES

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Big Chief (152)

ALTERNATE NAMES	DISTRICT	COUNTY
Royal Silver Key		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gillette Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 42′ 14.12″ N	117° 51′ 49.58″ W	SW¼ sec. 14, 37N, 39E

LOCATION: on a branch of Clugston Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Ag Zn	galena sphalerite cerussite	pyrite, quartz, siderite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley vein	

PRODUCTION: Produced 50 tons prior to 1940 (Huntting, 1956, p. 237). Total production is 220 tons of ore containing 24,595 lb Pb, 5,545 lb Zn, 139 lb Cu, and 182 oz Ag (Mills, 1977, p. 89).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore minerals occur as nodules and stringers along zones in fractured and brecciated dolomite and limestone. Also three quartz veins carrying ore minerals occur in limestone (Huntting, 1956, p. 237). Brecciation of the host carbonate is probably solution-collapse-related (Mississippi Valley-type mineralization) and is not a result of faulting (Mills, 1977, p. 90). The tetrahedrite in a quartz vein is later vein-type mineralization.

GEOLOGIC SETTING: The Big Chief mine is in the middle dolomite unit of the Metaline Formation. Yellowhead-type mineralization at the Big Chief mine occurs within 150 ft of the Ledbetter Slate contact. The normal position of Yellowhead mineralization is much farther from the Ledbetter Slate contact, which Mills (1977, p. 89-96) interpreted as either a fault or unconformity at the Big Chief deposit.

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Big Iron (232)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Churchill Mtn	1:24,0000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 49.76″ N	118° 3′ 26.96″ W	SW¼ SW¼ sec. 24, 40N, 37E

LOCATION: on the east side of Sulphide Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Mount Roberts Formation	limestone, graywacke	Permian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
lamprophyre	Eocene
dacite dikes	Eocene
metagabbro	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	magnetite	pyrite, pyrrhotite, hematite, limonite
W	chalcopyrite	
Au	scheelite	
Ag	gold	

DEPOSIT TYPE	MINERALIZATION AGE
manto	

PRODUCTION: Produced 35,000 tons of magnetite ore between 1924 and 1937. Also produced in 1940-1941 (Huntting, 1956, p. 201). The ore was reported to carry as much as $3 or $4 in Au per ton (Broughton, 1945, p. 9).

TECTONIC SETTING: The Mount Roberts Formation was deposited along an active margin. They are unconformably overlain by volcanic rocks of the Jurassic Rossland Group. These rocks are part of the Quesnellia terrane, which was accreted to North America prior to the mid-Jurassic (Monger and other, 1982). The rocks were affected by deformation associated with the Kootenay arc, a northeast-trending zone (in Washington) of multiply deformed rock (Watkinson and Ellis, 1987). Acidic and basic dikes were intruded during Eocene regional extension.

ORE CONTROLS: The Big Iron deposit is an elongate replacement zone; it is 480 ft long, 130 ft wide, and 45 ft deep and is in limestone interbedded with graywacke. Ore occurs in bands separated by the graywacke interbeds (Broughton, 1945, p. 9; Huntting, 1956, p. 201). Schistose gabbro contains small quartz veinlets with pyrite and chalcopyrite (Bancroft, 1914, p. 82). Broughton (1945, p. 10) suggested that mineralization was controlled by the original composition of the rock and by a zone of fracturing that trends N55W.

GEOLOGIC SETTING: The Big Iron deposit is hosted by graywacke and minor amounts of limestone and argillite of the Permian Mount Roberts Formation. The Mount Roberts Formation has been intruded by a basic sill of probable Jurassic age (Fox, 1981, geol. map; Stoffel, 1990, geol. map). These rocks have been cut by basic and acidic dikes of probable Eocene age (Broughton, 1945, p. 8; Fox, 1981).

COMMENTS: The main development work was an open pit 200 ft long and 100 ft wide and an average depth of 25 ft. Several caved shafts were found at the property (Broughton, 1945, p. 8).

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Broughton, W. A., 1945, Some magnetite deposits of Stevens and Okanogan Counties, Washington: Washington Division of Geology Report of Investigations 14, 24 p., 5 pl.

Culver, H. E.; Broughton, W. A., 1945, Tungsten resources of Washington: Washington Division of Geology Bulletin 34, 89 p., 23 pl.

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Big Smoke (270)

ALTERNATE NAMES		DISTRICT	COUNTY
Big Smoke Uranium			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Benjamin Lake	1:24,000	Coulee Dam	Ritzville
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 51′ 4.60″ N	118° 6′ 22.97″ W	SW¼ NE¼SE¼ sec. 11, 27N, 37E	

LOCATION: near the Spokane River

HOST ROCK: NAME	LITHOLOGY	AGE
Sanpoil Volcanics	pyroclastic rocks and carbonaceous shale	Eocene

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
quartz monzonite porphyry, biotite granodiorite, and granite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	metatorbernite	biotite
Th	monazite	
	complex uranium oxide	
	uraninite	
	gummite	
	coal	

DEPOSIT TYPE	MINERALIZATION AGE
unconformity and vein-type uranium	Tertiary

PRODUCTION: A few carloads of ore were shipped in 1956 (Huntting, 1956, p. 356).

TECTONIC SETTING: Tertiary volcaniclastic rocks were deposited on Cretaceous granitic rocks (Becraft and Weis, 1963).

ORE CONTROLS: The mineralization is in a pebble conglomerate (fluvial channel deposit, chiefly quartz monzonite pebbles) with a sand-sized matrix, and the deposit is adjacent to northwest-trending faults. Arkosic sedimentary rocks overlie the ore-bearing rocks. Quartz monzonite porphyry crops out to the south. There is slight to extensive argillization and sericitization of the quartz monzonite porphyry. Disequilibrium is indicated by higher chemical uranium values than radiation values (DGER unpubl. data). During the early years of the mine Huntting (1956, p. 355-356) noted two veins were being mined. The veins were in a 30-ft-wide fault zone in arkose near the contact with granite.

GEOLOGIC SETTING: The uranium deposits of the Big Smoke mine are in the Eocene Sanpoil Volcanics. The volcanics were intensely sheared along a fault (Becraft and Weis, 1963, p. 66-67; Waggoner, 1990).

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Black Rock (275)

ALTERNATE NAMES	DISTRICT	COUNTY
Washington Black Rock Gorien Zinc		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 13.45″ N	117° 42′ 22.12″ W	sec. 24, 39N, 40E

LOCATION: on the east side of Deep Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	dolomite
Pb	smithsonite	
	galena	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 6 carloads of ore prior to 1920, 5,280 tons in 1922-1924, $300,000 prior to 1930, and also produced in 1943 (Huntting, 1956, p. 376). Total production was 140,856 lb Pb, 7,903,447 lb Zn, and 377 oz Ag (Mills, 1977, p. 96).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore occurs disseminated along bedding planes in white, nonsilicified dolomitic marble. Two ore bodies (indicated by drilling) appear to have moderate ore reserves with an average grade of 8% Zn (Huntting, 1956, p. 376). Ore minerals in the vein are brecciated and are localized along a fault zone, suggesting this is an epigenetic deposit (Mills, 1977, p. 96).

GEOLOGIC SETTING: The Black Rock occurs in the middle dolomite unit of the Metaline Formation (Mills, 1977, p. 96).

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Blue Bar placer (221)

ALTERNATE NAMES		DISTRICT	COUNTY
		Kettle Falls	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Cedonia	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 10′ 12.90″ N	118° 11′ 15.70″ W	sec. 20, 31N, 37E

LOCATION: sec. 20, 31N, 37E

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1934.

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Bonanza (153)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Echo Valley	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 43′ 45.77″ N	117° 59′ 23.62″ W	secs. 2 and 11, 37N, 38E	

LOCATION: 5 mi southeast of Bossburg.

HOST ROCK: NAME	LITHOLOGY	AGE
argillite and phyllite	argillite and phyllite	Devonian - Carboniferous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Ag Zn Cu	galena sphalerite	pyrite, quartz, siderite

DEPOSIT TYPE	MINERALIZATION AGE
shear zone vein	

PRODUCTION: Produced 2,000 tons prior to 1890; produced in 1906-1908, 1910-1911, 1914, 1916, 1923-1924, and 1929-1930. Reported total value was $40,000 prior to 1944 and $2,000,000 from 1944 to 1950. Ore production in 1949 was 14,163 tons; 1950, 20,000 tons; and 1951,13,700 tons. Additional production in 1952-1954 (Huntting, 1956, p. 238).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: This lenticular deposit occurs along a shear zone in chlorite and graphite schist. Ore occurs as irregular stringers in the zone. The zone is as much as 4 ft wide. Another ore body 27 ft thick was discovered in 1950 (Huntting, 1956, p. 238).

GEOLOGIC SETTING: The Bonanza mine is in chlorite and graphite schist, part of a sequence of Devonian to Carboniferous argillaceous rocks in northeastern Washington (Joseph, 1990. geol. map, p. 22-23).

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Bonanza Copper (185)

ALTERNATE NAMES		DISTRICT	COUNTY
Maryland		Cedar Canyon	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 3′ 19.51″ N	118° 2′ 46.71″ W	sec. 32, 30N, 38E	

LOCATION: about 1 mi north of the Germania mine

HOST ROCK: NAME	LITHOLOGY	AGE
Togo Formation	argillite	Proterozoic
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
granodiorite		Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz, calcite, pyrite
Ag	bornite	
Au	malachite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced one small shipment in 1916 (Huntting, 1956, p. 94).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Zones in argillite and schist were replaced by mineralized quartz veinlets. The widest zone was 5 ft. Quartz veinlets vary from a few inches to 2 ft in width (Huntting, 1956, p. 94).

GEOLOGIC SETTING: The Bonanza Copper deposit is in the Togo Formation of the Proterozoic Deer Trail Group and also near the contact with granodiorite of the Fruitland area (Campbell and Raup, 1964, geol. map).

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Brooks (241)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 1′ 57.67″ N	118° 6′ 25.66″ W	near NE corner sec. 11, 29N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	stephanite	pyrite, quartz
Pb	galena	
Zn	sphalerite	
Cu	tetrahedrite	
Au		

DEPOSIT TYPE: vein

MINERALIZATION AGE:

PRODUCTION: Two carloads of ore were shipped prior to 1901 (Huntting, 1956, p. 324).

TECTONIC SETTING: Part of the known western extent of the Precambrian Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A 5- to 7-ft-wide group of quartz veins cuts a series of limestones and argillites, which were intruded by lamprophyre dikes (Huntting, 1956, p. 324).

GEOLOGIC SETTING: The Brooks deposit is in dolomite and slate in the Edna Dolomite of the Proterozoic Deer Trail Group (Campbell and Raup, 1964).

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Bullion (289)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Belshazzer Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 53′ 16.27″ N	117° 54′ 25.63″ W	SW¼SW¼ sec.18, 39N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Flagstaff Mountain sequence	siltite, argillite	Devonian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	sphalerite	quartz, pyrite, siderite, ankerite
Ag	galena	
Au	bornite	
Cu	chalcopyrite	
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	Devonian

PRODUCTION: Produced 11 tons in 1925 that yielded 115 oz Ag and 8,253 lb Pb (Moen, 1976, p. 85).

TECTONIC SETTING: Sediments that became the Flagstaff Mountain sequence were deposited in an extensional basin or in a continental-slope setting. These rocks are in the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Reported to contain 50-80-ft-thick quartz veins that cut metasedimentary rocks (Colville Engineering Company, 1944). Sulfide mineralization is present as streaks, pods, and irregular masses or patches generally less than an inch wide and from less than an inch to as much as a few inches long (Beka, 1980).

GEOLOGIC SETTING: Veins crosscut bedding in the metasedimentary rocks of the Flagstaff Mountain sequence (Joseph, 1990, geol. map).

COMMENTS: Mine was reported to consist of a 160-ft shaft from which drifts of 80 and 100 ft had been driven (Huntting, 1956).

REFERENCES

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Burrus (276)

ALTERNATE NAMES		DISTRICT	COUNTY
Rocky Creek		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Aladdin	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 43′ 26.87″ N	117° 39′ 43.91″ W	sec. 8, 37N, 41E	

LOCATION: on Rocky Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Maitlen Phyllite	phyllite and minor quartzite and carbonate	Cambrian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	chalcopyrite	quartz
Ag	galena	
Zn	sphalerite	
Cu		
Au		

DEPOSIT TYPE: mineralized zone

MINERALIZATION AGE:

PRODUCTION: Produced in 1935, 1938, and 1939 (Huntting, 1956, p. 376). The yield from 81 tons of ore was 1,026 oz Ag, 3,155 lb Pb, and 197 lb Cu (Moen, 1976, p. 85).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralized zone has a maximum width of 60 ft and consists of small quartz veins in argillite (Huntting, 1956, p. 376).

GEOLOGIC SETTING: The Burrus mine is in the Maitlen Phyllite (Joseph, 1990, geol. map, p. 31-32).

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Moen, W. S., 1976, Silver occurrences of Washington: Washington Division of Geology and Earth Resources Bulletin 69, 188 p.

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Calhoun (274)

ALTERNATE NAMES		DISTRICT	COUNTY
Anderson			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 55′ 9.72″ N	117° 35′ 28.64″ W	NW¼ sec. 2 39N, 41E	

LOCATION: on the west side of Deep Creek, 0.5 mi west of Leadpoint

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
lamprophyre dike	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, silicified dolomitic limestone, quartz, fluorite
Pb	galena	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced between 1948 and 1952. Total production to the end of 1951 was about 100,000 tons (Huntting, 1956, p. 375). The Calhoun operated up until 1968. During the course of this later production, James Browne reported (*in* Mills, 1977, p. 96-98) the ore averaged less than 4% combined Pb and Zn.

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore minerals occur disseminated in limestone (Huntting, 1956, p. 375). Ore-grade mineralization occurs in dolomite breccia. Sphalerite is more abundant than galena but is about equal in abundance to pyrite. The ratio of pyrite to sphalerite, however, does vary considerably from place to place. Paragenetically, quartz, white dolomite, and pyrite preceded deposition of fine- to medium-grained, yellow to orange to reddish-brown to dark-brown sphalerite and galena. Ore bodies are elongate in the direction of strike and range up to 80 ft wide, 80 ft high, and 650 ft long. The average ore body is about 35 to 45 ft wide, 20 to 30 ft high, and 300 to 350 ft long (James Browne, *in* Mills, 1977, p. 96-101).

GEOLOGIC SETTING: The Calhoun mine is in the middle dolomite unit of the Metaline Formation (James Browne in Mills, 1977, p. 97).

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Chewelah Standard (186)

ALTERNATE NAMES		DISTRICT	COUNTY
Nellie S.			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 17′ 36.28″ N	117° 40′ 58.48″ W	north part of sec. 7, 32N, 41E

LOCATION: 1.5 mi northeast of Chewelah

HOST ROCK: NAME	LITHOLOGY	AGE
Flowery Trail Granodiorite	granodiorite	Triassic - Jurassic
unnamed dolomite	dolomite	Devonian - Mississippian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz
Ag	molybdenite	
Au		
Mo		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: One carload of ore was shipped in 1915 (Huntting, 1956, p. 94).

TECTONIC SETTING: Early Mesozoic (Jurassic-Triassic) granitic rocks intrude Late Paleozoic sedimentary rocks (Miller and Clark, 1975, geol. map).

ORE CONTROLS: Three quartz veins are present, one along the contact between schist and granite, the others in granite. Ore minerals occur in the quartz and associated pegmatite dikes (Huntting, 1956, p. 94).

GEOLOGIC SETTING: Veins at the Chewelah Standard are near the contact between metamorphosed sedimentary rocks and the Flowery Trail Granodiorite. The metamorphosed country rocks are probably upper Paleozoic dolomite (Miller and Clark, 1975, geol. map).

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Chinto (187)

ALTERNATE NAMES		DISTRICT	COUNTY
Banner			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 19′ 14.22″ N	117° 39′ 43.17″ W	Near center, N1/2 sec. 32, 33N, 41E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Wallace Formation, upper part	dark laminated argillite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic
mafic dikes	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz, calcite, siderite, pyrite, arsenopyrite
Ag	tetrahedrite	
Au	sphalerite	
	malachite	
	azurite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	
disseminated	

PRODUCTION: Produced in 1937 and 1939 with a yield of 9 oz Au, 5,040 oz Ag, and 15,032 lb Cu (Moen, 1976, p. 66).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Several quartz-calcite-siderite veins are present along faults parallel to bedding in argillite. Ore occurs as lenses and disseminations within the veins and is also disseminated in the argillite (Huntting, 1956, p. 94).

GEOLOGIC SETTING: The Chinto mine is in argillites of the upper part of the Wallace Formation. It also is in and adjacent to a shear zone (Miller and Clark, 1975, geol. map).

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Patty, E. N., 1921, The metal mines of Washington: Washington Geological Survey Bulletin 23, 366 p.

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Weed, W. H., 1906, The copper mines of the United States in 1905. *In* Contributions to economic geology, 1905: U.S. Geological Survey Bulletin 285-B, p. 93-124.

Chloride Queen (154)

ALTERNATE NAMES		DISTRICT	COUNTY
Colville Queen			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gillette Mtn	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 41′ 32.11″ N	117° 51′ 26.64″ W	near center, sec. 23, 37N, 39E	

LOCATION: on one of the east branches of Clugston Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	pyrite, quartz, siderite, limonite
Ag	cerussite	
Zn	chalcopyrite	
Cu	sphalerite	
Fe		

DEPOSIT TYPE

vein
Mississippi Valley

MINERALIZATION AGE

PRODUCTION: Shipped 400 tons of limonite ore to the Colville smelter prior to 1900. Lead ore was shipped in 1900, 1914, 1925, and 1928 (Huntting, 1956, p. 239). Production from 1902 through 1956 was 35 tons of ore which yielded 1,569 oz Ag, 19 lb Cu, and 12,261 lb Pb (Mills, 1977, p. 104).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A mineralized 5-ft-wide quartz vein occurs along the contact between quartzite and dolomite. Limonite ore occurs in the dolomite (Huntting, 1956, p. 239). Two types and ages of mineralization occur at the Chloride Queen deposit. Lead-zinc (Mississippi Valley-type) mineralization occurs within rocks of the Yellowhead horizon. Vein-type mineralization, including tetrahedrite, sphalerite, and galena, occurs in a faulted and brecciated zone in silicified dolomite (Mills, 1977, p. 104).

GEOLOGIC SETTING: The mine is in the middle dolomite unit of the Metaline Formation (Mills, 1977, p. 104).

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Clara (209)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 19.37″ N	117° 36′ 16.37″ W	secs. 10 and 11, 40N, 41E

LOCATION: secs. 10 and 11, 40N, 41E

HOST ROCK: NAME	LITHOLOGY	AGE
Shepard Granite	granite and syenite	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Cu		

DEPOSIT TYPE	MINERALIZATION AGE
unknown	

PRODUCTION: Has produced (Huntting, 1956, p. 167).

TECTONIC SETTING: Eocene extension and associated volcanism and magmatism (Pearson and Obradovich, 1977).

ORE CONTROLS: Unknown

GEOLOGIC SETTING: The Shepard Granite is leucocratic, medium- to fine-grained, equigranular granite and syenite (Joseph, 1990, p. 43).

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Pearson, R. C.; Obradovich, J. D., 1977, Eocene rocks in northeast Washington-Radiometric ages and correlation: U.S. Geological Survey Bulletin 1433, 41 p., 1 pl.

Cleveland (136)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail Cedar Canyon	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn.	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 6′ 58.76″ N	118° 1′ 26.08″ W	W1/2 sec. 9, T30N, R38E

LOCATION: workings may also extend into adjacent sections

HOST ROCK: NAME	LITHOLOGY	AGE
Stensgar Dolomite	dolomite	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
metabasalt	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn Ag Sb	galena sphalerite boulangerite tetrahedrite chalcopyrite, stibnite cerussite anglesite, bindheimite mimetite valentinite	arsenopyrite, pyrite, quartz, dolomite, iron-bearing magnesite (mesitite)

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: In 1942 produced 4,000 tons, which reportedly averaged 6% Pb and 6% Zn (Huntting, 1956, p. 239). Moen (1976, p. 73) reported production of 26,459 tons from 1903 to 1948, yielding 89 oz Au, 98,745 oz Ag, 2,700,000 lb Pb, 551,170 lb Zn, and 7,396 lb Cu.

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore occurs in lenses in parallel brecciated zones in dolomite (Huntting, 1956, p. 239). Jenkins (1924, p. 130) reported that at no place in the mine are dikes or ore found cutting each other. Purdy (1951, p. 140) reported that sulfides from the surface to 200 ft depth consist of sphalerite with blebs of chalcopyrite, boulangerite, pyrite, arsenopyrite, and minor galena. Boulangerite and sphalerite predominate. Below 200 ft, sulfide mineralization changes abruptly to lesser amounts of boulangerite and arsenopyrite and increased amounts of galena.

GEOLOGIC SETTING: Rocks at the Cleveland mine are phyllite, quartzite, and dolomite of the Stensgar Dolomite of the Proterozoic Deer Trail Group (Campbell and Raup, 1964, geol. map). Bedding strikes northeast, and dips are steep and vary from SE to NW (Purdy, 1951, p. 137). The Precambrian rocks are cut by metamorphosed basic (diabase) dikes (Jenkins, 1924, p. 129; Campbell and Loofbourow, 1962, p. 25-26).

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Columbia River (188)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Marcus	1:24,000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 38′ 12.30″ N	118° 3′ 39.75″ W	NE¼ sec. 7, or NW¼ sec. 8, 36N, 38E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed Permian-Triassic metasedimentary rocks	argillite, black carbonaceous shale, limestone, limy shale, conglomerate	Permian - Triassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granite dike	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, quartz, calcite, siderite
Au	tetrahedrite	
Ag	molybdenite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Small production in 1904 and 1910 valued at $1,500 (Huntting, 1956, p. 95).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein ranges from 3 to 6 ft wide, is in shale and limestone, and consists of brecciated country rock cemented by gangue minerals. Ore shoots are as much as several inches wide and several feet long (Huntting, 1956, p. 94).

GEOLOGIC SETTING: Permian-Triassic metasedimentary rocks at the Columbia River mine are part of Weaver's (1920, geol. map, p. 72-75) Mission Argillite. Currently, the argillites and related rocks of the area are recognized as a complex sequence of eugeoclinal rocks and are assigned a Permian-Triassic age (Stoffel, 1990, geol. map, p. 19-20; Mills, 1985, geol. map, p. 7).

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Copper Butte (189)

ALTERNATE NAMES		DISTRICT	COUNTY
Shallenberger			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Empey Mountain	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 6′ 49.18″ N	117° 59′ 23.32″ W	SW corner sec. 11, and NW¼ sec. 14, 30N, 38E	

LOCATION: Springdale area

HOST ROCK: NAME	LITHOLOGY	AGE
McHale Slate	argillite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite bornite	quartz, barite, pyrrhotite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Shipped five carloads. In addition, several hundred tons of barite reportedly was produced (Huntting, 1956, p. 95).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The barite vein, which is 4 to 6 ft wide and along laminations in argillite, contains sparsely disseminated ore minerals (Huntting, 1956, p. 95).

GEOLOGIC SETTING: Moen (1964, p. 45-47) reported the Shallenberger barite deposit (alternate name for the Copper Butte mine) is in Middle Proterozoic rocks, the McHale Slate.

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Copper King (155)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 46′ 51.71″ N	117° 39′ 12.23″ W	NE¼ sec. 20, 38N, 41E.	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
Spirit pluton, quartz monzonite		Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn Au Fe	galena sphalerite	quartz, pyrite, pyrrhotite

DEPOSIT TYPE	MINERALIZATION AGE
vein contact metamorphic Mississippi Valley	

PRODUCTION: Several shipments were reportedly sent to the Northport smelter for flux (Huntting, 1956, p. 239).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Quartz veins occur in limestone near the contact with quartz monzonite. Some low-grade disseminated sphalerite and galena also are present in the host limestone (Huntting, 1956, p. 239).

GEOLOGIC SETTING: The Copper King deposit is in the middle dolomite unit of the Metaline Formation near its contact with the Spirit pluton (Yates, 1964, geol. map).

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Copper King (190)

ALTERNATE NAMES		DISTRICT	COUNTY
		Chewelah	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 19′ 18.38″ N	117° 39′ 38.92″ W	sec. 32, 33N, 41E.

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Wallace Formation	dark laminated argillite and carbonate-bearing siltite, quartzite, and argillite	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic
mafic dikes	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, quartz, siderite
Ag	tetrahedrite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced between 1904 and 1941. Yield from 13,027 tons was 183 oz Au, 39,593 oz Ag, and 446,879 lb Cu (Moen, 1976, p. 66).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Huntting (1956, p. 95) reported a body of low-grade ore 40 ft wide and 500 ft long. The veins average about 6 ft wide and range up to 30 ft wide. Quart-siderite veins in argillite are in a northeast-trending shear zone that is nearly vertical (Moen, 1976, p. 65-66).

GEOLOGIC SETTING: The Copper King mine is in a shear zone between the upper and lower units of the Wallace Formation (Miller and Clark, 1975, geol. map).

REFERENCES

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Coyote (290)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 55′ 44.84″ N	117° 48′ 54.88″ W	NW¼ sec. 35, 40N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Flagstaff Mountain sequence	siltite, argillite	Devonian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz
Ag	sphalerite	
Zn	gold	
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Twenty-nine tons were shipped in 1916 and 1917; yield was 156 oz Ag and 3,696 lb Pb (Moen, 1976, p. 85). Assays were said to run $30-$60 per ton (Huntting, 1956, p. 239).

TECTONIC SETTING: The Flagstaff Mountain sequence was deposited on an extensional basin or in a continental slope (Joseph, 1990). These rocks were affected by deformation associated with the Kootenay arc, a northeast-trending zone (in Washington) of multiply deformed rocks (Watkinson and Ellis, 1987).

ORE CONTROLS: In a shear zone intruded by an Eocene granitic dike (Beka, 1980).

GEOLOGIC SETTING: The vein strikes NE, averages about 14 ft in width, and has been traced for 2,100 ft. The vein parallels bedding in the metasedimentary rock (Colville Engineering Company, 1944).

COMMENTS: Development consisted of a shaft and a 20-ft drift at the 20-ft level. Considerable trenching and open cut work was done.

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Daisy (242)

ALTERNATE NAMES	DISTRICT	COUNTY
Daisy-Tempest Silver Mountain	Kettle Falls	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Kentry Ridge	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 22′ 45.81″ N	118° 4′ 42.59″ W	SW¼ sec. 6, 33N, 38E

LOCATION: on the west slope of the Huckleberry Range

HOST ROCK: NAME	LITHOLOGY	AGE
Ledbetter Slate	argillite and limestone	Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granite to granodiorite of the Huckleberry Range	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Cu Au	galena chalcopyrite nickeliferous pyrite sphalerite scheelite tetrahedrite	marcasite, arsenopyrite, quartz, calcite, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: The main production was prior to 1900. The mine also produced (between 1916 and 1935) 10 oz Au, 13,978 oz Ag, 4,527 lb Cu, and 28,967 lb Pb (Moen, 1976, p. 79).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: At least four quartz veins from a few inches to 12 ft in width cut a sequence of argillites and quartzites intruded by diorite (Huntting, 1956, p. 325).

GEOLOGIC SETTING: The Daisy mine is in the Ordovician Ledbetter Slate adjacent to Cretaceous-Tertiary granite to granodiorite of the Huckleberry Range (Snook and others, 1990, geol. map; Joseph, 1990, geol. map, p. 34).

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Deep Creek (277)

ALTERNATE NAMES	DISTRICT	COUNTY
Gorien Zinc Northport		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 48.91″ N	117° 42′ 54.38″ W	N1/2NE¼ sec. 26, 39N, 40E

LOCATION: about 100 yards from the west bank of Deep Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag	sphalerite galena	pyrite, dolomite, limestone, tremolite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced from 1944 to 1952 (350,000 tons), and 1953 to 1955 (Huntting, 1956, p. 377). Total production is 15,182,927 lb Pb, 65,621,962 lb Zn, and 36,455 oz Ag (Mills, 1977, p. 105).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore is in a highly banded and contorted zone of dolomite, which is 50-100 ft thick and 200-300 ft long. Lead values are highest to the south (Huntting, 1956, p. 376-377). Banding in the dolomite is believed to be metamorphic in origin. There were five ore zones exposed in the mine; these form an en echelon pattern over an area of 8,000 ft north-south by 4,000 ft east-west (Mills, 1977, p. 106-107).

GEOLOGIC SETTING: Mineralization at the Deep Creek deposit is in dolomite or dolomite marble of the middle dolomite unit of the Metaline Formation. The host rock is a dolomite breccia that was mineralized and subsequently deformed and recrystallized (Mills, 1977, p. 106-107).

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Deer Trail (137)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 1′ 55.20″ N	118° 6′ 5.56″ W	NW¼ sec. 12, 29N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	cyrargyrite	pyrite, quartz
Pb	silver	
Zn	argentite	
	galena,	
	pyrargyrite	
	sphalerite	
	cerussite	
	tetrahedrite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Reportedly produced substantial amounts from 1894 to 1902. From 1902 to 1947 1,855 tons of ore yielded 2 oz Au, 304,557 oz Ag, 323,417 lb Pb, and 293 lb Cu (Moen, 1976, p. 73).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The ore is in a 1-6-ft-wide quartz vein in argillite and dolomite. Ore shoots are tabular to lenticular and as much as 2.5 ft thick. High-grade ore shoots contained as much as 2,000 oz/ton Ag. Overall average ore yielded about 280 oz/ton Ag and 10% Pb (Moen, 1976, p. 73).

GEOLOGIC SETTING: The Deer Trail mine is located in the Edna Dolomite of the Deer Trail Group (Campbell and Raup, 1964, geol. map).

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Deer Trail Monitor (239)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail	Stevens
PRIMARY QUADRANGLE	SCALE	1/2° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 5′ 28.93″ N	118° 6′ 12.96″ W	near NW corner sec. 24, 30N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation?	limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granodiorite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Mo	molybdenite	pyrite, pyrrhotite, garnet,
Cu	chalcopyrite	epidote, calcite

DEPOSIT TYPE	MINERALIZATION AGE
contact metamorphic	

PRODUCTION: In 1936 and 1937 the mill produced 5 tons of 60% MoS_2 concentrate from 2,000 tons of ore containing 0.16% MoS_2. In 1938 210 tons of ore containing 0.28% MoS_2 produced 2,500 lb of 47.4% MoS_2 concentrate and in 1939 3,000 tons of ore produced 10 tons of concentrate. The mine also produced in 1941 (Huntting, 1956, p. 273).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Deposit is in a greenish, siliceous mineralized zone cutting limestone and argillaceous limestone near its contact with granodiorite. Molybdenite is intimately associated with the garnet zone (Huntting, 1956, p. 273; Joseph, 1990, geol. map).

GEOLOGIC SETTING: Campbell and Raup (1964, geol. map), show the mine is in granodiorite of the Fruitland area (name from Joseph, 1990, geol. map, p. 35). Huntting (1956, p. 273) notes the mine is in limestone and argillaceous limestone. The nearest limestone on the map (Joseph, 1990, geol. map) is Metaline Formation, which is about 500 ft from the mine as located on the geologic map.

REFERENCES

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Double Eagle (156)

ALTERNATE NAMES		DISTRICT	COUNTY
		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Stensgar Mtn	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 11′ 2.13″ N	117° 55′ 51.41″ W	SE¼ sec. 18, 31N, 39E.

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Stensgar Dolomite	dolomite	Middle Proterozoic
Buffalo Hump Formation	argillite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granite	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	pyrite, breccia, gouge, magnesite
Ag	chalcopyrite	
Cu		

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	

PRODUCTION: Produced in 1916 and 1939. The early production was from boulders in the surface mantle (Huntting, 1956, p. 240).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Boulders of solid galena were found in overburden. Mineralization, including pyrite, occurs in shear zones in argillite, limestone, and quartzite (Moen, 1976, p. 66; Huntting, 1956, p. 240).

GEOLOGIC SETTING: The Double Eagle deposit is near the contact between the Buffalo Hump Formation and the Stensgar Dolomite of the Proterozoic Deer Trail Group (Evans, 1987, geol. map).

REFERENCES

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Eagle (243)

ALTERNATE NAMES	DISTRICT	COUNTY
Blue Star Redwood Chewelah Eagle		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 18′ 22.09″ N	117° 39′ 44.69″ W	near center N1/2 sec. 5, 32N, 41E, and sec. 32, 33N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed dolomite	dolomite	Devonian - Mississippian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Cu Zn Au Mo	galena tetrahedrite sphalerite chalcopyrite cerussite anglesite malachite azurite molybdenite	pyrite, pyrrhotite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
contact metamorphic?	

PRODUCTION: Produced at various times from before 1890 through 1935. Total production to 1925 was $150,000. Yield from 173 tons was 2 oz Au, 2,166 oz Ag, 88,693 lb Pb, and 1,085 lb Cu (Huntting, 1956, p. 326; Moen, 1976, p. 67).

TECTONIC SETTING: Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks of the Kootenay arc were intruded by granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The ore is in irregular lenses and replacement bodies in dolomitic limestone near the contact with granite. Ore bodies range from a few inches to 3 or 4 ft wide and a few feet to 50 ft or more long (Huntting, 1956, p. 326). The deposit is probably a polymetallic, contact metamorphic deposit adjacent to the Flowery Trail Granodiorite.

GEOLOGIC SETTING: The Eagle mine occurs in a small block of dolomitic limestone or dolomite adjacent to the Flowery Trail Granodiorite (Miller and Clark, 1975, geol. map). Dolomitic rocks adjacent to the granodiorite near the Eagle mine may range in age from Mississippian to Devonian (Waggoner, 1990, geol. map, p. 14).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Easter Sunday (210)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Churchill Mtn	1:24,0000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 57′ 8.99″ N	118° 5′ 33.66″ W	near center E1/2 sec. 22, 40N, 37E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Mount Roberts Formation	cherty argillite	Permian
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
monzonite		Eocene?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	chalcopyrite	pyrite, quartz
Cu	sphalerite	
Ag	galena	
Pb	boulangerite	
Zn	tetrahedrite	

DEPOSIT TYPE — MINERALIZATION AGE

vein

PRODUCTION: Approximately 20 tons of ore was shipped in 1909 (Huntting, 1956, p. 168).

TECTONIC SETTING: The Mount Roberts Formation was deposited in an active margin setting. These sedimentary rocks are part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic. Rocks in Quesnellia were affected by deformation associated with the Kootenay arc, a northeast-trending zone (in Washington) of multiply deformed rocks (Monger and others, 1982). Extension during the Eocene resulted in the formation of volcano-tectonic depressions; dacite dikes are feeders to the volcanic rocks that fill the depressions (Holder and others, 1989).

ORE CONTROLS: The N25W-trending, 50NE-dipping quartz vein is parallel to bedding in cherty argillite. Below the 70-ft level the vein steepens and forms veinlets that crosscut the metasedimentary rocks (Bancroft, 1914). The vein is sparsely mineralized and cut off by a monzonite dike (Huntting, 1956, p. 168).

GEOLOGIC SETTING: In Permian cherty argillite and argillite cut by dikes of monzonite porphyry of probable Eocene age (Stoffel, 1990, geol. map).

COMMENTS: A 2-stamp mill and a vertical shaft to depth of 480 ft were present in 1910 (Bancroft, 1914, p. 83-84).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Edna (145)

ALTERNATE NAMES		DISTRICT	COUNTY
King		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Stensgar Mtn	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 11′ 49.88″ N	117° 53′ 15.54″ W	SE¼SE¼ sec. 9, and sec. 10, 31N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	argillite	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diorite	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz, siderite, pyrite, arsenopyrite
Ag	tetrahedrite	
Au	bornite	
	chalcocite	
	malachite	
	azurite	
	melaconite	

DEPOSIT TYPE	MINERALIZATION AGE
vein disseminated	

PRODUCTION: Produced in 1896, 1904-1906, and 1917 for a total value of about $5,000 (Huntting, 1956, p. 96).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: An 80-ft-wide mineralized zone contained a 4-ft-wide zone of direct shipping ore and a 6-ft-wide zone of ore requiring concentration was described in old reports (Huntting, 1956, p. 96). The vein lies parallel to the schistosity (Weaver, 1920, p. 181-182).

GEOLOGIC SETTING: Weaver (1920, p. 181) noted the Edna mine was in the Deer Trail argillite, chiefly argillite, quartz-mica schist, and siliceous limestone that strikes about N10E and dip 80NW (Weaver, 1920, p. 181). More detailed mapping shows the Edna mine is in the Edna Dolomite (Evans, 1987, geol. map).

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Electric Point (157)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 56.32″ N	117° 32′ 29.01″ W	secs. 17, 18, 19, and 20, 39N, 42E.

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granite	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena,	limonite, siderite, clay,
Ag	cerussite	sand, brecciated dolomite
Zn	anglesite	
Cu	pyromorphite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced every year from 1901 to 1955 except 1921, 1923-1924, 1943, and 1945-1946 (Huntting, 1956, p. 240). Total production was 30,711,917 lb Pb, 10,691 lb Zn, and 7,154 oz Ag (Mills, 1977, p. 110).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The ore is localized in chimney-like replacement bodies in limestone. These bodies occur in brecciated rocks at the intersections of two or more sets of fissures. The largest chimney had a depth of 800 ft and a diameter of 150 ft. Most were less than 300 ft deep and less than 100 ft in diameter (Huntting, 1956, p. 240).

GEOLOGIC SETTING: The host rocks are part of the middle dolomite unit of the Metaline Formation (Mills, 1977, p. 111).

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Eureka (211)

ALTERNATE NAMES	DISTRICT	COUNTY
Eureka and Orient Indian Orient Eureka	Orient	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Laurier	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 24.85″ N	118° 10′ 43.47″ W	secs. 13, 24, and 25, 40N, 36E

LOCATION: east of Kettle River

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	andesite, schist	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Pb Zn Cu	galena chalcopyrite sphalerite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in the 1890s (Huntting, 1956, p. 168).

TECTONIC SETTING: The volcanic rocks of the Rossland Group are of island arc affinity; they are part of the Quesnellia terrane, which was accreted to North America prior to the mid-Jurassic (Monger and other, 1982, p. 73).

ORE CONTROLS: The deposit consists of several east-striking quartz veins that dip 70S and are in schist and diabase (Huntting, 1956, p. 168; Weaver, 1920, p. 292).

GEOLOGIC SETTING: Veins are in andesite and schist of the Jurassic Rossland Group (Stoffel, 1990, geol. map).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Evans placer (222)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 26.15″ N	117° 43′ 32.89″ W	secs. 20, 21, 22, 40N, 40E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Presumably produced prior to 1941 (Huntting, 1956, p. 191).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCES

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Evergreen (158)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 57.46″ N	117° 33′ 55.82″ W	sec. 25, 40N, 42E

LOCATION: on the south slope of Red Top Mountain. Latitude and longitude are approximate. The site may be the same as that shown of the topographic map for the Copper King mine.

HOST ROCK: NAME	LITHOLOGY	AGE
Maitlen Phyllite	calcareous argillite and schist	Cambrian
Maitlen Phyllite, limestone member	limestone	Cambrian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	limonite, pyrite, quartz
Zn	sphalerite	
	cerussite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Huntting (1956, p. 241) reported 25 tons of ore was shipped in 1902.

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Several quartz veins are present along fracture zones in limestone and argillite. A 16-in.-wide vein lies along the contact of the two rocks types (Huntting, 1956, p. 241).

GEOLOGIC SETTING: Veins occur in extensively deformed and thrust rocks (O'Keefe, 1980, p. 108-110).

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F. H. and C. (212)

ALTERNATE NAMES	DISTRICT	COUNTY
Faith, Hope, and Charity Acme	Orient	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Laurier	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 54.44″ N	118° 9′ 37.83″ W	secs. 19 and 30, 40N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed gabbro unit	gabbro	Jurassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
gabbro diorite (?) dike	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag	pyrite	quartz, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: One small shipment was made to the Tacoma smelter in about 1917; the smelter shipment is said to have returned 2.36 oz/ton Au and 1.9 oz/ton Ag. The mine also produced in 1929 (Huntting, 1956, p. 169).

TECTONIC SETTING: The prospect is in Jurassic gabbro that is difficult to distinguish from the volcanic rocks of the Jurassic Rossland Group (Rhodes, 1980). The Rossland Group is part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic (Monger and others, 1982).

ORE CONTROLS: Mineralization is in a N53E-trending, 3-5-ft-wide quartz vein (Huntting, 1956, p. 169; Weaver, 1920, p. 277).

GEOLOGIC SETTING: Weaver (1920, p. 277) described the property as being hosted by metamorphosed granite and diorite. Rhodes (1980), mapped coarse-grained, altered diorite to pyroxenite that is difficult to distinguish from the volcanic rocks of the Jurassic Rossland Group.

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Farmer (278)

ALTERNATE NAMES		DISTRICT	COUNTY
Deep Lake		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Deep Lake	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 50′ 59.26″ N	117° 37′ 17.34″ W	sec. 34, 39N, 41E	

LOCATION: at the south end of Deep Lake

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
Spirit pluton, quartz monzonite		Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag Ga Ge	sphalerite galena	pyrrhotite, pyrite, dolomite, calcite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley contact metamorphic	

PRODUCTION: Produced small amounts in 1937 and from 1947 to 1951 (Huntting, 1956, p. 377).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Replaced and mineralized fracture zone in limestone is 2-20 ft wide and has been traced for 600 ft on the surface near the contact with granite (Huntting, 1956, p. 377). The Farmer deposit is interpreted as a contact-metamorphosed Mississippi Valley deposit (Mills, 1977, p. 114-116). Contact metamorphism is also indicated from the presence of pyrrhotite and more abundant tremolite in the limestone adjacent to the contact. The ore minerals also exhibit typical recrystallization textures (Todd, 1973, p. 87-90).

GEOLOGIC SETTING: The Farmer deposit is in the Metaline Formation adjacent to the Cretaceous Spirit quartz monzonite (Yates, 1964, geol. map).

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Yates, R. G., 1964, Geologic map and sections of the Deep Creek area, Stevens and Pend Oreille Counties, Washington: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-412, 1 sheet, scale 1:31,680.

Finley (159)

ALTERNATE NAMES		DISTRICT	COUNTY
		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Addy	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 19′ 37.11″ N	117° 51′ 8.13″ W	SE¼ sec. 26, 33N, 39E

LOCATION: 8 mi northwest of Chewelah

HOST ROCK: NAME	LITHOLOGY	AGE
Huckleberry Formation	greenstone (basalt)	Proterozoic
Addy Quartzite	quartzite	Cambrian - Late Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz, pyrite
Ag	chalcopyrite	
Cu		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Ore shipped to a Montana smelter prior to 1890. The ore shipped contained 20% Pb and 90 oz/ton Ag (Huntting, 1956, p. 241).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, mostly sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization occurs in a 3-ft-wide quartz vein (Huntting, 1956, p. 241).

GEOLOGIC SETTING: The Finley mine is approximately located. It appears to be near the contact between greenstone of the Huckleberry Formation of the Windermere Group and the Addy quartzite (Waggoner, 1990, geol. map, p. 18-23).

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First Thought (213)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Laurier	1:24,000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 53′ 2.05″ N	118° 9′ 30.62″ W	NW¼NE¼ sec. 18, 39N, 37E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Sanpoil Volcanics	dacite, andesite	Eocene
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
dacite, andesite dikes		Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS	
Au Ag	gold sphalerite chalcopyrite electrum?	quartz, calcite, pyrite, adularia	chalcedony, fluorite,

DEPOSIT TYPE	MINERALIZATION AGE
veins (epithermal) breccia zone	Eocene

PRODUCTION: Produced $1,350,000 of Au between 1904 and 1942; the average ore grade was 0.53 oz/ton Au and 0.37 oz/ton Ag. This included 36,150 tons of ore with an average grade of 0.83 oz/ton Au and 0.35 oz/ton Ag that were produced between 1904 and 1910. Between 1931 and 1932 the Sunset Gold Mining Co. produced 400 tons of ore averaging 0.59 oz/ton Au and 0.64 oz/ton Ag; this ore was mostly mined from the dumps. The First Thought Mining Corp. mined 45,000 tons of ore averaging 0.18 oz/ton Au and 0.12 oz/ton Ag from 1934 to 1942 (Goetz, 1990, p. 55-56).

TECTONIC SETTING: The Sanpoil Volcanics were deposited in volcano-tectonic depressions resulting from east-west extension during the mid-Eocene (Holder and others, 1989).

ORE CONTROLS: This mine is an adularia-sericite type of epithermal deposit. Mineralization is confined to bedding-, fracture-, and fault-controlled veins and adjacent zones of pervasive silicification. Below the main orebody at a depth of 300 ft, few zones of mineralization or gold enrichment have been found. Most commonly, mineralization occurs in a quartz stockwork in the volcaniclastic unit immediately below the unconformity with the Klondike Mountain Formation and as horizontal quartz-pyrite veins below the stockwork zone. Pervasive silicification with or without carbonate alteration is generally present; most veins contain brecciated interiors that were re-cemented with quartz or chalcedony. Veins have sharp contacts with wall rock, although the wall rock is commonly altered. The vein system is thought to have formed near the surface because the system was eroded subsequent to volcanism (Goetz, 1990). Mineralization is also present in a 15-110-ft-wide, northwest-trending breccia zone in dacitic flows parallel to a dacite porphyry dike. Richer ores in that zone are present at the intersections of faults (Weaver, 1920, p. 258-260; Huntting, 1956).

GEOLOGIC SETTING: The deposit is in volcaniclastic rocks and flows of the Eocene Sanpoil Volcanics near the contact with the overlying Klondike Mountain Formation (Stoffel, 1990, geol. map).

COMMENTS: The mine is currently (1990) being explored by a joint venture of Pathfinder Gold Corp. and Boise Cascade Minerals.

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Frisco Standard (244)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Abercrombie Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 34.97″ N	117° 26′ 39.63″ W	S½NW¼ sec. 12, 40N, 42E

LOCATION: on Jubilee Creek, just south of the international boundary

HOST ROCK: NAME	LITHOLOGY	AGE
Ledbetter Slate	black slate	Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	galena	quartz
Pb	tetrahedrite	
Cu	chalcopyrite	
Zn	sphalerite	
Au	pyrargyrite	
	cerargyrite	
	bromyrite	
	azurite	
	malachite	
	stannite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced between 1915 and 1944. Yield from 258 tons was 1 oz Au, 2,044 oz Ag, 1,586 lb Cu, and 5,973 lb Pb. Ore averaged about 8 oz/ton Ag, 1.15% Pb, and 0.3% Cu; high grade ores ran as much as 72 oz/ton Ag and 17% Pb (Moen, 1976, p. 85-86).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Park and Cannon, 1943; Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of whcih are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization occurs in quartz veins or lenses as much as 7 ft wide in sheared graphitic schist. Veins are parallel to the schistosity. One vein varies from a few inches to 6 ft in width (Huntting, 1956, p. 326).

GEOLOGIC SETTING: The Ledbetter Slate at the Frisco Standard mine is a graphitic schist (Patty, 1921, p. 112-114).

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Galena Hill (160)

ALTERNATE NAMES	DISTRICT	COUNTY
Kettle River Bliss	Orient	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Laurier	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 55′ 21.74″ N	118° 12′ 16.81″ W	near center sec. 35, 40N, 36E

LOCATION: on the east bank of the Kettle River

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed metamorphic rocks	schist, quartzite	pre-Tertiary

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diorite	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn Ag Cu	galena sphalerite chalcopyrite	pyrite, quartz, calcite, dolomite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: One carload of concentrate shipped in 1911 (Huntting, 1956, p. 241).

TECTONIC SETTING: Pre-Tertiary sillimanite-bearing quartzite within the Kettle metamorphic core complex (Stoffel, 1990, p. 47).

ORE CONTROLS: Several small veins are in schist near the contact with diorite. One vein was 6 in. to 8 ft wide; it trends N75W and dips 77SW on the 300 ft level. Ore minerals occur as small pockets and stringers that are 4 in. and less in width and that alternate between the hanging wall and the footwall (Weaver, 1920, p. 288).

GEOLOGIC SETTING: Veins are in sillimanite-bearing quartzite and schist near the contact with a diorite dike (Weaver, 1920).

COMMENTS: A 300-ft-deep shaft was driven on the property (Weaver, 1920, p. 288).

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Galena Knob (161)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gillette Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 41′ 46.10″ N	117° 45′ 48.90″ W	NE¼ sec. 21, 37N, 40E

LOCATION: on top of hill

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Ag	galena cerussite lead oxides	dolomite breccia, quartz

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley vein	

PRODUCTION: Produced 50 tons of sorted ore in 1950 from development work at the property (Huntting, 1956, p. 241).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Brecciated dolomite covers most of the hill around the Galena Knob mine. The exposed mineralized breccia zone is 4 ft wide and contains about 30 percent galena. The ore bodies are in quartz veins containing narrow, branching veinlets and irregular pockets of galena (Huntting, 1956, p. 241). Mineralization consists of coarse crystalline calcite, dark-gray to black chert, and galena in what is thought to be a solution-collapse breccia related to an overlying unconformity (Mills, 1977, p. 117).

GEOLOGIC SETTING: Host rocks at the Galena Knob deposit are dolomite marble, beds of chert or jasperoid, and veins and irregular masses of quartz (Mills, 1977, p. 117). J. E. Schuster (DGER, oral commun., 1990) notes the deposit is in middle dolomite of the Metaline Formation.

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Mills, J. W., 1977, Zinc and lead ore deposits in carbonate rocks, Stevens County, Washington: Washington Division of Geology and Earth Resources Bulletin 70, 171 p.

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Gem (214)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Orient	1:24,000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 50′ 51.89″ N	118° 9′ 36.39″ W	S½ sec. 30, 39N, 37E	

LOCATION: on the south side of Toulou Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Sanpoil Volcanics	dacite, andesite flows, sedimentary rocks	Eocene
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
dacite porphyry dike		Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	pyrite	quartz
DEPOSIT TYPE	MINERALIZATION AGE	
vein breccia	Eocene	

PRODUCTION: Produced in 1939 (Huntting, 1956, p. 169).

TECTONIC SETTING: Tertiary regional extension resulted in ductile deformation and brittle deformation. The ductile deformation resulted in the formation of metamorphic core complexes. Brittle deformation resulted in the formation of volcano-tectonic depressions in which rocks of the Sanpoil Volcanics were deposited. Dacite porphyry dikes are feeders to the lava flows (Holder and others, 1989).

ORE CONTROLS: Volcanic rocks and interbedded sedimentary rocks are cut by dacite and rhyolite porphyry dikes. Mineralization is present in a 4-ft-wide, N20E-trending fault zone that dips 65NW. The mineralization consists of quartz stringers in the dikes (Weaver, 1920, p.271; Huntting, 1956, p. 169).

GEOLOGIC SETTING: Sedimentary rocks and dacite and andesite flows of the Eocene Sanpoil Volcanics are cut by dacite and rhyolite dikes (Stoffel, 1990).

COMMENTS: The principal development was a tunnel driven into the mountain in a northerly direction and then westerly for 720 ft through shale, volcanic rock, and dike rocks (Weaver, 1920, p. 271).

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Germania Consolidated (138)

ALTERNATE NAMES	DISTRICT	COUNTY
Keeth Industrial Tungsten Norton	Deer Trail Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Turtle Lake	1:24,000	Coulee Dam	Ritzville

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 59′ 30.22″ N	118° 6′ 32.33″ W	SE¼ sec. 23 and NE¼ sec. 26, 29N, 37 E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Loon Lake granite	granite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W Mo	ferberite molybdenite scheelite chalcopyrite bismuthinite	quartz, pyrite, magnetite

DEPOSIT TYPE	MINERALIZATION AGE
vein	Cretaceous

PRODUCTION: Produced $100,000 from ferberite prior to 1945; produced in 1946, 1951-1955; $34,704 for 561 units of WO_3 from 19,921 lb of concentrates in the 1951-1955 period (Huntting, 1956, p. 348°).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Veins, which are in granite, rarely exceed 8 in. in width, and can be traced as much as 1,300 ft (Huntting, 1956, p. 348). Workings on three levels comprise more than 3,000 ft (Becraft and Weis, 1963, p. 70).

GEOLOGIC SETTING: The Cretaceous Loon Lake granite is part of a series of Jurassic to Tertiary granitic rocks that intrudes rocks of the Kootenay arc in northeast Washington (Becraft and Weis, 1963, geol. map).

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Germania (140)

ALTERNATE NAMES	DISTRICT	COUNTY
Roselle	Deer Trail Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Coulee Dam	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 0′ 29.34″ N	118° 5′ 59.74″ W	near center of SW¼ sec. 13, 29N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Intrusive rocks of the Germania mine	monzogranite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W Mo	wolframite scheelite galenobismutite molybdenite ferritungstite	pyrite, arsenopyrite, quartz, chlorite, tourmaline

DEPOSIT TYPE	MINERALIZATION AGE
vein	Cretaceous

PRODUCTION: Produced 1,400 units between 1904 and 1931, 57,436 units in 1931-1940, and 731 tons of concentrate between 1936 and 1955 (Huntting, 1956, p. 348).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization occurs in 2 in.-3-ft-wide veins in granite. Molybdenum content increases and tungsten content decreases in the lower levels of the mine (Huntting, 1956, p. 348).

GEOLOGIC SETTING: The host rock for mineralization at the Germania mine is equigranular to porphyritic monzogranite (Joseph, 1990, geol. map, p. 35).

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Gibson Bar placer (223)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Ninemile Flat	1:24,000	Nespelem	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 1′ 32.73″ N	118° 23′ 56.10″ W	secs. 10 and 15, 29N, 35E	

LOCATION: at Gibson Bar on the east side of the Columbia River

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced from 1938 to 1940; also mined in the early days by Chinese miners (Huntting, 1956, p. 191).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Gladstone (162)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 53′ 12.64″ N	117° 32′ 35.21″ W	secs. 17, 18, and 19, 39N, 42E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	clay, sand, dolomite breccia, hydrated iron oxide (possibly after siderite)
Ag	cerussite	
Zn	anglesite	
Cu	pyromorphite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced every year from 1901 to 1955 except for 1945 and 1946 (Huntting, 1956, p. 242). Total production was 15,583,187 lb Pb, 44,681 lb Zn, and 9,602 oz Ag (Mills, 1977, p. 110).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Chimney-type replacements of limestone occur at brecciated intersections of two or more sets of fissures. Remnants of galena and cerussite are imbedded in gangue. Most chimneys are 10-15 ft in diameter and 100 ft deep (Huntting, 1956, p. 241). Most of the circular to ellipsoidal chimneys do not extend more than 300 ft from the surface (Cole, 1949, p. 8).

GEOLOGIC SETTING: A Mississippi Valley-type deposit in the middle dolomite unit of the Metaline Formation (Mills, 1977, p. 111).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Gold Bar (215)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Marcus	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 41′ 39.70″ N	118° 0′ 30.10″ W	north of center sec. 22, 37N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed Permian sedimentary rocks	argillite, wacke	Permian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	pyrite	quartz
Ag	tetrahedrite	
Cu	sphalerite	
Pb		
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: A 400-lb test shipment was sent to the Bunker Hill smelter prior to 1945 (Huntting, 1956, p. 169).

TECTONIC SETTING: Wacke and argillite of Permian age were deposited in an active margin environment and were accreted to North America as part of the Quesnellia terrane prior to the mid Jurassic (Monger and others, 1982). Permian rocks were affected by deformation associated with formation of the Kootenay arc, a northeast-trending zone (in Washington) of multiply deformed rocks (Watkinson and Ellis, 1987).

ORE CONTROLS: Mineralization consists of quartz veins from 0.5 in. to 8 in. wide that fill fractures in wacke and argillite. The veins are sparsely mineralized (Huntting, 1956, p. 169).

GEOLOGIC SETTING: The Gold Bar deposit is in Permian argillite and wacke (Mills, 1985, geol. map).

REFERENCES

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Gold Ledge (216)

ALTERNATE NAMES		DISTRICT	COUNTY
		Kettle Falls	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Marcus	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 38′ 2.25″ N	118° 3′ 14.03″ W	NW¼ sec. 8, 36N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed Permian-Triassic metasedimentary rocks	argillite and other metasedimentary rocks	Permian - Triassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
porphyry	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	pyrite, quartz
Ag	silver sulfides	
	galena	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 6 tons in 1934 (Huntting, 1956, p. 169). Yield from 36 tons was 15 oz Au, 1,322 oz Ag, and 54 lb Pb (Moen, 1976, p. 90).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many are of which two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The quartz vein occurs along the contact between argillite and porphyry (Huntting, 1956, p. 169).

GEOLOGIC SETTING: Permian-Triassic metasedimentary rocks at the Gold Ledge mine are part of Weaver's (1920, geol. map, p. 72-75) Mission Argillite. Currently, the argillites and related rocks of the area are recognized as a complex sequence of eugeoclinal rocks and are assigned a Permian-Triassic age (Stoffel, 1990, geol. map, p. 19-20; Mills, 1985, geol. map, p. 7).

REFERENCES

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Gold Reef (217)

ALTERNATE NAMES	DISTRICT	COUNTY
Benvenue Golden Reef	Kettle Falls	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Marcus	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 37′ 46.34″ N	118° 1′ 31.93 ″W	SE¼ sec. 9, 36N, 38E

LOCATION: on top of hill

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed Permian-Triassic metasedimentary rocks	argillite and other metasedimentary rocks	Permian - Triassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
felsic dike (probably granite)	Cretaceous?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	quartz
Ag	silver sulfides	
Cu	chalcopyrite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Reportedly produced $100,000 prior to 1935; produced in 1939 (24 tons), and two or three carloads in 1946 and 1947 (Huntting, 1956, p. 170). Yield from 704 tons was 709 oz Au and 3,200 oz Ag (Moen, 1976, p. 90).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A quartz vein reportedly averaged about 3 ft wide, and was traceable for 800 ft. The vein is along a contact between argillite and an acidic dike (Huntting, 1956, p. 170).

GEOLOGIC SETTING: Permian-Triassic metasedimentary rocks at the Gold Reef mine are part of Weaver's (1920, geol. map, p. 72-75) Mission Argillite. Currently, the argillites and related rocks of the area are recognized as a complex sequence of eugeoclinal rocks and are assigned a Permian-Triassic age (Stoffel, 1990, geol. map, p. 19-20; Mills, 1985, geol. map, p. 7).

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Gray Eagle (202)

ALTERNATE NAMES	DISTRICT	COUNTY
Rightside Coyote Koyotte O'Neal-Schenk	Kettle Falls	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Kettle Falls	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 37′ 9.77″ N	118° 3′ 5.65″ W	center, sec. 17, 36N, 38E

LOCATION: on the east side of Franklin Roosevelt Lake

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed Permian-Triassic metasedimentary rocks	argillite and related metasedimentary rocks	Permian - Triassic
basic intrusive rocks	diabase	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Ag Au Pb Mo	bornite chalcopyrite molybdenite cuprite malachite azurite galena	pyrite, quartz, calcite, gypsum

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced a small amount of copper ore in 1918 and about 50 tons of copper concentrate per week in 1954 (Huntting, 1956, p. 102).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: An 8-ft-wide mineralized fracture zone is present in a series of argillites and quartzites cut by diabase. One vein is 4 ft wide (Huntting, 1956, p. 102).

GEOLOGIC SETTING: Diabase intrudes along a fault separating Permian and Permian-Triassic metasedimentary rocks. The diabase is not metamorphosed, which suggests it is Tertiary in age, perhaps Eocene (Stoffel, 1990, geol. map, p. 37).

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Great Western (163)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 52′ 6.40″ N	117° 41′ 48.33″ W	SE¼ sec. 24, 39N, 40E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn	galena, phalerite smithsonite cerussite	silicified limestone

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley vein	

PRODUCTION: Produced $40,000 prior to 1917 (Huntting, 1956, p. 242). Total production was 434,072 lb Pb, 936,524 lb Zn, and 125 oz Ag (Mills, 1977, p. 122).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore occurs in pre-mineralization faults in fine-grained marble along which are limonite seams as much as 18 in. wide and that locally contain rich lenses of ore (as much as 50 percent galena). Known length of the mineralized fault zone is 1,000 ft (Huntting, 1956, p. 242). Polished sections of ore minerals from the Great Western and Last Chance mines show textures indicative of deformation and subsequent annealing (Mills, 1977, p. 124).

GEOLOGIC SETTING: The Great Western mine is in the middle dolomite unit of the Metaline Formation (Mills, 1977, p. 122).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Hidden Treasure (218)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Orient	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 26.22″ N	118° 9′ 55.65″ W	SW¼ sec. 18, 39N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Sanpoil Volcanics	dacite, andesite	Eocene

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
latite, rhyolite dike metagabbro	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	pyrite	quartz, calcite

DEPOSIT TYPE	MINERALIZATION AGE
vein (epithermal) breccia	Eocene

PRODUCTION: Produced in 1934 (Huntting, 1956, p. 170).

TECTONIC SETTING: Tertiary regional extension was accommodated largely by simultaneous regional ductile stretching (metamorphic core complexes) and brittle deformation (volcano-tectonic depressions and dike swarms) and extrusion of voluminous andesite and dacite lava flows (Holder and others, 1989).

ORE CONTROLS: Pyrite and irregular stringers of quartz occur in a N30W-trending 70SE-dipping fracture zone in porphyritic hornblende-biotite andesite to dacite flows (Goetz, 1990, geol. map) near a latite dike (Weaver, 1920, p. 258-260; Huntting, 1956, p. 170; West, 1976). Mineralization is reported by West (1976) to be in a breccia pipe.

GEOLOGIC SETTING: The Hidden Treasure mine occurs in porphyritic hornblende-biotite dacite to andesite flows of the Eocene Sanpoil Volcanics and is associated with a latite dike (West, 1976).

COMMENTS: Development consisted of a 35-ft shaft , 60-ft tunnel, and open cuts (Huntting, 1956).

REFERENCES

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West, J. R.,, 1976, First Thought Mountain, Stevens County, Washington-A volcano within a caldera: Eastern Washington State College Master of Science thesis, 30 p., 2 pl.

Homestake (219)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bossburg	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 6.59″ N	118° 1′ 36.23″ W	sec. 19, 39N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	meta-andesite	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Cu Ag Pb	chalcopyrite	pyrite, pyrrhotite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: A total of 100 tons of ore were shipped (Weaver, 1920, p. 251).

TECTONIC SETTING: These rocks are part of the Rossland Group, which was deposited in an island arc environment; part of this arc, the Quesnellia terrane, is thought to have been accreted to North America prior to the mid-Jurassic (Monger and others, 1982).

ORE CONTROLS: The 4.5-ft-wide veins, which trend N30W and dip 50SW, cut meta-andesite (Weaver, 1920, p. 251; Stoffel, 1990, geol. map).

GEOLOGIC SETTING: The veins are in meta-andesite of the Jurassic Rossland Group (Stoffel, 1990, geol. map).

COMMENTS: Trenching and open-cut work were done at property; two shafts were sunk to depths of 27 and 12 ft, respectively (Weaver, 1920, P. 252).

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Hope and Twin Cabins (191)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Churchill Mtn	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 52′ 51.36″ N	118° 1′ 55.40″ W	sec. 18, 39N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	meta-andesite	Jurassic
Rossland Group?	quartzite	Permian - Jurassic?

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granite, granodiorite, monzonite	Eocene
dacite porphyry	Eocene

COMMODITIES-	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrrhotite
Au	gold	
Ag		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: 100 tons are said to have been shipped (Weaver, 1920, p. 253)

TECTONIC SETTING: The meta-andesite and basaltic andesite of the Rossland Group were originally deposited in an island arc setting. The Rossland Group is part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic (Monger and others, 1982). These rocks were intruded by acidic rocks during Eocene regional east-west extension (Holder and others, 1989).

ORE CONTROLS: The mineralized zone at the deposit is 7 ft wide and is in an acidic dike intruded into volcanic rocks of the Rossland Group (Weaver, 1920, p. 253; Fox, 1981, geol. map).

GEOLOGIC SETTING: Metavolcanic rocks of the Jurassic Rossland Group that Weaver (1920) reports overlie quartzite are intruded by Eocene dacite dikes (Fox, 1981, geol. map; Stoffel, 1990, geol. map).

COMMENTS: The claim was developed by two tunnels driven S40E and about 30 ft apart. Ore averaged $9.20 per ton (Weaver, 1920, p. 253).

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Hubbard (164)

ALTERNATE NAMES		DISTRICT	COUNTY
Royal Gold		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 55′ 16.11″ N	117° 52′ 3.68″ W	SE¼ sec. 32, 40N, 39E

LOCATION: on top of the peak at the head of Squaw Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Flagstaff Mountain sequence	siltite, argillite, limestone	Devonian - Carboniferous?

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
monzonite	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, pyrrhotite
Pb	galena	
Cu	tetrahedrite	
Ag	chalcopyrite	

DEPOSIT TYPE	MINERALIZATION AGE
massive sulfide vein	

PRODUCTION: One carload of ore was shipped (Huntting, 1956).

TECTONIC SETTING: Devonian-Carboniferous(?) fine-grained clastic and carbonate sediments were deposited in an extensional basin or on a continental slope (Joseph, 1990). These rocks are in the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Epigenetic ore deposits may have formed during development of the Kootenay arc or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is in Devonian dark-gray argillite and thin-bedded limestone that is cut by a monzonite dike of Eocene age. The sedimentary rocks contain fine-grained pyrite and disseminated lenses and irregular masses of sphalerite, galena, and pyrite (Beka, 1980).

GEOLOGIC SETTING: Devonian argillite and limestone of the Flagstaff Mountain sequence (Yates, 1971) are intruded by Eocene monzonite (Joseph, 1990, geol. map).

COMMENTS: Two tunnels and two shafts have been driven on the property (Colville Engineering Company, 1944).

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Yates, R. G., 1971, Geologic map of the Northport quadrangle, Washington: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-603, 1 sheet, scale 1:31,680.

Iroquois (279)

ALTERNATE NAMES	DISTRICT	COUNTY
Flannigan Columbia	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 57′ 6.02″ N	117° 32′ 22.84″ W	SW¼ sec. 20, NW ¼ sec. 29, and NE¼ sec. 30, 40N, 42E

LOCATION: about 1 mi southeast of the top of Red Top Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
altered lamprophyre dikes	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag Au	galena sphalerite chalcopyrite cerussite smithsonite	pyrite, dolomite

DEPOSIT TYPE	MINERALIZATION AGE
breccia zone vein	

PRODUCTION: Produced in 1917 and 1928; produced 2,898 tons in 1950 which averaged 3.3% Zn, 0.39% Pb, 0.1 lb Cd, and 0.025 oz/ton Ag (Huntting, 1956, p. 378).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore occurs as replacements in a 50-60-ft-wide breccia zone in limestone 280 ft from the contact with argillite. Altered lamprophyre dikes are associated with the ore (Huntting, 1956, p. 378). Fragments of the dolomite breccia are surrounded by: an early coarse white dolomite, sulfide minerals consisting of fine-grained pyrite, pale-yellow sphalerite, and lesser amounts of galena, and a layer of later white dolomite (Mills, 1977, p. 120-121).

GEOLOGIC SETTING: Mineralization occurs in what Yates (1964, geol. map) refers to as intraformational breccia in the Metaline Formation. The main adit enters in Ledbetter Slate, crosses the steeply dipping Russian Creek fault, and then enters the dolomite breccia (Mills, 1977, p. 119).

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Mills, J. W., 1977, Zinc and lead ore deposits in carbonate rocks, Stevens County, Washington: Washington Division of Geology and Earth Resources Bulletin 70, 171 p.

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Yates, R. G., 1964, Geologic map and sections of the Deep Creek area, Stevens and Pend Oreille Counties, Washington: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-412, 1 sheet, scale 1:31,680.

Jackson (280)

ALTERNATE NAMES		DISTRICT	COUNTY
Hunter		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 57′ 35.75″ N	117° 34′ 7.94″ W	SW¼NE¼ sec. 24, 40N, 41E Mountain

LOCATION: on the west side of Red Top Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Grass Mountain sequence	siliceous argillite	Carboniferous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	chalcopyrite	pyrite
Ag	sphalerite	
Pb	galena	
Cu		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: A total of 7 tons of ore yielded 1,318 oz Ag, 94 lb Cu, and 181 lb Pb (Moen, 1976, p. 86).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of hwich are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The mineralized quartz vein in argillite is 4-6 ft wide (Huntting, 1956, p. 378) and is gently dipping to near horizontal, probably parallel to a northwest-striking set of fractures that dip gently southwest (O'Keefe, 1980, p. 110).

GEOLOGIC SETTING: Veins occur in extensively deformed and thrust-faulted rocks (O'Keefe, 1980, p. 108-110).

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O'Keefe, M. E., 1980, Structural geology and mineral deposits of Red Top Mountain, Stevens County, Washington: Washington State University Master of Science thesis, 152 p., 1 pl.

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Jay Dee (246)

ALTERNATE NAMES	DISTRICT	COUNTY
High Grade Delmonico Enterprise		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 18′ 48.78″ N	117° 41′ 13.78″ W	SW¼ sec. 31, 33N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	impure dolomite, argillite, quartzite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Zn	galena tetrahedrite sphalerite chrysocolla malachite azurite chalcocite	quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Some hand-sorted ore shipped (Huntting, 1956, p. 328). Ninety-eight tons of ore produced in 1917, 1919, and 1920 yielded a total of 2 oz Au, 1,956 oz Ag, and 14,914 lb Cu (Moen, 1976, p. 67).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore minerals are sparsely distributed in small quartz stringers ranging from less than one inch to several inches wide in limestone (Huntting, 1956, p. 328).

GEOLOGIC SETTING: The Jay Dee mine is in the Middle Proterozoic Edna Dolomite of the Deer Trail Group (Miller and Clark, 1975, geol. map).

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Jay Gould (247)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 17′ 29.20″ N	117° 38′ 59.16″ W	on the east line NE¼ sec. 8, 32N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Striped Peak Formation	impure dolomite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Zn Cu Au	galena sphalerite chalcopyrite tetrahedrite bornite malachite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Production to 1920 was about $6,200 (Huntting, 1956, p. 328).

TECTONIC SETTING: Early Mesozoic (Jurassic-Triassic) granitic rocks intrude Proterozoic sedimentary rocks (Miller and Clark, 1975, geol. map).

ORE CONTROLS: Several large quartz veins and numerous small veinlets are found in argillite near the contact with granite and basic dikes (Huntting, 1956, p. 328).

GEOLOGIC SETTING: The Jay Gould is in argillites of the Striped Peak Formation (Belt Supergroup) adjacent to the Jurassic-Triassic Flowery Trail Granodiorite (Miller and Clark, 1975, geol. map).

REFERENCES

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

John Day (248)

ALTERNATE NAMES		DISTRICT	COUNTY
W. B. Stuart		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 18′ 48.21″ N	117° 40′ 16.37″ W	SE¼ sec. 31, 33N, 41E

LOCATION: on a southwest spur of Eagle Mtn

HOST ROCK: NAME	LITHOLOGY	AGE
Wallace Formation, upper part	carbonate-bearing siltite and quartzite and argillite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	argentiferous galena	quartz
Pb	chalcopyrite	
Cu	malachite	

DEPOSIT TYPE	MINERALIZATION AGE
stockwork vein	

PRODUCTION: The mine has produced silver ore (Huntting, 1956, p. 328).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization consists of a stockwork of small quartz veinlets in limestone (Huntting, 1956, p. 328).

GEOLOGIC SETTING: The John Day mine appears to be in carbonate-bearing rocks of the Wallace Formation (Miller and Clark, 1975, geol. map).

REFERENCES

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Juno-Echo (192)

ALTERNATE NAMES	DISTRICT	COUNTY
June-Echo Western Molybdenum		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 17′ 27.28″ N	117° 41′ .91″ W	center N½ sec. 7, 32N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Flowery Trail Granodiorite	granodiorite	Triassic - Jurassic
unnamed dolomite	dolomite	Devonian - Mississippian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz, pyrite, arsenopyrite
Mo	molybdenite	
W	scheelite	
Ag		
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 47 tons of ore in 1916 and three carloads of ore 1917. In 1941, 300 to 400 tons were mined and milled for MoS_2, but concentrate did not meet market specifications (Huntting, 1956, p. 98).

TECTONIC SETTING: Early Mesozoic (Triassic-Jurassic) granitic rocks intrude Late Paleozoic sedimentary rocks (Miller and Clark, 1975, geol. map).

ORE CONTROLS: Mineralization is present in lenticular quartz veins from a fraction of an inch to 4 ft wide along the contact between carbonate and monzonite (Huntting, 1956, p. 98).

GEOLOGIC SETTING: Veins of the Juno-Echo deposit are along the contact between metamorphosed Upper Paleozoic dolomite and the Flowery Trail Granodiorite (Miller and Clark, 1975, geol. map).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Purdy, C. P., Jr., 1954, Molybdenum occurrences of Washington: Washington Division of Mines and Geology Report of Investigations 18, 118° p., 6 pl.

Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Keystone (234)

ALTERNATE NAMES		DISTRICT	COUNTY
McDonald		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 52′ 53.03″ N	117° 31′ 43.57″ W	SW¼SE¼ sec. 17, 39N, 42E	

LOCATION: 3 mi southeast of Leadpoint

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	limonite	limonite and hematite
Pb	galena	
Ag	hematite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: A few tons of high-grade lead ore shipped prior to 1941 reportedly ran 72-80% Pb and 2 oz/ton Ag. Iron ore was shipped for use in portland cement manufacture from 1936 to 1940 (Huntting, 1956, p. 203).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Chimneys similar to those at the Electric Point mine carry abundant limonite-hematite (probably after siderite) and galena containing small values in silver (Huntting, 1956, p. 203).

GEOLOGIC SETTING: The host rock is the middle dolomite unit of the Metaline Formation (Yates, 1964, geol. map).

REFERENCES

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Krug (193)

ALTERNATE NAMES		DISTRICT	COUNTY
Hartford		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Addy	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 19′ 43.82″ N	117° 50′ 47.42″ W	NE¼SE¼ sec. 26, 33N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Huckleberry Formation	greenstone (basalt)	Proterozoic
Addy Quartzite	quartzite	Late Proterozoic - Cambrian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diabase	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, limonite, quartz
Ag	tetrahedrite	
Au	galena	
	sphalerite	
	malachite	
	azurite	
	cuprite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1916-1917. Yield from 78 tons was 316 oz Ag and 52 lb Cu (Moen, 1976, p. 68).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of diabase dikes.

ORE CONTROLS: Several quartz veins are present in chlorite schist and diabase. One 2- or 3-ft-wide vein is fairly well mineralized. Also, some pyrite and chalcopyrite is disseminated in the diabase and chlorite schist (Huntting, 1956, p. 98; Bancroft, 1914, p. 109-110).

GEOLOGIC SETTING: The Krug mine is approximately located, and it is near the contact between greenstone of the Huckleberry Formation of the Windermere Group and the Addy Quartzite (Waggoner, 1990, geol. map, p. 18-23). Bancroft (1914, p. 109-110) notes the mine is in sedimentary rocks that are intruded by numerous diabase dikes.

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Waggoner, S. Z., compiler, 1990, Geologic map of the Chewelah 1:100,000 quadrangle, Washington-Idaho: Washington Division of Geology and Earth Resources Open File Report 90-14, 63 p., 1 pl.

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Kulzer (235)

ALTERNATE NAMES		DISTRICT	COUNTY
Capital Vigilant		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Valley	1:24,000	Chewelah	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 10′ 34.56″ N	117° 38′ 56.65″ W	sec. 20, 31N, 41E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed carbonate	dolomite	Devonian - Mississippian
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
Mesozoic granitic rocks		Mesozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	limonite hematite	

DEPOSIT TYPE: contact metamorphic?

MINERALIZATION AGE:

PRODUCTION: About 7,000 tons produced prior to 1914 was used at the Tacoma smelter as flux. A small amount also was produced in 1921. Total production of 12,000 tons is reported by Huntting (1956, p. 203).

TECTONIC SETTING: Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks of the Kootenay arc were intruded by granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Irregular limonite-hematite bodies in limestone occur at its contact with granite. The ore zone ranges from a few feet to 30 ft wide and is traceable for 500 ft. Ore also occurs at the contact of limestone with overlying basalt (Huntting, 1956, p. 203).

GEOLOGIC SETTING: The Kulzer mine is in Middle Paleozoic carbonate rocks. Although the deposit is not shown on the geologic map by Miller and Clark (1975), Huntting (1956, p. 203) reports it is adjacent to Mesozoic granitic rocks.

REFERENCES

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Lakeview (245)

ALTERNATE NAMES	DISTRICT	COUNTY
Hazel Lake View	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 57′ 51.67″ N	117° 32′ 57.15″ W	near center, sec. 19, 40N, 42E

LOCATION: on the north side of the highest point of Red Top Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Grass Mountain sequence	siliceous argillite	Carboniferous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb	galena silver sulfides pyromorphite	quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: In 1922, 24 tons of ore yielded 770 oz Ag and 2,389 lb Pb (Moen, 1976, p. 86).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore consists of galena and silver sulfides in a quartz vein (Huntting, 1956, p. 327).

GEOLOGIC SETTING: Veins occur in extensively deformed and thrust rocks (O'Keefe, 1980, p. 108-110).

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Last Chance (165)

ALTERNATE NAMES		DISTRICT	COUNTY
Jupiter		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 59.52″ N	117° 41′ 56.39″ W	SW¼SE¼ sec. 24, 39N, 40E

LOCATION: on the east side of Deep Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	calcite, quartz, pyrite, limonite
Zn	cerussite	
Ag	anglesite	
	sphalerite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley vein	

PRODUCTION: Produced $600,000 prior to 1937; one carload of ore was shipped in 1938, and small amounts of concentrate were shipped in 1947-1949 (Huntting, 1956, p. 243). Between 1904 and 1954, the mine produced 5,937,708 lb Pb, 110,110 lb Zn, and 18,567 oz Ag (Mills, 1977, p. 122).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore shoots occur in a mineralized shear zone in dolomite, especially at fracture intersections. The zone is as much as 5 ft wide (Huntting, 1956, p. 243). Two distinct veins are remarkably uniform in strike and dip over a combined strike length of 650 ft and a dip length of at least 500 ft. The veins are emplaced along faults and appear to be parallel or sub-parallel to bedding (Mills, 1977, p. 122).

GEOLOGIC SETTING: The Last Chance mine is in the middle dolomite of the Metaline Formation (Mills, 1977, p. 122).

REFERENCES

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Lead Trust (166)

ALTERNATE NAMES	DISTRICT	COUNTY
		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 53′ 50.08″ N	117° 33′ 31.56″ W	SE¼ SE¼ sec. 12, 39N, 41E and SW¼SW¼ sec. 7, 39N, 42E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle unit	dolomite and limestone	Middle Cambrian - Middle Ordovician
Metaline Formation, intraformational dolomite breccia	dolomite breccia	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena cerussite	dolomite, siderite, limonite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced in 1939; sporadic shipments prior to 1924 are said to have amounted to 30,000 tons of lead ore (Huntting, 1956, p. 243).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore occurs as irregular bunches in brecciated limestone. The ore body in the lower adit was 16 to 24 in. wide (Huntting, 1956, p. 243). In a glory hole, white to yellow-white, very coarse grained dolomite forms the matrix of the intraformational dolomite breccia. This matrix contains galena in veinlets as much as 0.25 in. wide and several inches long, in lumps, and as disseminated grains (Mills, 1977, p. 126).

GEOLOGIC SETTING: The Lead Trust mine occurs in an intraformational breccia of the Metaline Formation. The breccia is in fault contact with the middle dolomite unit of the Metaline Formation (Yates, 1964, geol. map).

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Liberty Copper (147)

ALTERNATE NAMES		DISTRICT	COUNTY
Liberty		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Addy	1:24,000	Chewelah	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 18′ 20.28″ N	117° 51′ 9.87″ W	N½NE¼ sec. 2, 32N, 39E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Huckleberry Formation	argillite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz, pyrite
Au	tetrahedrite	
Ag	bornite	
	chalcocite	
	cuprite	
	malachite	
	azurite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: The Liberty Copper deposit has produced, but no records are available (Huntting, 1956, p. 98).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of whcih are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is sparse in quartz veins in metamorphic (argillite) rocks (Huntting, 1956, p. 98). One exposed vein is 6 ft wide (Weaver, 1920, p. 162-164).

GEOLOGIC SETTING: Host rocks are argillite, calcareous argillite, phyllite, and quartzite (Weaver, 1920, p. 162). Waggoner (1990, geol. map, p. 22) shows the area is underlain by rocks of the Huckleberry Formation of the Windermere Group, which consists of diamictite, conglomerate, quartzite, and argillite.

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Little Mountain (265)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Clayton	1:24,000	Spokane	Spokane
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 55′ 17.41″ N	117° 36′ 42.49″ W	SE¼ sec. 15, 28N, 41E	

LOCATION: on Little Mountain, southwest of Deer Park

HOST ROCK: NAME	LITHOLOGY	AGE
Eocene granitic rocks	granite	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	huebnerite scheelite	quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 500 lb of high-grade ore (Huntting, 1956, p. 349).

TECTONIC SETTING: The area is underlain by Tertiary granitic rocks (Griggs, 1973, geol. map).

ORE CONTROLS: A quartz vein 4-8 in. wide is exposed for a length of 30 ft in granite (Huntting, 1956, p. 349).

GEOLOGIC SETTING: The Little Mountain mine is in an area of Eocene granitic rocks (Joseph, 1990, geol. map).

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Lone Star (249)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 50′ 27.71″ N	117° 42′ 59.84″ W	sec. 35, 40N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Zn Au	galena sphalerite	quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Reportedly shipped ore to the Northport smelter (Huntting, 1956, p. 329).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A quartz vein ranging in width from 12 to 14 ft was traced for 1,300 ft on the surface (Huntting, 1956, p. 329).

GEOLOGIC SETTING: The Lone Star deposit is in the Spirit pluton (Yates, 1964, geol. map), which consists of quartz monzonite and monzogranite (Todd, 1973, p. 12-16).

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Yates, R. G., 1964, Geologic map and sections of the Deep Creek area, Stevens and Pend Oreille Counties, Washington: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-412, 1 sheet, scale 1:31,680.

Longshot (167)

ALTERNATE NAMES	DISTRICT	COUNTY
Newland Pioneer	Colville	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Park Rapids	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 37′ 21.20″ N	117° 41′ 27.02″ W	NW¼ sec. 18, 36N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Leola Volcanics	basaltic flows and volcaniclastic rocks	Late Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	limestone, tourmaline
Zn	sphalerite	
Ag	tetrahedrite	
Cd	scheelite	

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	

PRODUCTION: Produced during 1951-1955 (Huntting, 1956, p. 244). In 1951-1952, 246 tons of ore yielded 5,094 oz Ag, 3 oz Au, 16,330 lb Pb, and 20,581 lb Zn (Moen, 1976, p. 81-82).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, mostly sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The mineralized zone is about 20 ft thick and 150 ft long at the base of a limestone bed in Maitlen phyllite (Huntting, 1956, p. 244). Moen (1976, p. 81) notes the deposit is a replacement type of deposit and occurs in limy (inter)beds in argillite, phyllite, and quartzite (Moen, 1976, p. 81).

GEOLOGIC SETTING: Huntting (1956, p. 244) noted the Longshot was in Maitlen Phyllite. A small-scale map compilation (Joseph, 1990, geol. map, p. 37) shows the Longshot is in the Late Proterozoic Leola Volcanics. Presumably, the mine is in a small body of Maitlen Phyllite, or the Maitlen occurs as interbeds in the volcanics.

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Loon Lake Blue Bird (194)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Valley	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 8′ 43.73″ N	117° 37′ 51.19″ W	SE¼NE¼ sec. 33, 31N, 41E

LOCATION: ¼ mi east of Loon Lake Copper mine workings on Grouse Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Striped Peak Formation	argillite	Middle Proterozoic
Addy Quartzite	quartzite	Proterozoic - Cambrian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite bornite chalcocite cuprite malachite azurite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: The mine has produced (Huntting, 1956, p. 99).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is in a 5-10-ft-wide quartz vein in argillite and quartzite. The vein is sparsely mineralized (Huntting, 1956, p. 99).

GEOLOGIC SETTING: The Loon Lake Blue Bird mine is in a sequence of rocks of the Proterozoic Belt Supergroup which is cut by north-trending faults (Miller and Clark, 1975, geol. map).

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Loon Lake Copper (195)

ALTERNATE NAMES	DISTRICT	COUNTY
Kemp-Komar Key West Bluebird		Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Valley	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 8′ 42.10″ N	117° 37′ 43.94″ W	Near center, sec. 33, 31N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Striped Peak Formation	argillite	Middle Proterozoic
Addy Quartzite	quartzite	Proterozoic - Cambrian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	hematite, pyrite
Ag	bornite	
Au	tetrahedrite	
	malachite	
	azurite	
	cuprite	
	atacamite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced about $125,000 by 1918 (Huntting, 1956, p. 99). A total of about 7,317 tons of ore was processed, which yielded 622,555 lb Cu, 532 oz Ag, and 25 oz Au (Miller, 1969, p. 6).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The quartz vein in argillite ranges from 4 to 20 ft wide. The known payshoot was 200 ft long and 500 ft deep (Huntting, 1956, p. 99).

GEOLOGIC SETTING: The Loon Lake Copper deposit is in Cambrian quartzite or Proterozoic Belt Supergroup rocks (Miller and Clark, 1975, geol. map).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Lottie (196)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Bossburg	1:24,0000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 47.92″ N	118° 1′ 43.91″ W	sec. 19, 39N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	andesite	Jurassic
Rossland Group?	quartzite	Jurassic?

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
rhyodacite porphyry	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite	pyrrhotite, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced about $900 worth of ore prior to 1914 (Huntting, 1956, p. 99).

TECTONIC SETTING: Andesite and basaltic andesite of the Rossland Group were part of an island arc. The unit is part of the Quesnellia terrane, which was accreted to North America prior to the mid-Jurassic (Monger and others, 1982). Acidic dikes, associated with regional east-west extension during the Eocene, intrude the older rocks (Stoffel, 1990).

ORE CONTROLS: The 8-ft-wide mineralized zone is in rhyodacite porphyry intrusive into quartzite and andesite. The general trend of the mineralized zone is N80E (Weaver, 1920 p. 253).

GEOLOGIC SETTING: Rossland Group volcanic and sedimentary rocks are cut by granite and diorite. A rhyodacite porphyry dike is the host to mineralization (Hyde, 1985, geol. map; Weaver, 1920, p. 253). This dike is probably of the same rock-type as the hypabyssal dikes of Eocene age of Stoffel (1990, unit Eida).

COMMENTS: The workings consisted of a 50-ft shaft, a large amount of open-cut work, and trenching for more than 500 ft along the vein.

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Lowley (271)

ALTERNATE NAMES		DISTRICT	COUNTY
Lowley lease			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Benjamin Lake	1:24,000	Coulee Dam	Ritzville
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
47° 50′ 1.23″ N	118° 5′ 59.50″ W	SW¼ sec. 13, 27N, 37E	

LOCATION: 7 mi south of the Midnite mine

HOST ROCK: NAME	LITHOLOGY	AGE
biotite granodiorite	granodiorite	Cretaceous
quartz monzonite porphyry	quartz monzonite	Cretaceous
Cayuse Mountain-Mill Canyon area metasedimentary rocks	quartzite	Proterozoic - Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	meta-autunite uranophane coffinite uraninite autunite torbernite	chlorite, biotite, pyrite, hematite, quartz, sericite, iron oxide

DEPOSIT TYPE	MINERALIZATION AGE
unconformity and vein-type uranium	Tertiary

PRODUCTION: Shipped 285 tons of ore in 1956 (Becraft and Weis, 1963, p. 66).

TECTONIC SETTING: Eocene volcanism may have remobilized uranium minerals in Cretaceous granitic rocks (Becraft and Weis, 1963; Ludwig and others, 1981, p. 89).

ORE CONTROLS: Uranium is present in a shattered zone at the contact between impure gray to pink quartzite and biotite granodiorite and quartz monzonite porphyry. The quartzite also hosts ore (DGER unpubl. data). Huntting (1956, p. 356) noted that seams of uranium were found in small fractures throughout an area 100 ft by 300 ft adjacent to the fault contact between the sedimentary rocks and the granitic rocks (Huntting, 1956, p. 356).

GEOLOGIC SETTING: Uranium mineralization at the Lowley deposit is in Paleozoic (possibly as old as Proterozoic) quartzite and in Cretaceous granodiorite and quartz monzonite porphyry (Waggoner, 1990, geol. map, p. 18-19).

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Lucile (281)

ALTERNATE NAMES	DISTRICT	COUNTY
Owen Boundary Silver Lead	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 57′ .94″ N	117° 33′ 12.11″ W	near center of south line SW¼ sec. 19, and NW¼ sec. 30, 40N, 42E

LOCATION: on Red Top Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Maitlen Phyllite, Reeves Limestone Member	limestone	Cambrian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
lamprophyre dikes	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag Cd	galena tetrahedrite sphalerite scheelite cerussite	pyrite, quartz, calcite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 50 tons in 1926, 160 tons in 1948, and 44 tons in 1949 (Huntting, 1956, p. 378).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Irregular mineralized zones are found in quartz veins in marble and are associated lamprophyre dikes. The ore body developed in 1948 was 8-25 ft wide and estimated to contain 11,000 tons of ore. The best showing of scheelite was in quartz stringers associated with the sulfides in a zone exposed for 50 ft in a short drift at the end of the 212-ft adit (Huntting, 1956, p. 378).

GEOLOGIC SETTING: The host rocks are probably the Reeves Limestone Member of the Maitlen Phyllite (Mills, 1977, p. 133).

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Lucky Four (250)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 52′ 51.70″ N	117° 32′ 33.05″ W	sec. 18, 39N, 42E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Cu Pb Au	galena	limonite, siderite, clay, sand, brecciated dolomite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: One truckload of ore shipped in 1934 yielded 353 oz Ag, 1.6% Cu, 1.7% Pb, and 0.023 oz Au (Huntting, 1956, p. 329).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The Lucky Four is adjacent to the Electric Point mine where ore is localized in chimney-like replacement bodies in limestone. The ore bodies occur in brecciated rocks at the intersections of two or more sets of fissures. The largest chimney had a depth of 800 ft and a diameter of 150 ft. Most are 300 ft or less deep and 100 ft or less in diameter (Huntting, 1956, p. 240).

GEOLOGIC SETTING: Host rocks at the Lucky Four deposit are part of the middle unit of the Metaline Formation (Mills, 1977, p. 111).

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Magma (282)

ALTERNATE NAMES	DISTRICT	COUNTY
Easy Money Eldorado	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 46′ .61″ N	117° 38′ 24.94″ W	E½ SW¼ sec. 28, 38N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Spirit pluton, quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, garnet, epidote, calcite, tremolite
Pb	galena	
Mo	molybdenite	
W	scheelite	
Cu		
Ag		
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein Mississippi Valley contact metamorphic	

PRODUCTION: Produced 5 tons of galena ore in 1927 (Huntting, 1956, p. 379).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore is in contact metamorphosed limestone near its contact with granite (Huntting, 1956, p. 379). Mills (1977, p. 127) believes two types and stages of mineralization are represented at the Magma mine. The earlier, pre-quartz monzonite mineralization is Yellowhead-type (Mississippi Valley type) mineralization in the middle dolomite unit of the Metalline Formation. The later mineralization is contact metamorphic and is related to intrusion of the Spirit pluton.

GEOLOGIC SETTING: The Magma mine is in the middle dolomite unit of the Metaline Formation and is adjacent to the Cretaceous Spirit pluton (Mills, 1977, p. 127).

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Maki (168)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Deep Lake	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 50′ 45.57″ N	117° 36′ .04″ W	NE¼ sec. 35, 39N, 41E

LOCATION: east of the south end of Deep Lake; on Currant Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Spirit pluton, quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	calcite
Zn	sphalerite	
Co	pyrrhotite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley contact metamorphic	

PRODUCTION: Concentrate was shipped in 1921 (Huntting, 1956, p. 244).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Erratic mineralization occurs parallel to bedding in a zone 50-100 ft thick and 600 ft long in gray limestone adjacent to granite (Huntting, 1956, p. 244). Characteristics of mineralization include gossan zones containing lead and zinc carbonates and sulfides as streaks and disseminations parallel to banding in the host rock (Mills, 1977, p. 128).

GEOLOGIC SETTING: The limestone and dolomite of the upper unit of the Metaline Formation at the Maki mine are metamorphosed into bands of limestone marble, dolomitic limestone marble, and dolomite marble (Mills, 1977, p. 127).

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McGrath placer (224)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 54′ 8.84″ N	117° 48′ 3.38″ W	secs. 5, 7, and 8, 39N, 40E

LOCATION: on the east side of the Columbia River south and southwest of Northport; in the same general area as the Pohle, Weston, and Van Stone placers

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1934 (Huntting, 1956, p. 191).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

McNally (197)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Churchill Mtn.	1:24,0000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 55′ 31.24″ N	118° 6′ 9.69″ W	secs. 33 and 34, 40N, 37E

LOCATION: north side of Pierre Lake at elev. 2,600 ft—location incorrect

HOST ROCK: NAME	LITHOLOGY	AGE
Mount Roberts Formation?	limestone	Permian
Rossland Group?	andesite?	Jurassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diabase	Eocene ?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, hematite, calcite, quartz, epidote, serpentine
Au	gold	
Ag		
Pb		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1938 (Huntting, 1956, p. 99).

TECTONIC SETTING: The Rossland Group and Mount Roberts Formation were deposited in an active margin setting. They are part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic. Rocks of Quesnellia were affected by deformation associated with the Kootenay arc, a northeast trending zone (in Washington) of multiply deformed rocks (Monger and others, 1982). These rocks were intruded by Eocene dikes that are the result of regional east-west extension during the mid-Eocene (Holder and others, 1989).

ORE CONTROLS: The deposit consists of the replacement of limestone along east-trending contact with diabase; limestone generally trends N30W and dips 70NE (Weaver, 1920; p. 276; Bancroft, 1914, p. 84).

GEOLOGIC SETTING: The location of the deposit is uncertain. The deposit was reported to be in volcanics of the Rossland Group and limestones of the Mount Roberts Formation (?) (Bancroft, 1914; Fox, 1981, geol. map; M. Clements personal commun.).

COMMENTS: Small open cuts and two short adits.

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Melrose (251)

ALTERNATE NAMES	DISTRICT	COUNTY
Paragon Maple Leaf	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Boundary	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 44.42″ N	117° 38′ 46.02″ W	SW¼NW¼ sec. 28, 40N, 41E

LOCATION: 4 mi south of the town of Boundary

HOST ROCK: NAME	LITHOLOGY	AGE
Grass Mountain sequence	siliceous black argillite	Carboniferous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	tetrahedrite	pyrite, quartz
Pb	galena	
Zn	sphalerite	
Cu	-	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced between 1913 and 1938. The total yield from 97 tons of ore was 2,973 oz Ag, 1,255 lb Cu, and 11,176 lb Pb (Moen, 1976, p. 87).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A 6-ft-wide vein in argillite contains irregular, scattered bunches of ore (Huntting, 1956, p. 329).

GEOLOGIC SETTING: Yates (1964, geol. map) initially mapped rocks in the area of the Melrose mine as Carboniferous siliceous black argillite, but later suggested the rocks may be Devonian or older? (Yates, 1976, p. 62).

REFERENCES

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Middleport (283)

ALTERNATE NAMES		DISTRICT	COUNTY
Rinchaw		Colville	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Aladdin Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 37′ 47.70″ N	117° 33′ 50.90″ W	SE¼ sec. 12, 36N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Narcisse Creek biotite granite	granodiorite to monzogranite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, quartz, dolomite, chlorite
Pb	galena	
Cu	tetrahedrite	
Ag	chalcopyrite	
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1929 and 1937-1939. Mined 50 tons and milled 35 tons in 1939 (Huntting, 1956, p. 379). Ore averaged 8% Pb, 15% Zn, and 11.8 oz/ton Ag (Moen, 1976, p. 82).

TECTONIC SETTING: Voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The mineralized quartz vein in granite ranges from 6 to 24 in. wide. The vein is said to have a length of 6,000 ft (Huntting, 1956, p. 379).

GEOLOGIC SETTING: The Middleport deposit is in granodiorite to monzogranite of Narcisse Creek (Joseph, 1990, geol. map, p. 44-45).

REFERENCES

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Midnite (272)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Turtle Lake	1:24,000	Coulee Dam	Ritzville

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 56′ 28.72″ N	118° 5′ 33.01″ W	secs. 1, 12, 28N, 37E

LOCATION: on the flanks of Lookout Mountain, 10 mi northwest of Wellpinit

HOST ROCK: NAME	LITHOLOGY	AGE
Togo Formation	metapelites and metacarbonates	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
monzogranite of Midnight mine	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U	uraninite	pyrite, marcasite, montmorillonite
Mo	pitchblende	
Cu	coffinite	
Zn	meta-autunite	
	autunite	
	molybdenite	
	chalcopyrite	
	sphalerite	
	uranophane	
	gummite	
	torbernite	
	liebigite	
	phosphuranylite	

DEPOSIT TYPE	MINERALIZATION AGE
unconformity and vein-type uranium	Cretaceous - Recent

PRODUCTION: Produced 609 tons of ore by the end of February 1955 (100 tons in 1954) and had produced a total of 94 carloads of ore by the end of January 1956 (Huntting, 1956, p. 356). The mine operated from 1954 until it was closed in 1982 due to depressed market conditions; reserves of 766,000 tons containing 0.153% U_3O_8 and 1,600,000 tons containing 0.05% U_3O_8 were reported in earlier years (DGER unpubl. data).

TECTONIC SETTING: Tertiary volcaniclastic rocks were deposited on Cretaceous granitic rocks. This igneous activity may have remobilized uranium minerals in the Cretaceous granitic rocks (Becraft and Weis, 1963; Ludwig and others, 1981, p. 89).

ORE CONTROLS: Tabular uranium deposits are concentrated in a depression along the contact of the monzogranite and the metasedimentary rocks. Pyrite, marcasite, and possibly carbonate served as reducing agents, precipitating the uranium. Ore minerals are disseminated and in stockwork veins and may have been deposited in shear zones continuously from the Cretaceous to the present. Montmorillonite is the only alteration mineral whose formation accompanied mineralization. Uranium veins have no alteration selvages. Pyrite and marcasite are cogenetic. Molybdenite that is associated with minor chalcopyrite and sphalerite is not contemporaneous with uranium (DGER unpublished data).

GEOLOGIC SETTING: Mineralization occurs at the contact of monzogranite of the Cretaceous Midnight mine pluton with metapelites and metacarbonates of the Proterozoic Togo Formation (Waggoner, 1990, geol. map, p. 28-29).

REFERENCES

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Minorca (198)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Bossburg	1:24,0000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 44.32″ N	118° 1′ 44.30″ W	sec. 19, 39N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	andesite	Jurassic
unnamed rhyodacite, dacite	rhyodacite, dacite	Eocene?

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
rhyodacite, dacite	Eocene?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite scheelite	pyrrhotite, pyrite, arsenopyrite, magnetite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 100 tons of ore prior to 1920 (Huntting, 1956, p. 99).

TECTONIC SETTING: Meta-andesites and basaltic andesite of the Jurassic Rossland Group were originally deposited in an island arc setting. The Rossland Group is part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic (Monger and others, 1982). Rocks of the Quesnellia terrane were affected by deformation associated with the Kootenay arc, a northeast-trending zone (in Washington) of multiply deformed rocks (Monger and others, 1982; Watkinson and Ellis, 1987). Regional extension in the Eocene resulted in the formation of volcano-tectonic depressions which were filled with dacitic lavas and sediments and associated feeder dikes (Holder and others, 1989).

ORE CONTROLS: The lens-shaped lodes contain chalcopyrite and euhedral pyrite in very fine grained pyrrhotite (50%). The two steeply dipping veins are as much as 2 ft wide and trend N80E and N45E. Mineralization is present along the contact of the andesite and the rhyodacite, although mineralization is generally in the andesite. Mineralization is generally discordant with bedding. Rhyodacite dikes are spatially related to mineralization (Hyde, 1985).

GEOLOGIC SETTING: Andesite of the Jurassic Rossland Group is intruded by Eocene dacite to rhyodacite dikes (Hyde, 1985).

COMMENTS: Two shafts were driven, one of which is said to have been 165 ft deep (Weaver, 1920, p. 250).

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Morning (252)

ALTERNATE NAMES	DISTRICT	COUNTY
Moonlite		Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Aladdin	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 44′ 24.20″ N	117° 38′ 46.73″ W	NW¼NW¼ sec. 4, 37N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Maitlen Phyllite	phyllite and minor quartzite and carbonate	Cambrian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	galena	quartz
Pb	sphalerite	
Zn		
Cd		
Au		
Cu		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced an unknown amount in 1929 and 6 tons in 1948 (Huntting, 1956, p. 330). Yield from 19 tons was 1,712 oz Ag, 11 lb Cu, 10,917 lb Pb, and 4,898 lb Zn (Moen, 1976, p. 87).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein reportedly is 4.5 ft wide and 1,500 ft long (Huntting, 1956, p. 329).

GEOLOGIC SETTING: The Morning deposit is in the Maitlen Phyllite (Joseph, 1990, geol. map, p. 31-32).

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Mountain View (253)

ALTERNATE NAMES		DISTRICT	COUNTY
Contention			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 54′ 49.32″ N	117° 49′ 49.36″ W	N½ sec. 3, 39N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Flagstaff Mountain sequence	black argillite and fine-grained sandstone	Carboniferous
Pend Oreille sequence	argillite with chert, limestone, and greenstone interbeds	Carboniferous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	chalcopyrite	pyrite, quartz, fluorite
Pb	sphalerite	
Zn	galena	
Cu	tetrahedrite	
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 2½ tons of sorted ore in 1921 (Huntting, 1956, p. 330).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Two quartz veins in interbedded limestone and argillite are 1 ft and 9 ft wide. The 9-ft-wide vein has a 13-in.-wide band of solid sulfides along the footwall (Huntting, 1956, p. 330).

GEOLOGIC SETTING: The deposit is located in or near a north-trending fault that separates the Flagstaff Mountain sequence on the west from the Pend Oreille sequence. Both units consist of argillaceous rocks (Yates, 1971, geol. map).

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Myeerah (169)

ALTERNATE NAMES		DISTRICT	COUNTY
My Era		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Abercrombie Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 25.99″ N	117° 27′ 14.78″ W	E½ sec. 11, 40N, 42E

LOCATION: across the gulch west of the Frisco Standard mine

HOST ROCK: NAME	LITHOLOGY	AGE
Ledbetter Slate	black graphitic slate	Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz
Zn	tetrahedrite	
Ag		
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1926 and in 1942. Yield from 21 tons was 288 oz Ag and 8,175 lb of Pb (Moen, 1976, p. 87).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Park and Cannon, 1943; Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization occurs in a 2-ft-wide vein and consists of quartz and sheared slate. Numerous lamprophyre dikes are present. The vein is traceable for about 1,000 ft (Huntting, 1956, p. 245).

GEOLOGIC SETTING: The host rocks are Ordovician Ledbetter Slate; the graphitic slate is similar to that at the Frisco Standard and United Treasure mines (Park and Cannon, 1943, p. 62).

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Napoleon (236)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Marcus	1:24,000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 44′ 11.94″ N	118° 6′ 4.16″ W	NW¼ sec. 3, 37N, 37E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed Permian-Triassic metasedimentary rocks	argillite, limestone	Permian - Triassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
monzonite porphyry	Cretaceous?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	chalcopyrite	pyrrhotite, pyrite, limonite, amphibole, garnet, calcite
Cu	magnetite	
Au	hematite	

DEPOSIT TYPE	MINERALIZATION AGE
contact metamorphic	

PRODUCTION: Produced in 1907-1910, 1913-1917, and 1938-1955 (Huntting, 1956, p. 203).

TECTONIC SETTING: Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks of the Kootenay arc were intruded by granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: This deposit is contact metamorphic and is in amphibolite adjacent to monzonite porphyry. Mine development took place in area of 300 ft wide by 700 ft long by 250 ft deep. Ore in the lower workings consists of primary sulfides and in the upper workings consists mostly of iron oxide (Huntting, 1956, p. 203).

GEOLOGIC SETTING: Permian-Triassic metasedimentary rocks at the Napoleon mine are part of Weaver's (1920, geol. map, p. 72-75) Mission Argillite. Currently, the argillites and related rocks of the area are poorly understood and are assigned a Permian-Triassic age (Stoffel, 1990, geol. map, p. 19-20; Mills, 1985, geol. map, p. 7).

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Neglected (170)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Gillette Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 43′ 18.48″ N	117° 51′ 51.48″ W	SW¼ sec. 11, 37N, 39E

LOCATION: on the high spur between two branches of Clugston Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, upper unit	limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	
Zn	sphalerite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced in 1917, 1925, and 1928 (Huntting, 1956, p. 245).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987).

ORE CONTROLS: The country rock (limestone) is cut by a mineralized quartz-calcite vein about 8 ft wide (Huntting, 1956, p. 245). Mills (1977, p. 129) notes the mineralization is present in a small chimney of brecciated limestone that contains sphalerite and galena. The host rocks contain argillite fragments of the Ledbetter Slate, suggesting the mineralization is similar to that of the Josephine horizon at the top of the Metaline Formation.

GEOLOGIC SETTING: The Neglected deposit occurs in the upper unit of the Metaline Formation (Mills, 1977, p. 128-129).

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Negro Creek Bar placer (225)

ALTERNATE NAMES		DISTRICT	COUNTY
Dead Man's Eddy			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Boundary	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 56′ 19.82″ N	117° 44′ 55.54″ W	sec. 28, 40N, 40	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1933-1934 (Huntting, 1956, p. 192).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Nevada (171)

ALTERNATE NAMES		DISTRICT	COUNTY
		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Addy	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 15′ 16.46″ N	117° 51′ 30.58″ W	SW¼ sec. 23, 32N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Stensgar Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz, actinolite, epidote
Zn	sphalerite	
Ag	tetrahedrite	
Cu	chalcopyrite	

DEPOSIT TYPE	MINERALIZATION AGE
diagenetic? pipes	

PRODUCTION: A carload of ore was hauled to a siding in 1903 (Huntting, 1956, p. 245). Also produced in 1937; 5 tons yielded 58 oz Ag, 1,390 lb Pb, and 38 lb Cu (Moen, 1976, p. 68).

TECTONIC SETTING: Part of the known western extent of the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore minerals form pockets replacing limestone. The pockets range from a few inches to a foot or more in diameter (Huntting, 1956, p. 245).

GEOLOGIC SETTING: The Nevada mine is in the Proterozoic Stensgar Dolomite (Campbell and Loofbourow, 1962, geol. map).

REFERENCES

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

New Blue Grouse (263)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Deer Lake	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 6′ 3.62″ N	117° 30′ 31.04″ W	SW¼NE¼ sec. 16, 30N, 42E	

LOCATION: on Blue Grouse Mtn.

HOST ROCK: NAME	LITHOLOGY	AGE
Striped Peak Formation	argillite	Middle Proterozoic
muscovite quartz monzonite	quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	huebnerite	

DEPOSIT TYPE	MINERALIZATION AGE
greisen, disseminated	

PRODUCTION: Produced in 1939 and 1940 (Huntting, 1956, p. 347).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Huebnerite crystals as much as 0.25 in. long are disseminated in hydrothermally altered granite near its contact with argillite (Huntting, 1956, p. 347).

GEOLOGIC SETTING: The host rocks at the New Blue Grouse mine are Cretaceous muscovite quartz monzonite that is in contact with the Striped Peak Formation of the Belt Supergroup (Miller and Clark, 1975, geol. map).

REFERENCES

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New Leadville (172)

ALTERNATE NAMES		DISTRICT	COUNTY
Yo Tambien		Bossburg	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Echo Valley	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 44′ 8.66″ N	117° 52′ 33.61″ W	SE¼ sec. 3, 37N, 39E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, upper unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena cerussite wulfenite	calcite, siderite, quartz, limonite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced prior to 1924 (Huntting, 1956, p. 245).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore minerals occur in a brecciated zone in dolomitic limestone. The ore body is irregular and bunchy. Much of it has been stoped (Huntting, 1956, p. 245).

GEOLOGIC SETTING: The New Leadville mine is in fine-grained dolomitic limestone (Mills, 1977, p. 130) of the upper unit of the Metaline Limestone (Joseph, 1990, geol. map, p. 29-30).

REFERENCES

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Nobles placer (226)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
China Bend	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 50′ 50.11″ N	117° 54′ 40.37″ W	secs. 29 and 32, 39N, 39E

LOCATION: near Evans

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1934 (Huntting, 1956, p. 192).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

O-Lo-Lim (146)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
McCoy Lake	1:24,000	Coulee Dam	Ritzville

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 56′ 13.44″ N	118° 9′ 12.10″ W	NW¼SE¼ sec. 9, 28N, 37E

LOCATION: 3 mi north of the Spokane River

HOST ROCK: NAME	LITHOLOGY	AGE
Togo Formation	argillite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz, pyrite
Ag	bornite	
Zn	malachite	
Au	tenorite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced about $18,000 by the end of 1920. Ten carloads contained 7-10% Cu and 1-2 oz/ton Ag (Huntting, 1956, p. 100).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein is 2-6 ft wide and occurs in argillite (Becraft and Weis, 1963, p. 77).

GEOLOGIC SETTING: The O-Lo-Lim deposit is in the Togo Formation of the Proterozoic Deer Trail Group (Becraft and Weis, 1963, geol. map).

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Old Blue Grouse (264)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Deer Lake	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 5′ 39.85″ N	117° 30′ 2.99″ W	near center west line SW¼ sec 15, 30N, 42E	

LOCATION: on Blue Grouse Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Striped Peak Formation	argillite	Middle Proterozoic
muscovite quartz monzonite	quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	huebnerite	quartz, muscovite, kaolin

DEPOSIT TYPE	MINERALIZATION AGE
greisen, disseminated	

PRODUCTION: Produced in 1909. Total production was $10,000 prior to World War I (Huntting, 1956, p. 348).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is in hydrothermally altered granite along its contact with argillite and quartzite (Huntting, 1956, p. 347).

GEOLOGIC SETTING: The Old Blue Grouse mine is in Cretaceous muscovite quartz monzonite that intruded argillite and quartzite of the Striped Peak Formation of the Belt Supergroup (Miller and Clark, 1975, geol. map).

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Old Dominion (254)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
White Mud Lake	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 33′ 11.81″ N	117° 46′ 34.26″ W	S½ sec. 4 and N½ sec. 9, 35N, 40E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	limestone and dolomite	Middle Cambrian - Middle Ordovician
ASSOCIATED IGNEOUS ROCK: DESCRIPTION		AGE
Starvation Flat Quartz Monzonite		Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Zn	galena cerussite anglesite sphalerite silver sulfides native silve stephanite tetrahedrite chalcopyrite	quartz, calcite, siderite, dolomite, pyrite, limonite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced more than $625,000 by 1920. One report states about $2,000,000 was produced prior to 1897. Produced $20,000 in 1924; also produced in 1936-1940 (Huntting, 1956, p. 330). Total production was 744,391 lb Pb, 148,563 lb Zn and 342,517 oz Ag. Between 1921 and 1927, 2,446 tons of ore averaged .093 oz/ton Au, 102.85 oz/ton Ag, 10.93% Pb, and 17.36% Zn (Mills, 1977, p. 131).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The ore bodies in limestone are irregular and lenticular and range from 6 in. to 10 ft wide. Ore bodies are as much as 2,500 ft apart. The richest known ore was near the surface and was mined out (Huntting, 1956, p. 330). Two faults in the limestone are 60 ft from and parallel to a fault contact between limestone and granite. Most movement on the faults is pre-ore, with the ore occurring in brecciated and silicified dolomite (Mills, 1977, p. 130-131).

GEOLOGIC SETTING: Mineralization at the Old Dominion mine is in the Metaline Formation adjacent to a fault contact between the limestone (Mills, 1977, p. 130-131) and Starvation Flat Quartz Monzonite (Joseph, 1990, geol. map, p. 44).

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Ora (199)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Bossburg	1:24,0000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 46.70″ N	118° 3′ 43.14″ W	

LOCATION: on or near Jumbo Mountain west of Fifteen Mile Creek; at or near 3,400 ft elevation

HOST ROCK: NAME	LITHOLOGY	AGE
Rossland Group	andesite	Jurassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diorite (hypabyssal dike of Stoffel, 1990)	Eocene?
diorite? dike	
metagabbro	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrrhotite
Au	gold	
Ag		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Shipped 50 tons of ore prior to 1914 (Huntting, 1956, p. 101).

TECTONIC SETTING: Meta-andesites and basaltic andesite of the Jurassic Rossland Group were originally deposited in an island arc setting. These rocks are part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic (Monger and others, 1982). Regional Eocene east-west extension resulted in intrusion of acidic plutonic and hypabyssal rocks and widespread volcanism (Holder and others, 1989).

ORE CONTROLS: A 7-ft-wide, N75W-trending vein is in an altered dike that intrudes Rossland Group volcanic rocks (Huntting, 1956, p. 101; Weaver, 1920 p. 253).

GEOLOGIC SETTING: Meta-andesite of the Jurassic Rossland Group is cut by diorite dikes, according to Weaver (1920). These dikes are probably of the same rock type as the Eocene hypabyssal dikes of Stoffel (1990) that cut the Rossland Group on Jumbo Mountain.

COMMENTS: The property was developed by a shallow shaft; a large amount of surface stripping was done along the vein (Weaver, 1920, p.254).

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Orazada (255)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
McCoy Lake	1:24,000	Coulee Dam	Ritzville

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 59′ 8.91″ N	118° 8′ 11.31″ W	SE¼NW¼ sec. 27, 29N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	jamesonite	pyrite, arsenopyrite, quartz, barite, calcite
Pb	galena	
Sb	sphalerite	
Au		
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
breccia zone	

PRODUCTION: A test shipment was made in 1940 (Huntting, 1956, p. 330).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Narrow mineralized breccia zones are found in argillite and limestone. A heavy gossan is exposed on the surface (Huntting, 1956, p. 330).

GEOLOGIC SETTING: The Orazada deposit is in dolomite and argillite of the Edna Dolomite of the Proterozoic Deer Trail Group (Becraft and Weis, 1963, geol. map).

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Orchid (256)

ALTERNATE NAMES		DISTRICT	COUNTY
		Cedar Canyon	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 7′ 20.68″ N	118° 1′ 1.96″ W	secs. 3 and 4, 30N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Buffalo Hump Formation	argillite, slate, phyllite	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
metabasalt	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	argentite	quartz, calcite, barite
Pb	cerargyrite	
Cu		
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Shipped 3 tons of high-grade ore in 1900 (Huntting, 1956, p. 330).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The mineralized quartz vein also contains some calcite and barite (Huntting, 1956, p. 330).

GEOLOGIC SETTING: The Orchid deposit is in argillite and limestone of the Buffalo Hump Formation of the Proterozoic Deer Trail Group (Campbell and Raup, 1964, geol. map).

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Ore Cache (173)

ALTERNATE NAMES		DISTRICT	COUNTY
Oro Cache			Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
White Mud Lake	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 32′ 36.77″ N	117° 46′ 23.99″ W	sec. 9, 35N, 40E	

LOCATION: 0.5 mi south of the Old Dominion mine

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	limestone and dolomite	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Starvation Flat Quartz Monzonite	Cretaceous
Narcisse Creek biotite granite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz
Ag		

DEPOSIT TYPE	MINERALIZATION AGE
vein	
Mississippi Valley	

PRODUCTION: Produced in 1916 (Huntting, 1956, p. 246). Three tons yielded 156 oz Ag and 640 lb Pb (Moen, 1976, p. 82).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Galena has replaced limestone adjacent to fractures, and the galena is especially abundant at fracture intersections (Huntting, 1956, p. 246).

GEOLOGIC SETTING: The host rock at the Ore Cache mine is white, massive, crystalline limestone (Weaver, 1920, p. 173). Joseph (1990, geol. map) shows the area as Quaternary glacial deposits between two granitic bodies. Presumably the limestone (probably Metaline Formation) is either a subsurface exposure or is too small to be shown on the 1:100,000-scale map.

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Plata Rica (257)

ALTERNATE NAMES	DISTRICT	COUNTY
Saturday Night-Sunday Morning Plata Fino	Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 2′ 45.90″ N	118° 6′ 10.48″ W	NW¼NW¼ sec. 1, 29N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Stensgar Dolomite	dolomite and argillite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb	galena sphalerite tetrahedrite malachite	limonite

DEPOSIT TYPE	MINERALIZATION AGE
vein shear zone	

PRODUCTION: The deposit has produced (Huntting, 1956, p. 247, 331).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The ore is in small patches along fracture zones in dolomite and argillite (Huntting, 1956, p. 247).

GEOLOGIC SETTING: The Plata Rica and adjacent claims are in the Stensgar Dolomite adjacent to a northeast-trending fault (Campbell and Raup, 1964, geol. map).

REFERENCES

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Pohle placer (227)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 54′ 12.04″ N	117° 48′ 2.24″ W	secs. 5, 7, and 8, 39N, 40E

LOCATION: on the east side of the Columbia River south and southwest of Northport; in the same general area as the McGrath, Weston, and Van Stone placers

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1934.

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCES

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Providence (258)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail	Stevens
PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 02′ 21″ N	118° 05′ 22″ W	SE¼ sec. 1, 29N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb	galena	quartz, calcite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced more than $50,000 prior to 1914. Also produced in 1922, 1925, 1928-1930, and 1940 (Huntting, 1956, p. 331).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The ore occurs as tabular bodies and lenses in quartz veins which parallel bedding in calcareous argillite. The argillite is highly brecciated near ore (Huntting, 1956, p. 331).

GEOLOGIC SETTING: The Providence mine is in the Edna Dolomite near its contact with quartzite of the Togo Formation (Campbell and Raup, 1964, geol. map).

REFERENCES

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Queen (141)

ALTERNATE NAMES	DISTRICT	COUNTY
Queen & Seal Queen Seal Silver Queen Mexico Silver Basin Silver Seal	Deer Trail Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 1′ 32.96″ N	118° 7′ 11.68″ W	NE¼ SW¼ sec. 11, 29N, 37E

LOCATION: on Cedar Creek.

HOST ROCK: NAME	LITHOLOGY	AGE
Stensgar Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Pb Zn	argentite cerargyrite silver galena sphalerit tetrahedrite azurite malachite	quartz, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Production between 1900 and 1941 was 2,930 tons of ore, yielding 285,759 oz Ag, 14,148 lb Pb, and 821 lb Cu (Moen, 1976, p. 74).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is in 1-3-ft-wide quartz lenses in limestone and argillite (Huntting, 1956, p. 331).

GEOLOGIC SETTING: The Queen mine is in dolomite and argillite of the Stensgar Dolomite of the Deer Trail Group (Campbell and Raup, 1964, geol. map).

REFERENCES

Campbell, A. B.; Raup, O. B., 1964, Preliminary geologic map of the Hunters quadrangle, Stevens and Ferry Counties, Washington: U.S. Geological Survey Mineral Investigations Field Studies Map MF-276, 1 sheet, scale 1:48,000.

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R. J. (174)

ALTERNATE NAMES	DISTRICT	COUNTY
RJ R.J.	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x1° QUAD	1° x 2° QUAD
Echo Valley	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 43′ 54.70″ N	117° 52′ 31.92″ W	sec. 3, 37N, 39E

LOCATION: about 400 ft south of the Uncle Sam property

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, upper unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Ag	galena cerussite	quartz, siderite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley breccia zone	

PRODUCTION: Produced two carloads of ore (Huntting, 1956, p. 246).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is present in a 10-ft-wide breccia zone in limestone that was cemented by ore and gangue minerals (Huntting, 1956, p. 246).

GEOLOGIC SETTING: The R. J. is in the upper unit of the Metaline Formation (Joseph, 1990, geol. map, p. 29-30).

REFERENCES

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Rambler (200)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Colville	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 6′ 14.96″ N	118° 0′ 7.71″ W	NE¼ sec. 15, 30N, 38E

LOCATION: on the east slope of Huckleberry Mtn.

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	limestone and slate and phyllite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1916 and 1917 (Huntting, 1956, p. 101-102).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Several quartz veins are exposed; one is 4 ft wide. Some ore minerals are also found in the limestone wallrocks. The zone in which the workings are located is near the surface and badly broken. No sizable or continuous ore body was exposed (Huntting, 1956, p. 101-102).

GEOLOGIC SETTING: The Rambler deposit is in the Edna Dolomite of the Proterozoic Deer Trail Group (Campbell and Raup, 1964, geol. map).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Read (237)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 6′ 23.98″ N	118° 7′ 21.94″ W	N½ sec. 14, 30N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granodiorite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe Cu W Sn Ti Mn Mo	magnetite chalcopyrite scheelite	diopside, ludwigite, forsterite, almandite, andradite, hedenbergite, and minor amounts of spinel, epidote, tremolite, quartz, sanidine, labradorite, orthoclase, apatite, humite group minerals, serpentine, calcite, dolomite, pyrite, pyrrhotite, fluorite

DEPOSIT TYPE	MINERALIZATION AGE
contact metamorphic	

PRODUCTION: A few tons were smelted (Huntting, 1956, p. 204).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Contact metamorphic deposit is in limestone and ranges from a few inches to possibly 40 ft wide and 3,000 ft long (Huntting, 1956, p. 204).

GEOLOGIC SETTING: The Read deposit is in Metaline Formation adjacent to granodiorite of the Fruitland area (Bennett, 1962, p. 941; Joseph 1990, geol. map).

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Red Cloud (201)

ALTERNATE NAMES		DISTRICT	COUNTY
Giant Silver		Cedar Canyon	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 2′ 40.67″ N	118° 4′ 41.17″ W	sec. 6, 29N, 38E

LOCATION: 2 mi southeast of Turk

HOST ROCK: NAME	LITHOLOGY	AGE
Togo Formation	argillite	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Ag Pb Au	chalcopyrite silver sulfide(?) malachite	pyrite, limonite, quartz, calcite, siderite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced an unknown amount of silver ore (Huntting, 1956, p. 102).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Irregular fractures in quartzite near its contact with granite are filled with a quartz, calcite, and siderite gangue carrying locally abundant chalcopyrite and pyrite (Huntting, 1956, p. 102).

GEOLOGIC SETTING: The Red Cloud deposit is in the Togo Formation of the Proterozoic Deer Trail Group (Campbell and Raup, 1964, geol. map).

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Red Top (175)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 56′ 35.99″ N	117° 33′ 52.33″ W	NE¼SE¼ sec. 25, 40N, 41E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Maitlen Phyllite, Reeves Limestone Member	limestone	Cambrian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
lamprophyre dikes	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn Ag W	galena sphalerite, chalcopyrite tetrahedrite scheelite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Small shipments of lead-silver-zinc ore in 1938, 1944, and 1953. Four shipments prior to 1939 totaled about 200 tons of ore (Huntting, 1956, p. 247).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralized shear zones are in marble and argillite and are crisscrossed by quartz veins. Some ore shoots are as much as 4 ft wide and 18 ft long (Huntting, 1956, p. 247). Four separate mineralized zones (as much as 1 ft wide) cut across bedding. These transverse zones are made up of quartz stringers less than 1 in. wide. The ore minerals in these transverse zones include galena, tetrahedrite, pyrite, and scheelite. At least six other mineralized zones parallel bedding in limestone near the contact with phyllite or schist. Minerals in the conformable veins are sphalerite and galena (unpublished notes of W. A. G. Bennett as noted in Mills, 1977, p. 133).

GEOLOGIC SETTING: The host rocks are probably the Reeves Limestone Member of the Maitlen Phyllite (Mills, 1977, p. 133).

REFERENCES

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Reed and Roberts placer (228)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 57′ 17.29″ N	117° 44′ 38.14″ W	sec. 20, 40N, 40E

LOCATION: about 1 mi west of the Columbia River

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Reportedly produced $17,500 in 1934 from less than 2 acres of gravel 3 ft deep (Huntting, 1956, p. 192).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Production is from a high bench (Huntting, 1956, p. 192). Heavy minerals were concentrated by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Roosevelt (259)

ALTERNATE NAMES		DISTRICT	COUNTY
Lakeview		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 22.02″ N	117° 32′ 58.49″ W	sec. 7, 40N, 42E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Pend Oreille sequence	argillite, chert, and greenstone	Carboniferous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	galena	
Pb	sphalerite	
Zn		
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1937 (Huntting, 1956, p. 332).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein is about 4 in. wide (Huntting, 1956, p. 332).

GEOLOGIC SETTING: The Pend Oreille sequence, the host rocks at the Roosevelt mine, is similar to the Grass Mountain sequence (at the Clara mine) but is less carbonaceous and is lighter in color (Yates, 1976, p. 70).

REFERENCES

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Sand Creek (266)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
McCoy Lake	1:24,000	Coulee Dam	Ritzville

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 57′ 41.68″ N	118° 8′ 34.33″ W	sec. 3, 28N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Togo Formation	argillite and phyllite	Proterozoic
Cretaceous plutonic rocks	granite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	wolframite molybdenite	quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Several sacks of ore reportedly were taken out in 1917 (Huntting, 1956, p. 349).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization consists of scattered crystals of wolframite in small stringers of quartz in altered granite near its contact with argillite and schist (Huntting, 1956, p. 349).

GEOLOGIC SETTING: The Sand Creek deposit is in the Togo Formation of the Proterozoic Deer Trail Group (Becraft and Weis, 1963, geol. map). Granitic rocks of the area are Cretaceous (Waggoner, 1990, geol. map).

REFERENCES

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Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

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Scaman (176)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Leadpoint	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 57′ 30.13″ N	117° 32′ 24.16″ W	sec. 19, 40N, 42E	

LOCATION: on Red Top Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
minette (lamprophyre) dikes	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena cerussite	

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley pipe	

PRODUCTION: Produced 65 tons of ore from the upper adit prior to 1920 (Huntting, 1956, p. 247).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore is found in pockets in limestone near a dike. The width of the ore zone is about 3 ft (Huntting, 1956, p. 247).

GEOLOGIC SETTING: The area of the Scaman mine is underlain by extensively folded and thrust-faulted carbonates of the Metaline Formation (Yates, 1964, geol. map).

REFERENCES

Bancroft, Howland, 1914, The ore deposits of northeastern Washington: U.S. Geological Survey Bulletin 550, 215 p.

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Scandia (284)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Boundary	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 52′ 33.03″ N	117° 43′ 8.15″ W	NE¼ sec. 23, 39N, 40E	

LOCATION: on the west side of Deep Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, upper unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	calcite
Pb	galena	
Ag		
Au		

DEPOSIT TYPE: Mississippi Valley vein

MINERALIZATION AGE:

PRODUCTION: Produced in 1950 and in 1951. A carload of ore in 1950 ran 8% Pb and 8.6% Zn (Huntting, 1956, p. 380).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization occurs in a breccia zone in dolomite near the contact with the overlying slate. Evidence of mineralization extends over a lateral distance of about 400 ft (Huntting, 1956, p. 380). Galena, yellow-brown to pale-yellow sphalerite, and coarse-grained, gray and white calcite are exposed in a northwest-trending zone. Although the mineralization is discordant, Mills (1977, p. 137) believes it is analogous to Mississippi Valley type-mineralization of the Josephine horizon.

GEOLOGIC SETTING: The mine is in the upper unit of the Metaline Formation just below the contact with the Ledbetter Slate (Mills, 1977, p. 137).

REFERENCES

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Scotia (203)

ALTERNATE NAMES		DISTRICT	COUNTY
		Orient	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Orient	1:24,0000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 49′ 38.43″ N	118° 9′ 17.84″ W	NE¼ sec. 6, 38N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Mount Roberts Formation?	quartzite, wacke, schist	Permian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
dacite (monzonite of Weaver, 1920)	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Fe	chalcopyrite	pyrrhotite, pyrite, silica

DEPOSIT TYPE	MINERALIZATION AGE
veinlets	

PRODUCTION: Some shipments are said to have been made to a smelter for use as flux (Huntting, 1956, p. 103).

TECTONIC SETTING: Sedimentary rocks of the Mount Roberts Formation were deposited in an active margin setting. These rocks are part of the Quesnellia terrane, which is thought to have been accreted to North America prior to the mid-Jurassic. Rocks in Quesnellia were affected by deformation associated with the Kootenay arc, a northeast-trending zone (in Washington) of multiply deformed rocks (Monger and others, 1982). Extension during the Eocene resulted in the formation of volcano-tectonic depressions; dacite dikes are feeders to the volcanic rocks that fill the depressions (Holder and others, 1989).

ORE CONTROLS: Sulfide minerals are present in veinlets and pods along joint planes in schist and quartzite. Mineralization also occurs in bands that are parallel to the schistosity (Weaver, 1920, p. 266). Mineralization is present along the contact with the dacite (quartz monzonite of Bancroft, 1914 p. 79). The deposits are small and siliceous (Huntting, 1956, p. 103).

GEOLOGIC SETTING: Permian schist, quartzite, and wacke are intruded by an Eocene dacite dike (monzonite porphyry dike of Weaver, 1920).

COMMENTS: Workings included a large open cut, a shaft reported to be 200 ft deep, and a tunnel reported to have been driven N60E for 150 ft below the open cut.

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Sherwood (148)

ALTERNATE NAMES	DISTRICT	COUNTY
Northwest uranium Peters lease		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Turtle Lake	1:24,000	Coulee Dam	Ritzville
McCoy Lake	1:24,000		
Benjamin Lake	1:24,000		

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
47° 52′ 44.86″ N	118° 7′ 17.13″ W	NE¼SW¼SW¼ sec. 35, 28N, 37E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Sanpoil Volcanics	conglomerate	Eocene
Sanpoil Volcanics	sandstone, arkose, carbonaceous shale	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
U -	pitchblende uraninite coffinite meta-autunite uranophane metatorbernite	carbonaceous sedimentary rocks

DEPOSIT TYPE	MINERALIZATION AGE
sandstone-hosted uranium	

PRODUCTION: This open-pit mine and mill (2,000 tons per day) operation has been intermittently operated. Total production prior to 1962 was 305,700 lbs of U_3O_8. When the mine was reopened in 1977, the stated reserves were 8 million tons 0.089% U_3O_8 (DGER unpubl. data). The mine closed in 1982 due to depressed market conditions (Bunning, 1983, p. 9).

TECTONIC SETTING: Tertiary volcaniclastic rocks were deposited on Cretaceous granitic rocks (Becraft and Weis, 1963).

ORE CONTROLS: The ore consists of uranium minerals intimately associated with carbonaceous material near the base of fluvial conglomerate (Becraft and Weis, 1963, p. 62-63). The ore zone is 30 ft thick, and carbonaceous material is sporadically distributed in an arkosic lens in the conglomerate. The orebody is bounded on the south by a fault and is downdropped 285-345 ft to the north. Uraninite occurs with carbon complexes (DGER unpubl. data).

GEOLOGIC SETTING: Uranium at the Sherwood mine is in fluvial rocks of the Eocene Sanpoil Volcanics (Waggoner, 1990, geol. map). Drilling indicates the conglomerate occupies a shallow northwest-trending trough in the underlying porphyritic quartz monzonite (Becraft and Weis, 1963, p. 63).

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Shoemaker (285)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gillette Mtn	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 37′ 38.33″ N	117° 47′ 7.17″ W	SE¼ sec. 8, 36N, 40E	

LOCATION: northeast of Colville

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, lower unit	limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite
Ag	galena	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1926 and shipped 81 tons to Wallace, Idaho in 1941 (Huntting, 1956, p. 380).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A 6-ft-wide mineralized zone underlies a low-angle thrust fault in brecciated dolomite. Ore minerals were noted only in the upper adit (Huntting, 1956, p. 380). Intensely brecciated sphalerite (possesses a lineation, a mylonite?), together with curved cleavage pits in galena and shattered pyrite, indicate post-ore movement on the fault. The principal vein is along or just below the argillite-dolomite contact (Mills, 1977, p. 139-145).

GEOLOGIC SETTING: Joseph (1990, geol. map, p. 31-32) shows the Shoemaker mine as being in the lower member of the Metaline Formation near the contact with Maitlen Phyllite. Mills (1977, p. 139-145) suggests that the veins occur along and parallel to a fault between the lower unit of the Metaline Formation and Ledbetter Slate.

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Sierra Zinc (286)

ALTERNATE NAMES	DISTRICT	COUNTY
Aladdin Blue Ridge	Colville	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Spirit	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 46′ 28.02″ N	117° 40′ 6.06″ W	secs. 19, 20, 29, and 30, 38N, 41E

LOCATION: on the west side of Deep Creek, 4 mi north of Aladdin

HOST ROCK: NAME	LITHOLOGY	AGE
Maitlen Phyllite	quartzite, schist, and limestone	Cambrian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Spirit pluton, quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Ag Au	sphalerite galena chalcopyrite molybdenite smithsonite	pyrite, dolomite, limestone

DEPOSIT TYPE	MINERALIZATION AGE
vein Mississippi Valley disseminated	

PRODUCTION: Produced in 1909, 1924, 1925, 1941-1944 (100,000 tons), and 1950-1952 (Huntting, 1956, p. 380). Mills (1977, p. 145) reports total production was 919,837 lb Pb, 5,740,139 lb Zn, and 29,058 oz Ag. (Some production in 1956 was from other mines.)

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: In 1956 (Huntting, 1956), ore being mined consisted of sphalerite and galena disseminated in limestone. Quartz veins on the property carry minor amounts of chalcopyrite, sphalerite, galena, pyrite, and molybdenite. The main ore body mined prior to 1944 measured 300 ft along the strike, 200 ft down dip, and 4-12 ft thick. Three smaller ore bodies were also mined. The ore occurred in marble close to a low-angle fault and/or a sill (Huntting, 1956, p. 380).

GEOLOGIC SETTING: Mills (1977, p. 146) noted that intensely folded quartzite, schist, and calcitic marble at the Sierra Zinc mine were similar to the Reeves Limestone Member of the Maitlen Phyllite. Yates (1964, geol. map) tentatively interpreted these rocks as Precambrian in age.

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Silver Crown (177)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 54′ 33.98″ N	117° 46′ 40.83″ W	NE¼SE¼ sec. 5, and NW¼SW¼ sec. 4, 39N, 40E

LOCATION: on the outskirts of the town of Northport

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	cerussite	
Ag	lead oxide	
Zn	sphalerite	
	smithsonite	

DEPOSIT TYPE: vein

MINERALIZATION AGE:

PRODUCTION: Reportedly, two carloads of ore were shipped (Huntting, 1956, p. 247-248). The yield from 34 tons in 1925 and 1926 was 309 oz Ag and 5,674 lb Pb (Moen, 1976, p. 88).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore is in quartz-filled fissure veins in limestone. The veins are less than 2 ft wide (generally only 2 or 3 in.). They are mineralized for a few yards laterally and vertically, as exposed on the surface and in shafts (Huntting, 1956, p. 248).

GEOLOGIC SETTING: The host rock at the Silver Crown mine is the middle dolomite unit of the Metaline Formation (Yates, 1971, geol. map).

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Silver Queen (240)

ALTERNATE NAMES		DISTRICT	COUNTY
Ark		Kettle Falls	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Kettle Falls	1:24,000	Republic	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 32′ 58.59″ N	118° 6′ 53.45″ W	near center N½ sec. 11, 35N, 37E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	limestone and dolomite	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	tetrahedrite	pyrite, quartz, calcite
Pb	galena	
Zn	sphalerite	
Cu	chalcopyrite	
Au		

DEPOSIT TYPE: vein

MINERALIZATION AGE:

PRODUCTION: Produced in 1915 (14 tons), 1916, 1918, 1921, 1922, 1929, 1937, 1938 (1,700 tons of ore milled), 1939 (250 tons), 1940 (a few tons of concentrate produced), 1942, and 1949 (841 tons) (Huntting, 1956, p. 323). Yield from 2,474 tons was 6,339 oz Ag, 207,371 lb Pb, 140,595 lb Zn, and 2,960 lb copper (Moen, 1976, p. 87-88).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Quartz lenses ranging from a few inches to 4 ft wide are found along lamination planes in argillite and limestone. The mineralized zone is as much as 30 ft wide (Huntting, 1956, p. 323).

GEOLOGIC SETTING: Rocks near the mine are quartz-biotite-andalusite schist, hornblende schist, mica schist, and limestone marble, all probably of the Maitlen Phyllite or the Metaline Formation (Mills, 1977, p. 86).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Silver Summit (178)

ALTERNATE NAMES		DISTRICT	COUNTY
Summit		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Wellington Peak	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 18′ 59.14″ N	118° 1′ 40.44″ W	near center sec. 33, 33N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Intrusive rocks of the Huckleberry Range	granite to granodiorite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz, pyrite
Ag	anglesite	
Cu	scheelite	
	powellite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: The main production was in about 1890 but probably was only about 100 tons. Two tons produced in 1935 yielded 52 oz Ag, 1,178 lb Pb, and 14 lb Cu (Moen, 1976, p. 79).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein cuts trachyte and is 3 ft wide (Huntting, 1956, p. 248).

GEOLOGIC SETTING: Host rocks at the Silver Summit deposit are mapped as Cretaceous-Tertiary granitic rocks of the Huckleberry Range (Joseph, 1990, geol. map; Snook and others, 1990, geol. map). Huntting (1956, p. 248) notes the vein cuts trachyte.

COMMENTS: The Blanche deposit is adjacent to the Silver Summit mine (precise location unknown) and has recorded production prior to 1900 (Huntting, 1956, p. 324).

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Silver Trail (179)

ALTERNATE NAMES	DISTRICT	COUNTY
Clugston Dead Medicine		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
China Bend	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 9.51″ N	117° 52′ 56.10″ W	NE¼ sec. 33, 38N, 39E

LOCATION: near the head of the east branch of Bruce Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Ledbetter Slate	argillite and quartzite	Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Spirit pluton, quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	quartz
Ag	sphalerite	
Zn	chalcopyrite	
Cd		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced $122,000 prior to 1928. Also produced in 1938, 1939, 1941, 1950, and 1951 (Huntting, 1956, p. 248). Yield from 908 tons of ore between 1912 and 1952 was 4,876 oz Ag, 26,333 lb Pb, and 27,701 lb Zn (Moen, 1976, p. 78).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The quartz vein is 1.5-8 ft wide and is in argillite and quartzite; it is parallel to and within 600 ft of quartz monzonite contact (Huntting, 1956, p. 248).

GEOLOGIC SETTING: The Silver Trail deposit is in the Ledbetter Slate near the contact with the Cretaceous Spirit pluton (Yates, 1971, geol. map).

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Sterrett (180)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 55′ 33.39″ N	117° 45′ 45.35″ W	sec. 33, 40N, 40E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	
Ag	sphalerite	
Zn		
Au		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Reportedly shipped 5,870 lb prior to 1941 (Huntting, 1956, p. 248); assay from 500 lb shipped prior to 1941 was 56% Pb, 3% Zn, and 34 oz/ton Ag (Moen, 1976, p. 88).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The vein is as much as 3 ft wide (Huntting, 1956, p. 248).

GEOLOGIC SETTING: The precise location of the Sterrett mine is not known, but it probably is in rocks of the middle dolomite unit of the Metaline Formation (Yates, 1971, geol. map).

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Sunday (220)

ALTERNATE NAMES	DISTRICT	COUNTY
Sunday Morning Star Golden Hope		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Marcus	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 37′ 41.11″ N	118° 3′ 56.27″ W	S½SE¼ sec. 7, 36N, 38E

LOCATION: 2 mi northeast of Kettle Falls

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed Permian-Triassic metasedimentary rocks	argillite and other metasedimentary rocks	Permian - Triassic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag		quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1912 and 1915 (Huntting, 1956, p. 174).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization consists of two quartz veins, from 4 to 6 in. wide, in argillite and limestone (Huntting, 1956, p. 170).

GEOLOGIC SETTING: Permian-Triassic metasedimentary rocks at the Sunday mine are part of Weaver's (1920, geol. map, p. 72-75) Mission Argillite. Currently, the argillites and related rocks of the area are recognized as a complex sequence of eugeoclinal rocks and are assigned a Permian-Triassic age (Stoffel, 1990, geol. map, p. 19-20; Mills, 1985, geol. map, p. 7).

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Superior Copper (204)

ALTERNATE NAMES		DISTRICT	COUNTY
		Chewelah	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Addy	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 15′ 6.33″ N	117° 47′ 54.23″ W	SW¼SW¼ sec. 20, 32N, 40E

LOCATION: in lower part of Buck Canyon

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	dolomite, argillite, siltite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	quartz
Au	malachite	
Ag	azurite	
Pb		
W		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced several carloads of ore (Huntting, 1956, p. 103).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A 5-ft-wide quartz vein with 1 ft of schist in its center lies parallel to the planes of schistosity in a sequence consisting of quartzite, argillite, and schist (Huntting, 1956, p. 103).

GEOLOGIC SETTING: Waggoner (1990, geol. map, p. 25) shows the mine is in the Proterozoic Edna Dolomite. The host rocks for the mine, as described by Weaver (1920, p. 188-189), are argillite with interbeds of quartzite and schist. According to Waggoner, the lower part of the Edna is argillite and siltite.

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Tempest (260)

ALTERNATE NAMES		DISTRICT	COUNTY
		Kettle Falls	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Wellington Peak	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 22′ 22.31″ N	118° 4′ 39.01″ W	NE¼ sec. 7, 33N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed metamorphosed sedimentary rocks	quartzite and argillite	Late Paleozoic?
granite to granodiorite of the Huckleberry Range	granite to granodiorite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Au Cu Zn	sphalerite chalcopyrite	pyrite, quartz

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Has produced (Huntting, 1956, p. 333).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Two sparsely mineralized veins 4 and 12 ft wide cut quartzite, argillite, and diorite (Huntting, 1956, p. 333).

GEOLOGIC SETTING: Available geologic maps show rocks of the Tempest mine area are Cretaceous to Tertiary granite to granodiorite of the Huckleberry Range area (Joseph, 1990, geol. map, p. 34). Huntting (1956, p. 333) notes the presence of argillite and quartzite. The nearby sedimentary rocks are Ledbetter Slate and Metaline Formation.

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Tenderfoot (151)

ALTERNATE NAMES	DISTRICT	COUNTY
Avondale-Dome Gillette		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Gillette Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 41′ 17.65″ N	117° 51′ 19.95″ W	center S½ sec. 23, 37N, 39E

LOCATION: on the south side of the canyon from Chloride Queen property

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb	galena	pyrite, clay, and gouge
Ag	cerussite	
Zn	calamine	
Cu	wulfenite	
Fe	anglesite	
	azurite	

DEPOSIT TYPE	MINERALIZATION AGE
vein Mississippi Valley	

PRODUCTION: Several carloads of ore were shipped prior to 1890 (Huntting, 1956, p. 237).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore minerals occur as nodules and lenses in a 4-ft-wide fracture zone in limestone (Huntting, 1956, p. 237). The mineralization, as described by Mills (1977, p. 150), appears to be a vein or fracture-filling type of deposit; however, it occurs in rocks which host Mississippi Valley-type mineralization in the area. According to Schuster and others (1990), the host rock is dolomite and is a complex, multi-genetic breccia.

GEOLOGIC SETTING: The Tenderfoot deposit occurs in the middle dolomite unit of the Metaline Formation and is also near the contact with Ledbetter Slate. The contact between the Ledbetter and Metaline is an unconformity or fault (Mills, 1977, p. 150).

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Thompson (238)

ALTERNATE NAMES		DISTRICT	COUNTY
Iron Tunnel		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Deep Lake	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 5'2 9.66" N	117° 35' 3.68" W	E½ sec. 23, 39N, 41E

LOCATION: at the northeast end of Deep Lake

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	limonite goethite turgite	

DEPOSIT TYPE	MINERALIZATION AGE
vein supergene iron residuum	

PRODUCTION: Produced in 1941 (Huntting, 1956, p. 204).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Limonite occurs in a vein that is in dolomite, 3.5-60 ft wide, and continuous for 800 ft. A continuation of the vein has an average width of 10 ft and is traceable for 1,000 ft (Huntting, 1956, p. 204).

GEOLOGIC SETTING: The Tompson mine is in the Metaline Formation (Yates, 1964, geol. map).

REFERENCES

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Togo (139)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 2′ 53.81″ N	118° 4′ 17.24″ W	NE¼ sec. 6, 29N, 38E.

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Togo Formation	argillite	Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
felsic dikes and sills	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Ag Pb	chalcopyrite malachite azurite	quartz, calcite, tremolite, pyrite, arsenopyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1950 (Huntting, 1956, p. 104).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Two quartz veins (4-18 in. wide) cut calcareous argillite and dolomite. Ore minerals are found disseminated in the veins and in the wall rocks (Huntting, 1956, p. 103-104).

GEOLOGIC SETTING: The Togo mine is in the Togo Formation of the Proterozoic Deer Trail Group (Campbell and Raup, 1964, geol. map).

REFERENCES

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Tungsten King (267)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Deer Lake	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 5′ 48.75″ N	117° 30′ 20.61″ W	center SE¼ sec. 16, 30N, 42E	

LOCATION: on Blue Grouse Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Striped Peak Formation	argillite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
muscovite quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	huebnerite molybdenite cosalite	pyrite, quartz, sericite, limonite, hematite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: The mine has produced (Huntting, 1956, p. 349).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Quartz veins are parallel to the bedding in sandy schistose argillite (Huntting, 1956, p. 349).

GEOLOGIC SETTING: The host rock at the Tungsten King deposit is Proterozoic Striped Peak Formation of the Belt Supergroup, which is adjacent to Cretaceous quartz monzonite (Miller and Clark, 1975, geol. map).

UNPUBLISHED INFORMATION:

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Tungsten Products (268)

ALTERNATE NAMES		DISTRICT	COUNTY
Loon Lake			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Deer Lake	1:24,000	Colville	Sandpoint
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 5′ 57.13″ N	117° 31′ 10.75″ W	near center W½ sec. 16, 30N, 42E	

LOCATION: on Blue Grouse Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
muscovite quartz monzonite	quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W Sn	huebnerite	pyrite, greisen alteration

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1934 (17 tons of ore yielded 13 units WO_3), 1939 (100 tons of ore), and 1940 (Huntting, 1956, p. 349).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization is in a narrow quartz vein in hydrothermally altered granite (Huntting, 1956, p. 349).

GEOLOGIC SETTING: This deposit is tentatively located near the Little King mine shown on the primary quadrangle map. The host rocks are Cretaceous muscovite quartz monzonite that is in contact with the Striped Peak Formation of the Belt Super Group (Miller and Clark, 1975, geol. map).

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Turk (205)

ALTERNATE NAMES	DISTRICT	COUNTY
High Grade Lucky Boy Reardon Copper	Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Adams Mtn	1:24,000	Nespelem	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 2′ 54.83″ N	118° 5′ .25″ W	NW¼ sec. 6, 29N, 38E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Edna Dolomite	dolomite	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Ag Au	chalcopyrite tenorite cuprite copper malachite bornite	pyrite, marcasite, calcite, barite

DEPOSIT TYPE	MINERALIZATION AGE
vein shear zone	

PRODUCTION: Considerable production prior to 1919; produced in 1939-1942; 600 tons per month in 1941 and 68 tons of copper concentrate in 1942; produced again in 1950 and 100 tons of concentrate in 1954 (Huntting, 1956, p. 104).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore is found in lenses along shear zones in argillite and limestone, partly as fracture filling and partly as replacement of the rock. Lenses mined averaged 6 ft thick and 125 ft long. An 18-ft-wide vein was also reported (Huntting, 1956, p. 104).

GEOLOGIC SETTING: The Turk mine is in Edna Dolomite of the Proterozoic Deer Trail Group (Campbell and Raup, 1964, geol. map).

REFERENCES

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Tyee (233)

ALTERNATE NAMES	DISTRICT	COUNTY
Bechtol Iron Idler	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Deep Lake	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 51′ 27.26″ N	117° 37′ 11.83″ W	sec. 27, 39N, 41E

LOCATION: on the west side of Deep Lake

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Fe	limonite	limonite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley supergene iron residuum	

PRODUCTION: Produced 300 tons of iron ore (Huntting, 1956, p. 202).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: An irregular 6-25-ft-wide ore body in limestone is traceable for 1,000 ft along its outcrop. Limonite is a surface alteration of siderite (Huntting, 1956, p. 202).

GEOLOGIC SETTING: The host rocks are dolomite and limestone of the Metaline Formation (Yates, 1964, geol. map).

REFERENCES

Campbell, C. D., 1949, Geology of the Bechtol lead mine, Stevens County, Washington: U.S. Geological Survey Open-File Report, 3 p., 2 pl.

Glover, S. L., 1942, Washington iron ores, a summary report: Washington Division of Mines and Mining Report of Investigations 2, 23 p.

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Jenkins, O. P., 1924, Lead deposits of Pend Oreille and Stevens Counties, Washington: Washington Division of Geology Bulletin 31, 153 p.

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U.S. Copper Gold (261)

ALTERNATE NAMES		DISTRICT	COUNTY
M. and C.			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 17′ 2.19″ N	117° 39′ 11.51″ W	SE¼SE¼ sec. 8, 32N, 41E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
St. Regis Formation	argillite, siltite, quartzite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	chalcopyrite	pyrite, limonite, quartz
Cu	malachite	
Au	azurite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced one carload of ore in 1917 (Huntting, 1956, p. 333).

TECTONIC SETTING: Early Mesozoic (Triassic-Jurassic) granitic rocks intrude Proterozoic sedimentary rocks (Miller and Clark, 1975, geol. map).

ORE CONTROLS: Mineralization is in a 4-ft-wide quartz vein cutting metamorphic rocks (Huntting, 1956, p. 333).

GEOLOGIC SETTING: The U.S. Copper Gold deposit is in argillite and related rocks of the St. Regis Formation of the Proterozoic Belt Supergroup. The mine is also near the Triassic-Jurassic Flowery Trail Granodiorite (Miller and Clark, 1975, geol. map).

REFERENCES

Bancroft, Howland, 1914, The ore deposits of northeastern Washington: U.S. Geological Survey Bulletin 550, 215 p.

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Miller, F. K.; Clark, L. D., 1975, Geology of the Chewelah-Loon Lake area, Stevens and Spokane Counties, Washington, with a section on potassium-argon ages of the plutonic rocks, by J. C. Engels: U.S. Geological Survey Professional Paper 806, 74 p., 2 pl.

Moen, W. S., 1976, Silver occurrences of Washington: Washington Division of Geology and Earth Resources Bulletin 69, 188 p.

Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

Uncle Sam (181)

ALTERNATE NAMES	DISTRICT	COUNTY
Hi Cliff Eureka Surprise	Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Echo Valley	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 43′ 57.63″ N	117° 52′ 33.99″ W	sec. 3, 37N, 39E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, upper unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Pb Zn Ag	galena sphalerite smithsonite cerussite	quartz, dolomite

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley chimney or pipe	

PRODUCTION: A considerable tonnage of lead ore was produced prior to 1924 (Huntting, 1956, p. 248).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Ore occurred as a chimney in extensively brecciated dolomite. The ore chimney was 185 ft long and 4.5-8 ft in diameter. The deposit is similar to the Gladstone (Huntting, 1956, p. 249).

GEOLOGIC SETTING: The deposit is in rocks of the upper unit of the Metaline Formation (Joseph, 1990, geol. map, p. 29-30).

REFERENCES

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Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., editor, Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

United Copper (206)

ALTERNATE NAMES	DISTRICT	COUNTY
United Silver Copper		Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Chewelah	1:24,000	Chewelah	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 19′ 1.55″ N	117° 40′ 44.67″ W	E½NW¼ sec. 32, and NE¼ sec. 31, 33N, 41E

LOCATION: on the west slope of Eagle Mtn.

HOST ROCK: NAME	LITHOLOGY	AGE
Wallace Formation, upper part	carbonate-bearing siltite and quartzite and argillite	Middle Proterozoic
Edna Dolomite	dolomite	Middle Proterozoic

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Flowery Trail Granodiorite	Triassic - Jurassic
mafic dikes	Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	pyrite, arsenopyrite, quartz, calcite, siderite
Ag	tetrahedrite (freibergite)	
Au	malachite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced from 1906 to 1931 and from 1955 to 1957. Yield from 370,554 tons of ore was 1,673,072 oz Ag, 1,300 oz, Au, and 9,714,504 lb Cu (Moen, 1976, p. 69).

TECTONIC SETTING: Part of the known western extent of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: The mineralized zone in fractured argillite is 5-20 ft wide and averages 8 ft. The ore shoot of silver-rich tetrahedrite was from 2 to 12 in. wide (Huntting, 1956, p. 104). The mine was developed over a horizontal distance of 1,500 ft. The vein ranges from 3 to 15 ft wide and follows a continuous shear zone in argillite (Moen, 1976, p. 65).

GEOLOGIC SETTING: The United Copper mine is in Wallace Formation argillite and is near a fault contact with the Edna Dolomite (Miller and Clark, 1975, geol. map).

REFERENCES

Bancroft, Howland, 1914, The ore deposits of northeastern Washington: U.S. Geological Survey Bulletin 550, 215 p.

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Weaver, C. E., 1920, The mineral resources of Stevens County: Washington Geological Survey Bulletin 20, 350 p., 1 pl.

United Treasure (262)

ALTERNATE NAMES		DISTRICT	COUNTY
United Treasurer		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Abercrombie Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 21.52″ N	117° 27′ 50.97″ W	near center, sec. 11, 40N, 42E

LOCATION: on the east side of Fish Creek in the Russian Creek area

HOST ROCK: NAME	LITHOLOGY	AGE
Ledbetter Slate	black slate	Ordovician

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	tetrahedrite	pyrite, quartz, carbonates
Pb	galena	
Zn	sphalerite	
Cu	azurite	
Au	malachite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced 62 tons in 1917, 2 tons in 1933, and in some 1953 (Huntting, 1956, p. 333). The yield from 84 tons was 1 oz Au, 3,783 oz Ag, 695 lb Cu, 30,702 lb Pb, and 22 lb Zn (Moen, 1976, p. 88).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Park and Cannon, 1943; Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Mineralization occurs in an irregular, quartz-bearing vein zone in slate; the zone has a maximum width of 4 ft. A thin lamprophyre dike is exposed above, within, and below the vein zone (Huntting, 1956, p. 333). The vein is parallel to subparallel to bedding; quartz stringers alternate with slate bands. In places the quartz veins coalesce to form massive quartz bodies (Park and Cannon, 1943, p. 60).

GEOLOGIC SETTING: The Ledbetter Slate is a fissile, carbonaceous black slate (Burmester and Miller, 1983, p. 4).

REFERENCES

Burmester, R. F.; Miller, F. K., 1983, Preliminary geologic map of the Abercrombie Mountain area, Pend Oreille County, Washington: U.S. Geological Survey Open-File Report 83-600, 10 p., 1 pl., scale 1:48,000.

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Moen, W. S., 1976, Silver occurrences of Washington: Washington Division of Geology and Earth Resources Bulletin 69, 188 p.

Park, C. F., Jr.; Cannon, R. S., Jr., 1943, Geology and ore deposits of the Metaline quadrangle, Washington: U.S. Geological Survey Professional Paper 202, 81 p., 5 plates.

Patty, E. N., 1921, The metal mines of Washington: Washington Geological Survey Bulletin 23, 366 p.

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Valbush Bar placer (229)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Marcus	1:24,000	Republic	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 42′ 5.49″ N	118° 1′ 14.25″ W	secs. 16 and 21, 37N, 38E

LOCATION: on the east side of the Columbia River between Marcus and Bossburg

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1934, 1939, and 1940 (Huntting, 1956, p. 192).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Van Stone (287)

ALTERNATE NAMES		DISTRICT	COUNTY
			Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Onion Creek	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 38.19″ N	117° 45′ 23.61″ W	E½ sec. 33, 38N, 40E

LOCATION: on the headwaters of Onion Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Metaline Formation, middle dolomite unit	dolomite and limestone	Middle Cambrian - Middle Ordovician

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
Spirit pluton, quartz monzonite	Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn Pb Cd	sphalerite galena	pyrrhotite, pyrite, jasperoid, tremolite, diopside

DEPOSIT TYPE	MINERALIZATION AGE
Mississippi Valley	

PRODUCTION: Produced in 1930, 1937, 1942, and 1952-1955 (Huntting, 1956, p. 381). Production to the end of 1965 was 2,242,960 tons of ore, 10,700 tons of lead concentrates and 120,000 tons of zinc concentrates. Average grade of the concentrate was 62% Pb and 54% zinc (Cox, 1967, p. 1513).

TECTONIC SETTING: Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: Two ore bodies were developed, one of which is exposed in an open pit. The ore bodies are 400-1,600 ft from the granite contact (Huntting, 1956, p. 381). Sulfide mineralization occurs as streaks, pods, and lenticular and elongate tabular masses of sphalerite, pyrite, and galena; this mineralization is parallel to the banded dolomite and jasperoid- or tremolite-bearing dolomite. Tremolite, jasperoid, and pyrrhotite are attributed to metamorphism (probably contact metamorphism) of the deposit. Lamprophyre dikes are hydrothermally altered and are also mineralized with sphalerite. The dikes, however, cut mineralization and do not contain combined lead and zinc mineralization. (This description is from Mills 1977, p. 150-158, which contains data cited from Neitzel, 1972, and Cox, 1968, and is also supplemented with material from Todd, 1973.)

GEOLOGIC SETTING: The Van Stone mine is in the middle dolomite unit of the Metaline Formation. The deposit is also adjacent to the contact with the Cretaceous Spirit pluton (Mills, 1977, p. 150-156).

REFERENCES

Cox, M. W., 1968, Van Stone mine area (lead-zinc), Stevens County, Washington. *In* Ridge, J. D., editor, Ore deposits of the United States, 1933-1967; the Graton-Sales Volume: American Institute of Mining, Metallurgical, and Petroleum Engineers, v. 2, p. 1511-1519.

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Mills, J. W., 1977, Zinc and lead ore deposits in carbonate rocks, Stevens County, Washington: Washington Division of Geology and Earth Resources Bulletin 70, 171 p.

Neitzel, T. W., 1972, Geology of the Van Stone mine, Stevens County, Washington: Washington State University Master of Science thesis, 47 p.

Rhodes, B. P.; Hyndman, D. W., 1988, Regional metamorphism, structure, and tectonics of northeastern Washington and northern Idaho. *In* Ernst, W. G., editor, Metamorphism and crustal evolution of the western United States: Prentice-Hall [Englewood Cliffs, N.J.], Rubey Volume VII, p. 271-295.

Todd, S. G., 1973, The geology and mineral deposits of the Spirit pluton and its metamorphic aureole, Stevens and Pend Oreille Counties, Washington: Washington State University Doctor of Philosophy thesis, 153 p.

Watkinson, A. J.; Ellis, M. A., 1987, Recent structural analyses of the Kootenay arc in northeastern Washington. *In* Schuster, J. E., editor, Selected papers on the geology of Washington: Washington Division of Geology and Earth Resources Bulletin 77, p. 41-53.

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Van Stone placer (230)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 54′ 21.34″ N	117° 47′ 58.69″ W	secs. 5, 7, and 8, 39N, 40E

LOCATION: on the east side of the Columbia River south and southwest of Northport; in the same general area as the Pohle, Weston, and McGrath placers

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1934 (Huntting, 1956, p. 192).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Washington Metals (269)

ALTERNATE NAMES		DISTRICT	COUNTY
		Summit	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Wellington Peak	1:24,000	Nespelem	Okanogan
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 15′ 21.35″ N	118° 4′ 8.70″ W	S½ sec. 19, 32N, 38E	

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
granite and granodiorite of the Huckleberry Range	granite and granodiorite	Cretaceous - Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	wolframite	quartz, orthoclase, tourmaline
Mo	scheelite	
	molybdenite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced a total of 10 tons of concentrate in 1916-1917; also produced in 1929-1932, 1936-1939, and 1955 (Huntting, 1956, p. 350).

TECTONIC SETTING: Voluminous Jurassic to Tertiary granitic rocks intrude miogeoclinal rocks of the Kootenay arc (Rhodes and Hyndman, 1988).

ORE CONTROLS: Quartz veins range from 2 to 12 in. wide and cut porphyritic granite (Huntting, 1956, p. 350).

GEOLOGIC SETTING: The Washington Metals property is in Tertiary to Cretaceous granite and granodiorite of the Huckleberry Range area (Joseph, 1990, geol. map, p. 34).

REFERENCES

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Wells Fargo (143)

ALTERNATE NAMES		DISTRICT	COUNTY
		Deer Trail Cedar Canyon	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Stensgar Mtn	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 8′ 55.17″ N	117° 58′ 4.93″ W	N½NW¼ sec. 36, 31N, 38 E

LOCATION:

HOST ROCK: NAME	LITHOLOGY	AGE
Buffalo Hump Formation	slate	Proterozoic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Sb Ag Zn Au Pb	stibnite pyrite stibiconite	barite, siderite, quartz, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: A small shipment of antimony ore was made in 1937 (Huntting, 1956, p. 22).

TECTONIC SETTING: Part of the known western margin of the Proterozoic Belt basin and is also within the Kootenay arc, a northeast-trending (in Washington) structural belt containing multiply deformed, Proterozoic and Paleozoic shallow-water-marine (miogeoclinal) sedimentary rocks (Watkinson and Ellis, 1987). Ore deposits may have formed during Kootenay arc development or during emplacement of voluminous granitic rocks (many of which are two-mica granites) of batholithic dimensions and which range in age from Jurassic to Tertiary (Rhodes and Hyndman, 1988).

ORE CONTROLS: A 3-5-ft-wide quartz vein is subparallel to the laminations in the host argillite (Huntting, 1956, p. 22). Stibnite-bearing quartz veins cut an older barite vein (Purdy, 1951, p. 146-148).

GEOLOGIC SETTING: The host rock at the Wells Fargo mine is the Buffalo Hump Formation, which is predominantly slate (Evans, 1987, geol. map).

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Weston placer (231)

ALTERNATE NAMES		DISTRICT	COUNTY
		Northport	Stevens

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Northport	1:24,000	Colville	Sandpoint

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 54′ 14.94″ N	117° 48′ 1.13″ W	secs. 5, 7, and 8, 39N, 40E

LOCATION: on the east side of the Columbia River south and southwest of Northport; in the same general area as the Pohle, McGrath, and Van Stone placers

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1934 (Huntting, 1956, p. 192).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

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Young America (288)

ALTERNATE NAMES		DISTRICT	COUNTY
Robena		Northport	Stevens
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bossburg	1:24,0000	Colville	Okanogan

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 31.09″ N	118° 2′ .57″ W	SW¼ sec. 28, and NE¼NW¼ sec. 33, 38N, 38E

LOCATION: about 500 ft above Roosevelt Lake

HOST ROCK: NAME	LITHOLOGY	AGE
unnamed limestone	limestone	Permian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
lamprophyre (shonkinite?)	Eocene?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, quartz, calcite, siderite
Pb	galena	
Ag	smithsonite	
Au	geocronite	
Cu	cerussite	
	cervantite	
	stannite	

DEPOSIT TYPE	MINERALIZATION AGE
vein breccia	

PRODUCTION: A few carloads were produced prior to 1890; there also was production in 1922-1923, 1938, 1941, and 1947-1954. Three tons of Pb concentrate and 15 tons of Zn concentrate were produced in 1950. Twenty tons of Pb concentrate and 35 tons of Zn concentrate were produced in 1951 (Huntting, 1956, p. 382).

TECTONIC SETTING: Permian rocks were deposited along an active margin west of North America and were affected by deformation associated with the Kootenay arc, a northeast-trending zone (in Washington) of multiply deformed rocks. The rocks have been intruded by Eocene dikes (Monger and others, 1982).

ORE CONTROLS: Two parallel mineralized zones are present in brecciated limestone (Hundhausen, 1949). Mineralization is along bedding in these parallel, flat-lying zones. The parallel zones have a sudden increase in dip at their north end and plunge steeply downward along a fault (Patty, 1921, p. 119-121). The ore commonly occurs in veins and lenses in sharp contact with unmineralized, unaltered wall rock. Quartz as concentric, open-spaced filling was found around angular fragments of limestone in breccia, stringers and lenses of high-grade ore and disseminated ore in dolomite. One low-grade disseminated deposit occupies a zone 30-150 ft wide and has been traced by diamond drilling for a length of 900 ft (Huntting, 1956, p. 381).

GEOLOGIC SETTING: Mineralization is present in two parallel zones in brecciated Permian limestone that is interbedded with wacke.

COMMENTS: Six adits with a total of about 1,500 feet of drifts and considerable stoping were driven into two parallel mineralized zones in brecciated limestone (Bunning, 1985, p. 13). A 60-ton flotation mill was constructed at the site (1952). Shipping ore averaged 7% Pb, 7.7% Zn, 16.1 oz/ton Ag; as much as $3/ton Au has been reported. Ore from one stope yielded 3% Sb (Huntting, 1956, p. 381). One oxidized sample from the dump yielded more than 1,000 ppm Sn and 15 ppm each of Mo and W; an unoxidized sample yielded 62 ppm Sn, 10 ppm W, and 19 ppm Mo (Bunning, 1985 p. 13).

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Allen Basin (496)

ALTERNATE NAMES		DISTRICT	COUNTY
		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Pasayten Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 15.26″ N	120° 43′ 53.08″ W	sec. 34, 38N, 17E

LOCATION: elev. 6,100 ft, 1 mi south of Tamarack Peak, west of Bonita Creek; prospects of the group are scattered in a 0.5-mi radius around the location

HOST ROCK: NAME	LITHOLOGY	AGE
Harts Pass Formation	argillite, feldspathic sandstone	Early Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
quartz porphyry, dacite porphyry, felsite porphyry	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	arsenopyrite, pyrite, quartz
Ag	galena	
Pb	sphalerite	
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Some ore apparently was shipped in the early 1900s, and 11.8 tons averaging 1.92 oz/ton Au and 6.27 tons of ore averaging 1.38 oz/ton Au were shipped in 1938-1940 (Huntting, 1956, p. 175).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: Mineralization occurs along faults. One set of faults trends N60-70E, dips 40-60NW, and contains quartz veins that range from 6 to 30 in. in thickness. These faults and veins are offset by several N40W-trending faults that parallel bedding. These later faults are devoid of quartz veins. The early quartz veins of the deposit contain fine-grained pyrite, arsenopyrite, sphalerite, and galena. This ore resembles that at the Indiana and Golden Arrow mines in that it contains thin parallel bands of finely divided sulfide minerals. The major vein is not exposed at the surface, but a strike length of at least 500 ft is suggested from quartz in the dumps and from open cuts along the vein (Moen, 1969, p. 100).

GEOLOGIC SETTING: The Allen Basin mine is in rocks of the Early Cretaceous Harts Pass Formation, which consists of argillite and fine-grained feldspathic sandstone. The rocks strike N30W and their dip is nearly vertical. The sedimentary rocks were deposited by turbidity currents in a westerly deepening marine basin (Stoffel and McGroder, 1990, p. 19). The argillite and feldspathic sandstone were intruded by several sill-like bodies of quartz porphyry and dacite porphyry that also contain quartz veins (Moen, 1969, p. 100).

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Anacortes (497)

ALTERNATE NAMES		DISTRICT	COUNTY
		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Shull Mtn	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 46′ 32.10″ N	120° 49′ 29.13″ W	sec. 23, 38N, 16E

LOCATION: elev. 4,500 ft, 2 mi northwest of Chancellor campground, Mt. Baker National Forest; near the headwaters of Cascade Creek, a tributary to North Fork Canyon Creek; in Hells Basin

HOST ROCK: NAME	LITHOLOGY	AGE
Virginian Ridge Formation	black mudstone (argillite), siltstone, conglomerate, feldspathic sandstone	Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
quartz diorite	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold tellurides	quartz, pyrite
Ag	galena	
Pb	sphalerite	
Zn		
Te		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Has produced (Huntting, 1956, p. 175). A 5-stamp mill was installed in 1936, and at that time 3,000 ft of development work had been completed. The mine probably produced between 1936 and 1943 (Moen, 1969, p. 102).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: The deposit consisted of two parallel quartz veins. The principal vein had an average thickness of 2 ft and a maximum uncovered thickness of 13 ft. It strikes N10W and dips 70SW. Quartz on the dumps of all adits is iron-oxide stained and contains disseminated pyrite. In addition, some of the quartz contains minor galena and sphalerite in hairlike stringers (Moen, 1969, p. 102).

GEOLOGIC SETTING: The Anacortes mine is in argillite, conglomerate, and feldspathic sandstone of the Cretaceous Virginian Ridge Formation, which was deposited in a fan-delta system sourced from the west (Stoffel and McGroder, 1990, geol. map).

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Azurite (498)

ALTERNATE NAMES		DISTRICT	COUNTY
		Slate Creek Mining	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Azurite Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 40′ 57.93″ N	120° 46′ 51.82″ W	E½ sec. 30, 37N, 17E

LOCATION: elev. 4,500 ft, 1 mi west-southwest of Mt. Ballard summit; on the eastern slope of Majestic Mountain and 4.5 mi up Mill Creek from its confluence with Canyon Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Virginian Ridge Formation	conglomerate, mudstone, siltstone	Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diorite	Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Cu Zn Pb	chalcopyrite sphalerite galena gold	pyrite, pyrrhotite, arsenopyrite, calcite, quartz; silicic, chloritic, serecitic, kaolin, and pyritic alteration

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1918 (10 tons of ore, 19.5 oz of Au recovered), 1920, 1930, 1934, 1936 (3,000 tons), 1937 (27,530 tons), 1938 (36,515 tons), 1939 (5,375 tons), and 1941. Gross value of reported production is $972,000 in Au and Ag from November 1936 to February 1939. (Huntting, 1956, p. 175). Some of the ore milled at the Azurite in 1936 and 1937 may have come from the Whistler mine.

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: The deposit is on the northeast limb of a northwest-trending anticline. Mineralization is localized along faults. The largest veins of the deposit are the Azurite, Devil's Hole, Monster, and Lucky Dog. The Azurite is the principal vein and consists of massive sulfides over a 7.5-ft width. It was mined for a vertical distance of 819 ft and explored along strike for 1,070 ft (Moen, 1969, p. 103-105).

GEOLOGIC SETTING: The Azurite mine is in rocks of the Cretaceous Virginian Ridge Formation, which consists of mudstone, siltstone, and conglomerate (Stoffel and McGroder, geol. map, p. 17-18). These were intruded by circular and elliptical bodies of diorite (Moen, 1969, p. 103).

COMMENTS: American Smelting and Refining Co. installed a mill and operated the property from November 1936 to February 1939. Production was at a rate of 2,500 to 3,000 tons of ore per month. A total of 72,700 tons of ore was mined and milled by the company.

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Blonden (505)

ALTERNATE NAMES	DISTRICT	COUNTY
Goat Mountain Evergreen	Mt Baker	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt. Larrabee	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 25.95″ N	121° 38′ 35.19″ W	NE¼ sec. 28, 40N, 9E

LOCATION: elev. 5,000 ft, 1 mi southwest of Twin Lakes. The land is unsurveyed, and landnet location is projected.

HOST ROCK: NAME	LITHOLOGY	AGE
Darrington Phyllite of the Shuksan Metamorphic Suite	phyllite, graywacke	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag	gold	quartz, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced small amounts in 1902 and 1903 (Huntting, 1956, p. 177).

TECTONIC SETTING: The high-pressure (blueschist) Shuksan Metamorphic Suite is contained within the Northwest Cascade System, an assemblage of tectonically imbricated metamorphosed oceanic rocks that was created during the Late Cretaceous. The Shuksan suite is correlated with other blueschist terranes of southern Oregon and northern California (Brown and Blake, 1987).

ORE CONTROLS: The deposit is in quartz veins 2-12 in. thick. The host rocks are sheared and contorted (Moen, 1969, p. 79).

GEOLOGIC SETTING: The Blonden mine is in Jurassic-Cretaceous metasedimentary rocks of the Darrington Phyllite (Brown and others, 1987).

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Boundary Red Mountain (499)

ALTERNATE NAMES		DISTRICT	COUNTY
Red Mountain		Mount Baker	Whatcom
PRIMARY QUADRANGLE	**SCALE**	**½° x 1° QUAD**	**1° x 2° QUAD**
Mt Larrabee	1:24,000	Mt Baker	Concrete
Mt Sefrit	1:24,000		

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 42.78″ N	121° 37′ 49.13″ W	NW¼ sec. 3, 40N, 9E, W½ sec. 34, 41N, 9E

LOCATION: 0.25 mi south of the international boundary; elev. 4,750 ft, 8 mi north of Twin Lakes. The mine is accessible from Sardis, B.C.

HOST ROCK: NAME	LITHOLOGY	AGE
Chilliwack Group, sedimentaryrocks	carbonaceous amphibole and quartz schist	Devonian - Permian
Slesse diorite (Chilliwack batholith?)	hornblende-biotite diorite	Paleogene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	pyrite, pyrrhotite, quartz
Ag	chalcopyrite	
Cu	tellurobismuthite	
Bi	gold	
Te		

DEPOSIT TYPE	MINERALIZATION AGE
vein	
contact metamorphic	

PRODUCTION: Produced in 1912-1917 ($148,578 in 1916, $131,918 in 1917), 1920-1922 ($95,000 in 1922), 1925, 1929-1930, 1935, 1936 (200 tons), 1937-1942, and 1947 (Huntting, 1956, p. 176).

TECTONIC SETTING: Contained within the Northwest Cascade System, an assemblage of imbricated metamorphosed oceanic rocks bounded by thrust and strike-slip faults that was assembled during the Late Cretaceous (Brown and others, 1987). The Slesse diorite of Daly (1912) is probably a phase of the Cenozoic Cascade magmatic arc.

ORE CONTROLS: Mineralization is in a contact zone containing numerous faults and fractures. The gold-bearing veins were formed during two stages of mineralization. In the initial stage, fractures were filled with quartz containing pyrite, pyrrhotite, and chalcopyrite; in the later stage, hydrothermal gold-bismuth telluride solutions infiltrated the veins. Finely divided gold is present in quartz veins, which vary from 0.5 ft to 10 ft in thickness and average 3 ft thick. The veins crop out on the surface for as much as 900 ft along strike, but because of several north-trending faults, continuous sections of the vein do not extend much more than 100 ft in length. Gold is irregularly distributed and has a tendency to follow microbrecciated parts of veins that parallel margins of the main vein. Mining has extended to a depth of 850 ft (Moen, 1969, p. 80-82).

GEOLOGIC SETTING: The deposit occurs along faults in the contact zone between the Chilliwack Group and the Slesse diorite (Daly, 1912) of the Chilliwack batholith (Moen, 1969, p. 80; Brown and others, 1987).

COMMENTS: Parts of the Boundary Red Mountain vein have not yet been mined (Moen, 1969, p. 80).

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Breckenridge Creek (515)

ALTERNATE NAMES	DISTRICT	COUNTY
Sumas Mountain Stein	Mount Baker	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Kendall	1:24,000	Bellingham	Victoria

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 55′ 24.01″ N	122° 12′ 49.77″ W	N½SW¼, sec. 30, 40N, 5E

LOCATION: 5 mi southeast of Sumas, on a tributary to Breckenridge Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Sumas Mountain serpentinite	serpentinzed ultramafic rocks	Jurassic - Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cr	chromite	serpentine, magnetite, chrysotile, antigorite

DEPOSIT TYPE	MINERALIZATION AGE
massive chromite disseminated	

PRODUCTION: Several tons of chromite were produced in 1946 (Moen, 1969, p. 69).

TECTONIC SETTING: One of many ultramafic masses in the northwest Cascades.

ORE CONTROLS: The serpentine contains two sets of joints: one set parallels the chromite veins, and the other set has associated faulting, which offsets the chromite veins. Chromite is concentrated in a series of parallel bands ranging from 0.25 to 2 in. thick; in a few places the chromite grains increase in size and number to form lenticular bodies. The largest lens observed at the mine was a 5 ft long by 4 in. thick. Massive chromite in a stockpile indicates some lenses were as much as 10 in. thick. The bands of chromite alternate with layers of serpentinite. The attitude of the chromite bands appears to be persistent. Most of the chromite bands vary in thickness and terminate against small cross faults. Chromite assays 45.1% Cr_2O_3 and 17.6% FeO with a Cr to Fe ratio of 2.5:1 (Moen, 1962, p. 114-118).

GEOLOGIC SETTING: The saxonite of Sumas Mountain was serpentinized prior to or during injection into rocks of the Chilliwack Group. Serpentinite pebbles are found in the nearby Late Cretaceous-Early Tertiary Chuckanut Formation (Moen, 1962, p. 42-49).

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Chancellor (500)

ALTERNATE NAMES	DISTRICT	COUNTY
Indiana Illinois Grandview	Slate Creek	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Pasayten Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 23.72″ N	120° 42′ 6.27″ W	SW¼ sec. 26, N½ sec. 35, 38N, 17E

LOCATION: 2 mi north of the New Light mill, elev. 6,550 ft, 0.33 mi south of Buffalo Pass

HOST ROCK: NAME	LITHOLOGY	AGE
Harts Pass Formation	feldspathic sandstone, shale	Early Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
porphyry	Late Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Pb Zn Cu	galena sphalerite	arsenopyrite, pyrite, quartz, calcite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced an unknown amount in 1903 and 119.4 tons in 1935-1939 (Huntting, 1956, p. 176).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: Quartz-calcite veinlets fill fractures in shear zones. The mineralized shears are 1-14 in. wide and are present in several shear zones. Other shear zones offset the veinlets. The main vein contains calcite and a small amount of disseminated pyrite. In the lower Grandview adit, the vein averages 1.7 ft wide and contains 0.33 oz/ton Au and 3.25 oz/ton Ag. In the upper Indiana adit, a 125-ft-long vein averages 14 in. wide and contains 0.67 oz/ton Au and 2.75 oz/ton Ag. Some quartz veins contain narrow black stringers consisting of finely divided particles of pyrite, sphalerite, and galena (Moen, 1969, p. 109-111).

GEOLOGIC SETTING: The Chancellor mine is in rocks of the Early Cretaceous Harts Pass Formation, which consists of argillite and fine-grained feldspathic sandstone. The sedimentary rocks were deposited by turbidity currents in a westerly deepening marine basin (Stoffel and McGroder, 1990, p. 19).

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Danny (493)

ALTERNATE NAMES	DISTRICT	COUNTY
Dannie Washington Chrome	Sisters	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Twin Sisters Mtn	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 41′ 28.32″ N	121° 57′ 27.79″ W	approximately in S1/2 sec. 18 and N1/2 sec. 19, 37N, 7E

LOCATION: near the head of the South Fork, Nooksack River, Twin Sisters area; in a cliff about 800 ft above the valley floor

HOST ROCK: NAME	LITHOLOGY	AGE
Twin Sisters Dunite	dunite	pre-Late Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cr	chromite	magnetite, serpentine, fayalite-forsterite, enstatite-hypersthene, anthophyllite, clinozoisite

DEPOSIT TYPE	MINERALIZATION AGE
podiform chromite	pre-Late Cretaceous

PRODUCTION: Produced 3,000 lb of ore that was sacked and packed to Bellingham in 1934 (Huntting, 1956, p. 40) averaging 51.7 % Cr_2O_3 with Cr:Fe ratio of 3.13:1.

TECTONIC SETTING: Twin Sisters Dunite is the largest ultramafic mass in the northwest Cascades.

ORE CONTROLS: Two lenses of nearly solid chromite are separated by 6 in. of dunite. Each lens is about 10 ft wide and exposed for 10 ft. One lens grades into dunite at a depth of 6 ft (Huntting, 1956, p. 40). Mineralization is in pods and lenses and lacks continuity.

GEOLOGIC SETTING: The Twin Sisters Dunite is a dismembered pre-Late Cretaceous dunite intrusive body.

COMMENTS: For refractory test results, see Wilson and others (1943).

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Evergreen (501)

ALTERNATE NAMES		DISTRICT	COUNTY
		Mount Baker	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt Larrabee	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 32.49″ N	121° 38′ 34.23″ W	NW¼ sec. 21, 40N, 9E

LOCATION: 2 mi north of Shuksan cabins, elev. 4,400 ft, 3.5 miles northeast of Silver Fir campground, Mt. Baker National Forest; near the headwaters of Swamp Creek and 200 ft above the creek

HOST ROCK: NAME	LITHOLOGY	AGE
Chilliwack Group, sedimentary rocks	argillite and chlorite schist	Devonian - Permian

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Zn	sphalerite	pyrite, quartz, calcite; wall rock adjacent to veins contains kaolinite, sericite, fine-grained pyrite
Ag	galena	
Pb	chalcopyrite	
Au		
Cu		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Shipped ore to the Tacoma smelter in 1938 (Huntting, 1956, p. 176).

TECTONIC SETTING: Contained within the Northwest Cascade System, an assemblage of imbricated metamorphosed oceanic rocks bounded by thrust and strike-slip faults that was assembled during the Late Cretaceous (Brown and others, 1987).

ORE CONTROLS: The deposit consists of small ore stringers from ⅛ to 8 in. thick along a northwest-trending, steeply-dipping shear zone. Ore assayed 2.03% Pb, 2.82% Zn, 1.08 oz/ton Ag, and 0.02 oz/ton Au (Moen, 1969, p. 83-84).

GEOLOGIC SETTING: The host rocks are green to gray calcareous argillite and chlorite schist of the Devonian-Permian Chilliwack Group (Moen, 1969, p. 83; Brown and others, 1987, p. 5). The Chilliwack Group consists of arc volcanic rocks and associated deep-water, marine fan graywacke and argillite (Tabor and others, 1989).

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Farrar Placer (518)

ALTERNATE NAMES		DISTRICT	COUNTY
Chancellor		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Shull Mtn	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 5.31″ N	120° 48′ 22.79″ W	NE¼ sec. 36, 38N, 16E, and NW¼ sec. 31, 38N, 17E

LOCATION: on Canyon Creek downstream of its junction with Slate Creek; near Chancellor Campground

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand, gravel, boulders

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced several hundred dollars worth of gold per year prior to 1948 (Huntting, 1956, p. 192). Remnants of a mined-out bench placer half a mile below Chancellor indicate about 10,000 yd^3 of material was mined from a pit that now measures 300 ft long, 75 ft wide, and 12 ft deep (Staatz and others, 1971, p. 189).

TECTONIC SETTING: The stream gradient is 2% and optimum for placer formation.

ORE CONTROLS: Heavy-mineral concentration by stream action. Approximately half of the clasts in bench gravels (which may be Pleistocene) ranged from 0.5 ft to more than 3 ft in diameter. The deposit is the largest placer on Canyon Creek and has 75,000 yd^3 of reserves. Panned concentrates contain gold, ferromagnesian minerals, quartz, mica, magnetite, and pyrite. Samples taken by the USGS showed a trace to 4.2 cents per cubic yard Au at 1971 prices (Staatz and others, 1971, p. 189).

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Fourth of July (502)

ALTERNATE NAMES		DISTRICT	COUNTY
		Mount Baker	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Shuksan Arm	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 49′ 23.91″ N	121° 40′ 13.06″ W	NE¼NW¼ sec. 5, 38N, 9E, and SE¼SW¼ sec. 32, 39N, 9E

LOCATION: elev. 4,200 ft, 3 mi south of Mt. Baker Lodge; at the headwaters of Swift Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Chilliwack Group, sedimentary rocks	argillaceous sedimentary rocks and basic volcanic rocks	Devonian - Permian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diorite stock	Oligocene?

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	pyrite, pyritization in a shear zone

DEPOSIT TYPE	MINERALIZATION AGE
shear zone	

PRODUCTION: Stamp mill produced in the early days (Huntting, 1956, p. 176).

TECTONIC SETTING: Contained within the Northwest Cascade System, an assemblage of imbricated metamorphosed oceanic rocks bounded by thrust and strike-slip faults that was assembled during the Late Cretaceous (Brown and others, 1987).

ORE CONTROLS: The deposit is along three pyritized shear zones that are 10-30 ft thick (Moen, 1969, p. 84).

GEOLOGIC SETTING: The Fourth of July mine is near the contact of a small quartz diorite stock and argillaceous sedimentary rocks of the Chilliwack Group. A small diorite stock crops out near Lake Ann, north of the property (Moen, 1969, p. 84; Brown and others, 1987, p. 5). The Chilliwack Group consists of arc volcanic rocks and associated deep-water, marine fan graywacke and argillite (Tabor and others, 1989).

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Gargett (503)

ALTERNATE NAMES		DISTRICT	COUNTY
Gold Run		Mount Baker	Whatcom
PRIMARY QUADRANGLE	**SCALE**	**½° x 1° QUAD**	**1° x 2° QUAD**
Mt Larrabee	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 58′ 18.88″ N	121° 38′ 51.55″ W	SW¼ sec. 4 and SE¼ sec. 8, 40N, 9E

LOCATION: elev. 5,600 ft, 5 mi N30E of Silver Fir campground, Mt. Baker National Forest, on the south slope of Mt. Larrabee

HOST ROCK: NAME	LITHOLOGY	AGE
Chilliwack Group, sedimentary rocks	limestone, argillite, quartzite	Devonian - Permian

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
andesite dike and granitic rocks	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	sphalerite	pyrite, pyrrhotite, quartz
Ag	galena	
Cu	chalcopyrite	
Pb	malachite	
Zn	chalcocite	
	azurite	
	massicot	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: A 5-ton test shipment was made to the Tacoma smelter in 1938; it contained 1.03 oz Au, 4.34 oz Ag, 0.78% Cu, and 8% Pb (Moen, 1969, p. 84).

TECTONIC SETTING: Contained within the Northwest Cascade System, an assemblage of imbricated metamorphosed oceanic rocks bounded by thrust and strike-slip faults that was assembled during the Late Cretaceous (Brown and others, 1987).

ORE CONTROLS: The deposit consists of mineralized quartz fissure veins and replacement bodies. The vein is 1-14 in. thick and averages 12 in. A 1-ft band of mineralized siliceous limestone was found 1,750 ft from the main portal. Ore minerals make up 5% of the quartz vein and occur as bands and segregated masses (Moen, 1969, p. 84).

GEOLOGIC SETTING: Rocks in the main adit are described as gray siliceous limestone, light-gray to buff quartzite, and black carboniferous argillite of the Devonian-Permian Chilliwack Group. About 300 ft from the portal, a gray porphyritic andesite dike, 8 ft thick, was encountered and followed for 160 ft. The dike crops out on the surface (Moen, 1969, p. 84; Brown and others, 1987, p. 5). The Chilliwack Group consists of arc volcanic rocks and associated deep-water, marine fan graywacke and argillite (Tabor and others, 1989).

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Glacier (517)

ALTERNATE NAMES		DISTRICT	COUNTY
Midas		Mt. Baker	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Glacier	1:24,000	Mt Baker	Concrete
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 53′ 48.74″ N	121° 54′ 50.87″ W	secs. 4, 5, 8, and 9, 39N, 7E	

LOCATION: elev. 1,000 ft, 1.5 mi east of Glacier; 100 ft south of State Highway 542

HOST ROCK: NAME	LITHOLOGY	AGE
Nooksack Group	slaty argillite	Early Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
basic igneous dike	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag	chalcopyrite	quartz, calcite, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
boulder float	

PRODUCTION: Shipped 4.5 tons of copper ore to the Tacoma smelter in 1951 (Moen, 1969, p. 85).

TECTONIC SETTING: The Nooksack Group was deposited as a submarine fan associated with a volcanic arc (Wells Creek Volcanics). The Nooksack Group may be part of the tectonically imbricated northwest Cascade thrust system that was created during Late Cretaceous deformation (Sondergaard, 1979).

ORE CONTROLS: The deposit consists of numerous pyrite-chalcopyrite-bearing boulders exposed on the ground surface. Some copper-bearing boulders were 3-4 ft in diameter and assayed 4.5% Cu, 0.02 oz/ton Au, and 0.89 oz/ton Ag. The chalcopyrite-bearing boulders and cobbles may have originated as replacement deposits along shear zones in the underlying argillite; however, exploration work has failed to reveal any sizable bodies of ore similar to that found as float on the surface. A crushed zone in schist, 4-5 ft wide, contains large chunks of nearly solid pyrite surrounded by crushed schist and clay and numerous quartz and calcite stringers. The general appearance of much of the terrain resembles a landslide. If the surface material is landslide debris, the copper-bearing boulders may have originated from some place other than the immediate area of the claims (Moen, 1969, p. 85).

GEOLOGIC SETTING: The known part of the Glacier deposit was found in boulders overlying Mesozoic schistose rocks (Moen, 1969, p. 85).

COMMENTS: By 1966, exploration consisting of 1,670 ft of underground drifts, 1,280 ft of dozer trenching, and 1,500 ft of drilling had failed to locate the bedrock source of the ore boulders (Moen, 1969, p. 85).

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Goat (504)

ALTERNATE NAMES		DISTRICT	COUNTY
		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Slate Peak	1:24,000	Robinson Mtn	Concrete
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 43′ 53.33″ N	120° 44′ 55.29″ W	SW¼ sec. 33, 38N, 17E	

LOCATION: southwest of and adjacent to the Allen Basin claims, elev. 4,200 ft, 3.5 mi west-northwest of Harts Pass

HOST ROCK: NAME	LITHOLOGY	AGE
Goat Creek Formation	feldspathic sandstone	Early Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	quartz
Ag	silver	
Cu	chalcopyrite	
	malachite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced at the turn of the century; the grade was 0.52-1.14 oz/ton Au (Moen, 1969, p. 106).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: The deposit is in a 4-ft-thick quartz-bearing shear zone containing flakes of malachite and a 9-18-in.-thick quartz vein (Moen, 1969, p. 106).

GEOLOGIC SETTING: The Goat deposit is in Cretaceous feldspathic sandstone of the Goat Creek Formation, which was deposited by east-sourced turbidity currents and submarine fans into a westerly deepening marine basin (Stoffel and McGroder, 1990, geol. map).

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Gold Basin (506)

ALTERNATE NAMES		DISTRICT	COUNTY
		Mount Baker	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mount Sefrit	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 59′ 27.86″ N	121° 36′ 50.50″ W	sec. 6, 40N, 9E

LOCATION: elev. 3,500 ft, 3 mi north of Twin Lakes; near the Red Mountain mine; 2 mi northwest of the junction of Winchester Creek with Silesia Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Chilliwack Group, volcanic rocks	greenstone	Devonian - Permian
Chilliwack batholith	quartz diorite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	quartz

DEPOSIT TYPE- MINERALIZATION AGE

vein

PRODUCTION: Produced $17,000 worth of ore (consisting of talus boulders) before 1934 (Huntting, 1956, p. 177) .

TECTONIC SETTING: Contained within the Northwest Cascade System, an assemblage of imbricated metamorphosed oceanic rocks bounded by thrust and strike-slip faults that was assembled during the Late Cretaceous (Brown and others, 1987).

ORE CONTROLS: Deposit consists of free gold in quartz float. One vein crops out on the property and is as much as 4 ft thick (Moen, 1969, p. 85-86).

GEOLOGIC SETTING: The Gold Basin deposit is in metamorphosed volcanic rocks (greenstone) of the Chilliwack Group (Brown and others, 1987, p. 5). The Chilliwack Group consists of arc volcanic rocks and associated deep-water, marine fan graywacke and argillite (Tabor and others, 1989).

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Gold Hill (516)

ALTERNATE NAMES	DISTRICT	COUNTY
Northern Cascade Peterson Sandusky Iron Mountain	Slate Creek	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Azurite Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 40′ 8.92″ N	120° 48′ 27.82″ W	E½ sec. 36, 37N, 16E

LOCATION: 1 mi southwest of the summit of Majestic Mountain

HOST ROCK: NAME	LITHOLOGY	AGE
Jack Mountain Phyllite	phyllite, argillite, quartzite	Jurassic - Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granodiorite of the Golden Horn batholith aplite, felsite andesite	early Eocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag Au Pb Zn Cu Sb	sphalerite galena argentite chalcopyrite stibnite anglesite	pyrrhotite, pyrite, arsenopyrite, calcite, talc

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: About 30,000 tons of "ore" were reportedly stockpiled, but a mill to process it was never built (Moen, 1969, p. 106 and 108). In 1936, 1.8 tons of ore were shipped to Bunker Hill and returned assays of 0.07 oz/ton Au, 93.25 oz/ton Ag, 29.4% Pb, 9.2% Zn, 0.25% Cu, 0.40% Sb, and 0.66% As (Moen, 1969, p. 107-108).

TECTONIC SETTING: The area is west of the Hozameen fault and north of the Golden Horn batholith.

ORE CONTROLS: Ore minerals occur along several well-developed shear zones 2-8 ft thick in argillite and quartzite. The shear zones exhibit three prominent trends: E-W, N50E, and N10W. The dips are north and west 40-72 degrees. Ore deposits consist of four principal lodes and a number of cross-leads; some of the lodes are of fair size and richness. The Iron Mountain, Genevieve, and Gouge lodes have a westerly course. The Virginia lode has a northerly course. The lodes are co-extensive with some of the principal lodes of the Azurite group. The Iron Mountain lode has a thickness of 5-7 ft. The gangue is chiefly quartz (bluish-gray to white or rust) that contains dark-blue material, varied in places by light-gray lenses composed of silica, talc, and some calcite (Moen, 1969, p. 106-107).

GEOLOGIC SETTING: The Gold Hill mine is in rocks of the Late Jurassic-Early Cretaceous Jack Mountain Phyllite (Misch, 1987, p. 394-395). The area near the mine was intruded by granodiorite and felsite, aplite, and andesitic dikes as much as 20 ft wide.

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Golden Arrow (513)

ALTERNATE NAMES		DISTRICT	COUNTY
Tacoma		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Pasayten Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 14″ N	120° 42′ 59″ W	NE¼ sec. 34, 38N, 17E

LOCATION: elev. 5,300 ft, 3.5 mi northwest of Harts Pass; on the west side of Bonita Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Harts Pass Formation	argillite, feldspathic sandstone	Early Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold tellurides	pyrite, arsenopyrite, quartz
Ag	galena	
Zn	sphalerite	
Pb	malachite	
Cu		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: A 10-ton test shipment netted $60.00/ton (Huntting, 1956, p. 179). Shipments of ore were made in 1951, 1952, and 1953 (Moen, 1969, p. 108).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: The deposit consists of two veins. The Golden Arrow vein ranges from 6 to 24 in. in thickness, contains some free gold, and terminates against a fault. The second vein ranges from 6 to 28 in. in thickness and averages 24 in.; portions of the vein are brecciated (Moen, 1969, p. 108-109).

GEOLOGIC SETTING: The Golden Arrow mine is in rocks of the Early Cretaceous Harts Pass Formation, which consists of argillite and fine-grained feldspathic sandstone. The sedimentary rocks were deposited by turbidity currents in a westerly deepening marine basin (Stoffel and McGroder, 1990, p. 19).

REFERENCES

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Great Excelsior (507)

ALTERNATE NAMES	DISTRICT	COUNTY
Lincoln President Excelsior Wells Creek	Mount Baker	Whatcom

PRIMARY QUADRANGLE	SCALE	½°-x 1° QUAD	1° x 2° QUAD
Bearpaw Mtn	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 53′ 56.45″ N	121° 48′ 17.39″ W	sec. 6, 39N, 8E

LOCATION: elev. 2,000 ft, 6 mi east of Glacier; on the west side of Wells Creek, 0.5 mi above junction with the Nooksack River

HOST ROCK: NAME	LITHOLOGY	AGE
Wells Creek volcanics	andesite, felsite, tuff, slate	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Cu Pb Zn Sb	chalcopyrite galena sphalerite tellurides silver tetrahedrite	pyrite, arsenopyrite, quartz, dolomite

DEPOSIT TYPE	MINERALIZATION AGE
stockworks breccia pipe	

PRODUCTION: Produced 10,000 tons with a net return of $20,276 prior to 1915. Ore grade from 305.10 tons of concentrate shipped averaged 1.857 oz/ton Au (Huntting, 1956, p. 177). Total production in gold and silver is about $69,000 (Moen, 1976, p. 160). Production ceased in 1916.

TECTONIC SETTING: Volcanic rocks were deposited in a marine volcanic arc setting. The unit may be autochthonous, or it may be part of the Northwest Cascade System, a tectonically imbricated assemblage of autochthonous, metamorphosed oceanic rocks created in the Late Cretaceous.

ORE CONTROLS: This epithermal deposit consists of sulfide-cemented, brecciated veins along a shear zone. The main fracture system extends for about 4,000 ft and has a width of 200-400 ft. The fractures are lined by quartz, pyrite, and other sulfides. The brecciated zone, as exposed in the Big Stope mine workings, is 400 ft long by 270 ft wide and has been explored to a depth of 325 ft. The breccia consists of 0.25-1 in. fragments of volcanic rocks, quartz, and slate. The higher grade ore occurs in felsic and tuffaceous breccia. In 1934 approximately 200 channel and crosscut samples of underground workings gave an average of 0.09 oz/ton Au and 0.75 oz/ton Ag and outlined a reserve of 1,250,000 tons of ore from the lowest mine workings to the surface (Moen, 1969, p. 86). On September 5, 1988, Steelhead Resources, Ltd. announced reserves of 4.1 million tons averaging 0.042 oz/ton Au and 2.60 oz/ton Ag (based on 0.03 oz/ton Au cutoff) or 5.9 million tons of ore averaging 0.0333 oz/ton Au and 2.047 oz/ton Ag (based on 0.02 oz/ton Au cutoff). The 1988 reserves were calculated on the basis of data from underground workings and 114 drill holes.

GEOLOGIC SETTING: Rocks of the Jurassic Wells Creek Volcanics have been tightly folded into a west-plunging syncline which is superimposed on the west limb of a larger regional north-trending anticline.

COMMENTS: ASARCO staked the property in 1967 and abandoned the claims in 1968. Silver Standard held the property from 1972 to 1975. In 1975 Silver Standard leased the property to Hanna Mining Co., who drilled two holes totaling 2,018 ft. In 1976 Quintana Exploration Co. leased the claims and drilled six holes. In 1977 U.S. Borax and Chemical Corp. acquired the property and from 1977 to 1981 drilled 45 holes totaling 15,214 ft. Steelhead Gold (formerly Nooksack Mines, Inc.) acquired the property in 1984 and by 1987 had drilled 61 holes totaling 24,776 ft. Steelhead Gold is a wholly owned subsidiary of Steelhead Resources, Ltd.

UNPUBLISHED INFORMATION: Steelhead Gold, 1988, Summary of information, the Excelsior Project, Whatcom County, Washington. This report is in DGER files.

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Lazy Tar Heel Placer (519)

ALTERNATE NAMES		DISTRICT	COUNTY
		Slate Creek	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Crater Mountain	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 42′ 20.24″ N	120° 56′ 43.38″ W	secs. 10, 11, and 12, 37N, 14E

LOCATION: on Ruby Creek between Granite and Panther Creeks

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced in 1939 (Huntting, 1956, p. 192).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

REFERENCE

Huntting, M. T., 1956, Inventory of Washington minerals—Part II, Metallic minerals: Washington Division of Mines and Geology Bulletin 37, v. 1, 428 p.; v. 2, 67 p.

Lone Jack (508)

ALTERNATE NAMES	DISTRICT	COUNTY
Mount Baker Post-Lambert Brooks-Willis Boundary Gold	Mount Baker	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt Sefrit	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 56′ 42.33″ N	121° 37′ 8.96″ W	sec. 22 and sec. 23, 40N, 9E

LOCATION: elev. 5,000 ft, approximately 1 mi southeast of Twin Lakes

HOST ROCK: NAME	LITHOLOGY	AGE
Darrington Phyllite of the Shuksan Metamorphic Suite	phyllitic schist	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Cu Bi	gold tellurobismuthite	quartz, pyrite, pyrrhotite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced in 1902-1905 ($360,000 in Au from Lone Jack vein) and in 1915-1918. Total verified production reported to be 9,463 oz Au and 1,961 oz Ag (Huntting, 1956, p. 178). Total production for Lone Jack and Lulu veins from 1902 to 1924 is estimated at $550,000 in Au. In the last year of operation (1924), the Lulu vein produced 1,557 tons of ore yielding 907 oz Au and 38 oz Ag.

TECTONIC SETTING: The high-pressure (blueschist) Shuksan metamorphic suite is contained within the Northwest Cascade System, an assemblage of tectonically imbricated metamorphosed oceanic rocks that was created during the Late Cretaceous. The Shuksan suite is correlated with other blueschist terranes of southern Oregon and northern California (Brown and Blake, 1987).

ORE CONTROLS: Deposits are in quartz fissure veins. Three main veins are traceable for 2500 ft: the Lone Jack vein crops out for 500 ft, ranges in thickness from 1 to 6 ft, and averages 2.5 ft; the Lulu vein ranges from a few inches to 9 ft thick and averages 6 ft thick; and the Whist vein averages 2 ft in thickness. Mineralization is localized in shoots.

GEOLOGIC SETTING: The Lone Jack mine is in metasedimentary rocks of the Jurassic-Cretaceous Darrington Phyllite and is 1 mi east of the west boundary of the Chilliwack batholith (Moen, 1969, p. 88-89; Brown and others, 1987).

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Mammoth (509)

ALTERNATE NAMES		DISTRICT	COUNTY
		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Pasayten Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 11.74″ N	120° 42′ 49.61″ W	sec. 35, 38N, 17E

LOCATION: elev. 5,400 ft, 3.5 mi northwest of Harts Pass; on the east side of Bonita Creek, 0.75 mi north of junction with Slate Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Harts Pass Formation	slate (black shale), feldspathic sandstone	Early Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	pyrite, arsenopyrite, quartz
Ag	sphalerite	
Pb	galena	
Zn		
As		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Reportedly produced 15,000 tons of ore yielding $397,500 between 1898 and 1901. An additional 15,000 tons were mined between 1936 and 1942; this had an estimated yield of $147,250 (Moen, 1969, p. 111).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: Mineralization is in a quartz fissure vein carrying sulfides, gold, and silver. The thickness of the vein ranges from 2 to 40 in. and averages 20 in. in the upper level. In the lower level, the vein ranges from 1 to 24 in. thick. Samples from the Mammoth vein averaged nearly 0.7 oz/ton Au and 1.0 oz/ton Ag (Moen, 1969, p. 111-112).

GEOLOGIC SETTING: The Mammoth mine is in rocks of the Early Cretaceous Harts Pass Formation, which consists of argillite and fine-grained feldspathic sandstone. The sediments were deposited by turbidity currents in a westerly deepening marine basin (Stoffel and McGroder, 1990, p. 19).

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Minnesota (512)

ALTERNATE NAMES		DISTRICT	COUNTY
Seattle-St. Louis		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Azurite Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 43′ 45.93″ N	120° 50′ 28.62″ W	SW¼ sec. 2, 37N, 16E

LOCATION: 2.5 mi west of Cady Pass; 2,000 ft downstream from junction of Mill and Canyon Creeks; approximately 100 ft above the creek level, on the north side of Canyon Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Harts Pass Formation	feldspathic sandstone	Early Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Cu	gold bornite	quartz, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Gold ore was milled at the property in 1911-1913 at the rate of 20 tons/day (Moen, 1969, p.113).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: Mineralization is in quartz veins in a 6-24-in.-wide shear zone. A grab sample of quartz assayed 1.26 oz/ton Au and 6.12 oz/ton Ag (Moen, 1969, p. 113).

GEOLOGIC SETTING: The Minnesota mine is in rocks of the Early Cretaceous Harts Pass Formation, which consists of argillite and fine-grained feldspathic sandstone. The sediments were deposited by turbidity currents in a westerly deepening marine basin (Stoffel and McGroder, 1990, p. 19).

REFERENCES

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New Light (510)

ALTERNATE NAMES	DISTRICT	COUNTY
Eureka Bonita Slate Creek Monica	Slate Creek	Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Pasayten Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 45′ 40.97″ N	120° 43′ 31.77″ W	center, S½ sec. 27, 38N, 17E

LOCATION: elev. 6,500 ft, 4 mi north-northwest of Harts Pass

HOST ROCK: NAME	LITHOLOGY	AGE
Harts Pass Formation	argillite, feldspathic sandstone	Early Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
diorite stock diabase sills	Late Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	pyrite, quartz, calcite
Ag	sylvanite	
Cu	galena	
Ni	chalcopyrite	
Pt	platinum	
Pb		

DEPOSIT TYPE	MINERALIZATION AGE
breccia vein	Tertiary?

PRODUCTION: Produced 60,000 tons of ore in the early 1900s; the total value was $350,000. Several tons of high-grade ore were shipped from 1940 to 1942. In 1947 about 24 tons of concentrates were shipped, and in 1949, 300 tons of ore was milled. In 1963, 300 tons of ore was mined and milled; concentrates contained $74.25-$103.25/ton Au. In 1978, 7 tons of ore was shipped; it contained 2 oz/ton Au and 4 oz/ton Ag. Total production is estimated at $1,250,000 (Moen, 1969, p. 115).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: Extensive zones of quartz-carbonate-cemented slate-argillite breccia were found at the mine. Free gold and galena are present in the breccia. Minor amounts of the galena are commonly found in pyrite-bearing breccias. The reported average grade of the breccia is 0.33 oz/ton Au and 0.137 oz/ton Ag. In 1965 assays of the concentrate returned 0.25% Ni and 0.0005-2.6 oz/ton Pt (Moen, 1969, p. 115-116).

GEOLOGIC SETTING: The New Light mine is in rocks of the Early Cretaceous Harts Pass Formation, which consists of argillite and fine-grained feldspathic sandstone. The sediments were deposited by turbidity currents in a westerly deepening marine basin (Stoffel and McGroder, 1990, p. 19).

REFERENCES

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North American (511)

ALTERNATE NAMES		DISTRICT	COUNTY
Velvet Anoka		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Azurite Peak	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 43′ 15.28″ N	120° 50′ 8.73″ W	sec. 11, 37N, 16E

LOCATION: elev. 4,200 ft, 2.25 mi west of Cady Pass; approximately 3,000 ft south of junction of Mill and Canyon Creeks; between Boulder Creek and Mill Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Harts Pass Formation	shale, feldspathic sandstone	Early Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
granodiorite	Tertiary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	quartz
Ag	silver	
Cu	malachite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced around 1910. Moen (1969, p. 116-117) reported the patented claims of the North American mine include three claims named the Anoka. The Anoka mine (Huntting, 1956, p. 175) is presumed to be the same mine as the North American and reportedly operated a stamp mill in the 1900s. Only a few hundred tons were milled.

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: A small intrusive body of Early Tertiary granodiorite is found at the south end of the claims. Six quartz veins, mostly 1-3 ft thick (one is 7-20 ft thick) are present in east-trending shear zones in quartzite (Moen, 1969, p. 116-117).

GEOLOGIC SETTING: The North American mine is in rocks of the Harts Pass Formation, which are described as fine-grained, gray feldspathic sandstone with minor shale that strikes N20-40W and dips 70NE to vertical (Moen, 1969, p. 116-117; Stoffel and McGroder, 1990, geol. map).

REFERENCES

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Old Discovery Placer (520)

ALTERNATE NAMES	DISTRICT	COUNTY
Boulder Placer New Discovery Ruby Bar		Whatcom

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Crater Mountain	1:24,000	Robinson Mtn	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 42′ 55.77″ N	120° 52′ 38.51″ W	S½ sec. 9, 37N, 16E

LOCATION: on Ruby Creek between Boulder Creek and Pete Miller Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Produced several thousand dollars worth of gold in the "old days" (Huntting, 1956, p. 192). Drift mining methods were employed.

TECTONIC SETTING: The stream gradient is 3.6%, permitting only transitory placer deposit formation.

ORE CONTROLS: Heavy-mineral concentration by stream action. Drift mining took place in bench gravel or glacial drift, which is 40 ft above the stream level and at the bedrock surface. Coarse gold was recovered from pockets on bedrock. It is estimated that 10,000 yd^3 of bench gravels remain. Samples by the USGS returned a trace to 3.0 cents per cubic yard Au at 1971 prices (Staatz and others, 1971, pp. 191-192).

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Ribbon (494)

ALTERNATE NAMES		DISTRICT	COUNTY
Washington Chrome		Sisters	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Twin Sisters Mtn	1:24,000	Mt Baker	Concrete
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 42′ 55.92″ N	121° 57′ 15.92″ W	W½ sec. 7, 37N, 7E	

LOCATION: on the northwest valley wall of Green Creek, elev. 3,875 ft

HOST ROCK: NAME	LITHOLOGY	AGE
Twin Sisters Dunite	dunite	pre-Late Cretaceous

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cr	chromite kammererite	magnetite, serpentine, fayalite-fosterite, enstatite-hypersthene, anthophyllite, melilite group, tourmaline group, ferroan clinochlore, staurolite, prehnite

DEPOSIT TYPE	MINERALIZATION AGE
podiform chromite	pre-Late Cretaceous

PRODUCTION: Produced 20 tons of ore that was sacked and shipped to Bellingham (Huntting, 1956, p. 42) averaging 51.2 % Cr_2O_3 with a Cr:Fe ratio of 3.06:1.

TECTONIC SETTING: Twin Sisters Dunite is the largest ultramafic mass in the northwest Cascades.

ORE CONTROLS: Lenses of chromite are present in dunite. One lens on the Ribbon claim was 20 ft long and had a maximum width of 3 ft. It was mined to a depth of 15 ft (Huntting, 1956, p. 42). Mineralization is in pods and lenses and lacks continuity.

GEOLOGIC SETTING: The Ribbon mine is in a dismembered dunite of the pre-Late Cretaceous Twin Sisters dunite intrusive.

COMMENTS: For refractory test results, see Wilson and others (1943).

REFERENCES

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Wilson, Hewitt; Skinner, K. G.; Hurst, T. L., 1943, Some refractory properties of Washington chromite: U.S. Bureau of Mines Report of Investigations 3694, 31 p.

Scougale Placer (521)

ALTERNATE NAMES		DISTRICT	COUNTY
Ruby Creek Placer		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Ross Dam	1:24,000	Mt Baker	Concrete
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 44′ 14.59″ N	121° 3′ 17.43″ W	sec. 36, 38N, 13E and sec. 31, 38N, 14E	

LOCATION: at the mouth of Ruby Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Quaternary alluvium	sand and gravel	Quaternary

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au	gold	sand and gravel

DEPOSIT TYPE	MINERALIZATION AGE
placer	Quaternary

PRODUCTION: Ore worth $950 was taken out in 6 weeks in 1897 (Huntting, 1956, p. 193). The Ruby Creek Placer mine was the largest producer in the Slate Creek district in 1906 and 1907. In 1906, placer mines in the Slate Creek district produced $14,617 in Au at $20.00 per oz (Staatz and others, 1971, p. 86). Gravels contained $0.25-$1.00/yd^3 Au and were 35-200 ft thick (Moen, 1969, p. 123).

TECTONIC SETTING: Deposition of heavy minerals in river gravels.

ORE CONTROLS: Heavy-mineral concentration by stream action.

COMMENTS: The placer is now covered by Ross Lake.

REFERENCES

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Silver Tip (495)

ALTERNATE NAMES		DISTRICT	COUNTY
Silvertip		Mount Baker	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Mt Larrabee	1:24,000	Mt Baker	Concrete

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
48° 54′ 28.34″ N	121° 37′ 48.04″ W	W½ sec. 34, 40N, 9E

LOCATION: on Ruth Creek, 3 mi east of Shuksan

HOST ROCK: NAME	LITHOLOGY	AGE
Darrington Phyllite of the Shuksan Metamorphic Suite	phyllite, siliceous schistose marble	Jurassic

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Ag	chalcopyrite	quartz, calcite, siderite, pyrrhotite, pyrite, arsenopyrite.
Au	malachite	
Cu	sphalerite	
Pb	galena	
Zn		

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Shipped a carload of ore valued at $27/ton; produced in 1943 ($146) and in 1947 (27 tons) (Huntting, 1956, p. 106).

TECTONIC SETTING: The high-pressure (blueschist) Shuksan metamorphic suite is contained within the Northwest Cascade System, an assemblage of tectonically imbricated metamorphosed oceanic rocks that was created during the Late Cretaceous. The Shuksan suite is correlated with other blueschist terranes of southern Oregon and northern California (Brown and Blake, 1987).

ORE CONTROLS: Mineralization occurs in a shear zone. Cu, Zn, and Pb minerals occur as disseminations along shear zones and in lenticular replacement bodies. Veinlets of quartz and calcite are assumed to contain gold and silver (Moen, 1969, p. 94).

GEOLOGIC SETTING: Ore minerals are confined to N45W-trending shear zones dipping 50SW to 80NE in Jurassic-Cretaceous phyllite and siliceous, schistose marble of the Darrington Phyllite (Moen, 1969, p. 94; Brown and others, 1987).

COMMENTS: The main underground workings consisted of two adits on the Silver Tip ″2 claim: a 240-ft-long adit with 180 ft of drifts, a 30-ft inclined raise, and a small stope; and a 90-ft adit with a 40-ft drift and a 20-ft raise; a third adit is 1,500 ft southwest of the first two and heads N50W into the hillside. The adit is caved, but the dump size suggests at least 100 ft of underground workings (Moen, 1969, p. 94).

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Whistler (514)

ALTERNATE NAMES		DISTRICT	COUNTY
Homestake		Slate Creek	Whatcom
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Slate Peak	1:24,000	Robinson Mtn	Concrete
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
48° 43′ 25.85″ N	120° 44′ 30.96″ W	sec. 10, 37N, 17E	

LOCATION: elev. 4,500 ft, 3 mi west-northwest of Harts Pass; approximately 1 mi southeast of the junction of South Fork Slate Creek with Slate Creek. United States land monument no. 3 is on the Whistler claim.

HOST ROCK: NAME	LITHOLOGY	AGE
Goat Creek Formation	quartzite	Cretaceous

ASSOCIATED IGNEOUS ROCK: DESCRIPTION	AGE
andesite porphyry	

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Au Ag Cu	chalcopyrite gold	quartz, pyrite

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Produced an unknown amount of ore in 1936 and 1937 (Huntting, 1956, p. 180).

TECTONIC SETTING: The Methow basin is a Jurassic-Cretaceous fold-and-thrust belt intruded by Late Cretaceous-Early Tertiary magmatic arc plutons (McGroder, 1989).

ORE CONTROLS: Fine-grained gray quartzite was intruded by andesite porphyry. Shear zones as much as 20 ft wide in the quartzite contain quartz stringers and quartz veins as much as 12 in. thick. Samples from the veins on the Whistler and Homestake claims assayed from 0.18 to 0.44 oz/ton Au, 2 to 8 oz/ton Ag, and as much as 2.8% Cu (Moen, 1969, p. 118).

GEOLOGIC SETTING: The Whistler mine is in feldspathic sandstone of the Cretaceous Goat Creek Formation (Stoffel and McGroder, 1990, geol. map, p. 20).

REFERENCES

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Chinook (630)

ALTERNATE NAMES	DISTRICT	COUNTY
		Yakima

PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Norse Peak	1:24,000	Mt Rainer	Yakima

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
46° 53′ 18.05″ N	121° 29′ 55.72″ W	SW¼ sec. 12, 16N, 10E

LOCATION: 1.5 mi east of Chinook Pass on the Chinook Pass road

HOST ROCK: NAME	LITHOLOGY	AGE
Bumping Lake pluton	quartz monzonite and granodiorite	Miocene
Ohanapecosh Formation	andesite	Oligocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu	chalcopyrite	arsenopyrite, pyrite, granodiorite
Au	sphalerite	
Ag	galena	
	molybdenite	

DEPOSIT TYPE	MINERALIZATION AGE
vein	

PRODUCTION: Shipped 21 tons to the smelter in 1941; this ore ran 10% Cu, 27 oz/ton Ag, and 0.1 oz/ton Au (Huntting, 1956, p. 106).

TECTONIC SETTING: The area is underlain by intrusive (25 m.y.) and extrusive (35 m.y.) rocks of the Cascade magmatic arc.

ORE CONTROLS: Mineralization occurs as a lens that is 4-5 ft wide along the contact between iron-stained granodiorite and andesite (Huntting, 1956, p. 106).

GEOLOGIC SETTING: The Chinook mine is at the contact between the Bumping Lake pluton and the Ohanapecosh Formation. The Bumping lake pluton is of similar age and is probably related to the Snoqualmie batholith (Simmons and others, 1983, p. 20).

REFERENCES

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New Find (628)

ALTERNATE NAMES		DISTRICT	COUNTY
		Bumping Lake	Yakima
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bumping Lake	1:24,000	Mt Rainer	Yakima

LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE
46° 46′ 9.27″ N	121° 21′ 3.83″ W	near the south line sec. 19, 15N, 12 E

LOCATION: south of Bumping Lake on Deep Creek

HOST ROCK: NAME	LITHOLOGY	AGE
Bumping Lake pluton	quartz monzonite and granodiorite	Miocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
Cu Au Ag W	chalcopyrite scheelite	arsenopyrite, pyrite, quartz, tourmaline

DEPOSIT TYPE	MINERALIZATION AGE
vein fracture zone	

PRODUCTION: Produced 11 tons of concentrate which ran 19.6% Cu, 100 oz/ton Ag, and 1 oz/ton Au (Huntting, 1956, p. 107).

TECTONIC SETTING: Rocks of the area are part of the Cascade magmatic arc.

ORE CONTROLS: Quartz veins occur in a fracture zone that is several feet wide (Huntting, 1956, p. 107).

GEOLOGIC SETTING: The Bumping lake pluton is of similar age and is probably related to the Snoqualmie batholith (Simmons and others, 1983, p. 20).

REFERENCES

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Red Bird (629)

ALTERNATE NAMES		DISTRICT	COUNTY
Bird		Bumping Lake	Yakima
PRIMARY QUADRANGLE	SCALE	½° x 1° QUAD	1° x 2° QUAD
Bumping Lake	1:24,000	Mt Rainer	Yakima
LATITUDE	LONGITUDE	SECTION, TOWNSHIP, AND RANGE	
46° 47′ 39.78″ N	121° 21′ 19.87″ W	NW¼ sec. 18, 15N, 12E	

LOCATION: south of Bird Lake

HOST ROCK: NAME	LITHOLOGY	AGE
Bumping Lake pluton	quartz monzonite and granodiorite	Miocene

COMMODITIES	ORE MINERALS	NON-ORE MINERALS
W	chalcopyrite	arsenopyrite, pyrite, quartz, calcite
Cu	scheelite	
	molybdenite	

DEPOSIT TYPE	MINERALIZATION AGE
vein shear zone	

PRODUCTION: Produced 650 lb of concentrates (63% WO_3) in 1940 which came mostly from the Bird workings. Other mines include the nearby Garibaldi (Huntting, 1956, p. 350).

TECTONIC SETTING: Rocks of the area are part of the Cascade magmatic arc.

ORE CONTROLS: Mineralization occurs in a series of parallel and diverging quartz veinlets in a hydrothermally altered shear zone. The shear zone is as much as 7 or 8 ft wide and can be traced on the surface for more than 2,000 ft (Huntting, 1956, p. 350).

GEOLOGIC SETTING: The Bumping lake pluton is similar in age to the Snoqualmie batholith (Simmons and others, 1983, p. 20).

REFERENCES

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APPENDIX

Alternate site name	Primary site name	Site no.	County
"45"	Forty Five	551	Snohomish
45	Forty Five	551	Snohomish
Aces Up	Cleopatra group	602	King
Acme	F. H. and C.	212	Stevens
Aladdin	Sierra Zinc	286	Stevens
Alice	Summit	419	Okanogan
Allison	Okanogan Free Gold	399	Okanogan
Alta Vista	Blewett camp	557	Chelan
Anderson	Calhoun	274	Stevens
Andy Starr	Starr	440	Okanogan
Andy O.	Andy O'Neal	473	Okanogan
Angle Placer	Keller Ferry placer	301	Lincoln
Angle Placer	Keller Ferry placer	301	Lincoln
Anoka	North American	511	Whatcom
Antimony Belle	Antimony Belle	441	Okanogan
Apex Gold	Apex	595	King
Apollo	California	316	Ferry
Arizona	Horn Silver	422	Okanogan
Ark	Silver Queen	240	Stevens
Aurelia Crown	Crown Point	546	Chelan
Austin	Aichan Bee	142	Stevens
Avondale-Dome	Tenderfoot	151	Stevens
Bailey-Hanson	Red Top	114	Pend Oreille
Bailey	Red Top	114	Pend Oreille
Balfour Guthrie	Cle Elum River Iron	581	Kittitas
Banner	Chinto	187	Stevens
Baring	Anderson	600	King
Bead Lake	Comstock	108	Pend Oreille
Bead Lake	Kootenai Conquest	111	Pend Oreille
Bear Creek	Victor	609	Clallam
Bear Creek uranium	Herem-Moore	291	Spokane
Bear	Victor	609	Clallam
Bechtol Iron	Tyee	233	Stevens
Bella May	Metaline	129	Pend Oreille
Bella May	West Conctact	134	Pend Oreille
Bella May	Blue Bucket	121	Pend Oreille
Bellview	Bellevie	377	Okanogan
Ben Lomond	Rainy	546	Snohomish
Benvenue	Gold Reef	217	Stevens
Big Smoke Uranium	Big Smoke	270	Stevens
Big Joker	Messenger	356	Ferry
Bird	Red Bird	629	Yakima
Black Jack	Blewett camp	557	Chelan
Blaine Republic	Republic	335	Ferry
Blewett	Blewett Iron	562	Chelan
Blewett	Blewett camp	557	Chelan
Bliss	Galena Hill	160	Stevens
Blue Bucket	Bella May	120	Pend Oreille
Blue Bucket	West Contact	134	Pend Oreille
Blue Bell	Blewett camp	557	Chelan
Blue Bucket	Metaline	129	Pend Oreille
Blue Star	Eagle	243	Stevens
Blue Bell-Belcher	Belcher	353	Ferry
Blue Mountain	Jennie	322	Ferry
Blue Ridge	Sierra Zinc	286	Stevens
Bluebird	Loon Lake Copper	195	Stevens
Bonanza	Dolphin	570	Kittitas
Bondholders Syndicate	Apex	595	King
Bonita	New Light	510	Whatcom
Border Lord	Wolframite	484	Okanogan
Boulder Placer	Old Discovery Placer	502	Whatcom
Boundary Gold	Lone Jack	508	Whatcom
Boundary Group	Wolframite	484	Okanogan
Boundary Silver Lead	Lucile	281	Stevens
Brooks-Willis	Lone Jack	508	Whatcom
Brown Mule	Triple Trip	618	Mason
Bruce Creek	A and C	182	Stevens
Buckhorn	Magnetic	412	Okanogan
Bunker Hill	Lead Hill	127	Pend Oreille
Bunker Hill	Copper Belle	530	Snohomish
Burke	Boulder Creek	567	Kittitas
Burnt Mountain	Burnt Peak	624	Grays Harbor
Burtn Hill	Burnt Peak	624	Grays Harbor
Buzzell	Lucky Strike	128	Pend Oreille
Caaba	Kaaba	415	Okanogan
Calumet	Glacier Peak	554	Snohomish
Capital	Kulzer	235	Stevens
Chancellor	Farrar Placer	518	Whatcom
Charlotte Ann	Lytle-Lynch	634	Lewis
Chelan	Dick	565	Chelan
Chewelah Eagle	Eagle	243	Stevens
Chief Sunshine	Mohawk	436	Okanogan
Clark	Josephine	126	Pend Oreille
Cle Elum River, north deposit	Cle Elum River Iron	581	Kittitas
Cle Elum River, south deposit	Cle Elum River Iron	581	Kittitas
Cleopatra	Cleopatra group	602	King
Cleveland	Silverton mines	539	Snohomish
Clugston	Silver Trail	179	Stevens
Coe	Sweden	636	Skamania
Columbia	Wheeler	427	Okanogan
Columbia	Iroquois	279	Stevens
Colville Queen	Chloride Queen	154	Stevens
Condor	Condor-Hemlock	606	King
Conquest	Kootenai Conquest	111	Pend Oreille
Contention	Mountain View	253	Stevens
Copper Plate	Seattle-Cascade	603	King
Copper Independent	Silverton mines	539	Snohomish
Copper Key	Key East	309	Ferry
Coyote	Gray Eagle	202	Stevens
Crescent	Triune	408	Okanogan
Crowe	Mount Hawkins	568	Kittitas
Crown Power	Crown Point	546	Chelan
Crystal Butte camp	Crystal Butte	386	Okanogan
Culver	Blewett camp	557	Chelan
D. Aldrich	Lead King	112	Pend Oreille
Dahl Uranium	Dahl	295	Spokane
Dahl lease	Daybreak	294	Spokane
Daisy-Tempest	Daisy	242	Stevens
Damon	Damon and Pythias	596	King
Dannie	Danny	493	Whatcom

Appendix

Alternate site name	Primary site name	Site no.	County
Davenport-Troyer	Washington	117	Pend Oreille
Davenport	Negro Creek Iron	563	Chelan
Dead Man's Eddy	Negro Creek Bar placer	225	Stevens
Dead Medicine	Silver Trail	179	Stevens
Deep Lake	Farmer	278	Stevens
Delmonico	Jay Dee	246	Stevens
Dennis	Elma	623	Grays Harbor
Denver City	John Judge	396	Okanogan
Devils Mountain	Mount Vernon	525	Skagit
Dixie Queen	Antimony Queen	442	Okanogan
Doamond R	Diamond R.	109	Pend Oreille
Double Header	Little Chief	479	Okanogan
Dreadnaught-Emily	Hoage	125	Pend Oreille
Durrwachter	Mineral Creek	571	Kittitas
Eagle	Gray Eagle	390	Okanogan
Eagle	Ries	115	Pend Oreille
Earl	Margaret	639	Skamania
Easy Money	Magma	282	Stevens
Eclipse	Silverton mines	539	Snohomish
Egypt	Spokane Molybdenum	297	Lincoln
Eldorado	Magma	282	Stevens
Enterprise	Jay Dee	246	Stevens
Ethel Consolidated	Ethel	531	Snohomish
Eureka and Orient	Eureka	211	Stevens
Eureka	Blewett camp	557	Chelan
Eureka	New Light	510	Whatcom
Eureka	Quilp	334	Ferry
Eureka	Uncle Sam	181	Stevens
Evergreen	Blonden	505	Whatcom
Excelsior	Great Excelsior	507	Whatcom
Faith Hope and Charity	F. H. and C.	212	Stevens
Faithful Surprise	Morning Star	328	Ferry
Ferris R. Ford	Wolframite	484	Okanogan
Fidalgo	Stephens	527	Skagit
First of August	Boulder Creek	567	Kittitas
Fisher	Roy	633	Lewis
Flannigan	Iroquois	279	Stevens
Fraction	Blewett camp	557	Chelan
Frankie Boy Consolidated	Wheeler	427	Okanogan
Funkhauser	Johnson Creek	445	Okanogan
Gallgher Head	Mount Hawkins	568	Kittitas
Gem	Washington	117	Pend Oreille
Germania	Margaret	639	Skamania
Giant Silver	Red Cloud	201	Stevens
Gillette	Tenderfoot	151	Stevens
Gillispie	Roy	633	Lewis
Gladstone	Boulder Creek	567	Kittitas
Goat Mountain	Margaret	639	Skamania
Goat Mountain	Blonden	505	Whatcom
Gold King	Clarence Jordin	573	Kittitas
Gold Run	Gargett	503	Whatcom
Gold Crown	Spokane	463	Okanogan
Gold King	Lovitt	566	Chelan
Golden King	Lovitt	566	Chelan
Golden Anchor	Ries	115	Pend Oreille
Golden Eagle	Blewett camp	557	Chelan
Golden Reef	Gold Reed	217	Stevens
Golden Arrow	Ries	115	Pend Oreille
Golden Valley	Valley	343	Ferry
Golden Chord	Justice	544	Snohomish
Golden Crown	Gold Crown	388	Okanogan
Golden Hope	Sunday	220	Stevens
Golden Promise	Knob Hill	323	Ferry
Goody placer	Berrian Island placer	303	Benton
Gorien Zinc	Black Rock	275	Stevens
Gorien Zinc	Deep Creek	277	Stevens
Grand Summit	Palmer Summit	400	Okanogan
Grand Coulee	Little Chief	479	Okanogan
Grandview	John Judge	396	Okanogan
Grandview	Chancellor	500	Whatcom
Grant	Roosevelt	413	Okanogan
Guinn	Gwinn	364	Ferry
H & B	Aichan Bee	142	Stevens
Hall Creek	Gwinn	354	Ferry
Happy Thought	Great Republic	591	King
Hart Stone	Kelsey	438	Okanogan
Hartford	Krug	193	Stevens
Hatfield	Wolframite	484	Okanogan
Hazel	Lakeview	245	Stevens
Hemlock	Condor-Hemlock	606	King
Hi Cliff	Uncle Sam	181	Stevens
Hicks	Sultan King	540	Snohomish
High Noon	Highnoon	135	Pend Oreille
High Grade	Turk	205	Stevens
High Grade	Jay Dee	246	Stevens
Highland Light	Highland	393	Okanogan
Highnoon Uranium	Highnoon	135	Pend Oreille
Home	H-O-M-E	582	Kittitas
Homestake	Whistler	514	Whatcom
Hoodoo	Silverton mines	539	Snohomish
Hoover	Kootenai Conquest	111	Pend Oreille
Hope	Black Tail	315	Ferry
Hortense	Josephine	125	Pend Oreille
Howe Sound	Holden	555	Chelan
Hummingbird	Blewett camp	557	Chelan
Hunter	Holden-Campbell	394	Okanogan
Hunter	Jackson	280	Stevens
Idler	Tyee	233	Stevens
Illlinois	Chancellor	500	Whatcom
Imperator	Quilp	334	Ferry
Index Gold Mines, Inc.	Index Gold	543	Snohomish
Index-Independent	Lake Serene	536	Snohomish
Index	Lake Serene	536	Snohomish
Indian	Eureka	211	Stevens
Indiana	Chancellor	500	Whatcom
Industrial Tungsten	Germania Consolidated	138	Stevens
Irene	Holden	555	Chelan
Iron Mountain	Hamilton	523	Skagit
Iron Master (?)	Copper World Extension	449	Okanogan
Iron Mask	Copper World Extension	449	Okanogan
Iron Mountain	Gold Hill	516	Whatcom
Iron Creek	Shamrock	358	Ferry
Iron Tunnel	Thompson	238	Stevens
Ivanhoe Group	Ivanhoe	423	Okanogan
Jenny	Jennie	322	Ferry
Johnnie M	Littleton	611	Clallam
Jones	Kromona	535	Snohomish
Josephine	Sullivan	116	Pend Oreille

Alternate site name	Primary site name	Site No.	County
Josie	Hiawatha	392	Okanogan
June-Echo	Juno-Echo	192	Stevens
Jupiter	Last Chance	165	Stevens
Kaaba-Texas	Kaaba	415	Okanogan
Karnes	Elkhorn	616	Jefferson
Katie Belle	Clipper	605	King
Keeth	Germania Consolidated	138	Stevens
Kemp-Komar	Loon Lake Copper	195	Stevens
Kettle River	Galena Hill	160	Stevens
Key West	Loon Lake Copper	195	Stevens
King	Edna	145	Stevens
Koyotte	Gray Eagle	202	Stevens
Kroll	Blue Bucket	121	Pend Oreille
Kropolis	Lytle-Lynch	634	Lewis
L-D	Lovitt	566	Chelan
La Rica	Blewett camp	557	Chelan
Laeuna	Leuena	425	Okanogan
Lake View	Lakeview	245	Stevens
Lakeview	Prize	418	Okanogan
Lakeview	Roosevelt	259	Stevens
Lame Foot	Valley	343	Ferry
Launa	Leuena	425	Okanogan
Laurier	Talisman	313	Ferry
Lawrence	Lucky Knock	444	Okanogan
Leadville	John Judge	396	Okanogan
Lehmbecker lease	Dahl	295	Spokane
Lesley	Mazama	439	Okanogan
Liberty Lode	Mineral Creek	571	Kittitas
Liberty	Liberty Copper	147	Stevens
Lincoln	Great Excelsior	507	Whatcom
Little John	Una	594	King
Little Ulm	Una	594	King
London	Methow	397	Okanogan
Lone Star and Washington	Lone Star	311	Ferry
Lone Pine Claims	Fuller	465	Okanogan
Loon Lake	Tungsten Products	268	Stevens
Lovelace	Shi Shi Beach placer	613	Clallam
Lowley lease	Lowley	271	Stevens
Lucile Dreyfus	Morning Star	328	Ferry
Lucky Queen	Blewett camp	557	Chelan
Lucky Boy	Turk	205	Stevens
M. and C.	U.S. Copper Gold	261	Stevens
Maclean	Roosevelt	413	Okanogan
Magus	Forty Five	551	Snohomish
Mammoth Claim	Mammoth	426	Okanogan
Mammoth (?)	Four Metals	467	Okanogan
Manistee	Blewett camp	557	Chelan
Maple Leaf	Melrose	251	Stevens
Maryland	Bonanza Copper	185	Stevens
McDonald	Keystone	234	Stevens
McKean	Triple Trip	618	Mason
Mercer	Golden Fleece	577	Kittitas
Metaline	Bella May	120	Pend Oreille
Metaline	Blue Bucket	121	Pend Oreille
Metaline	West Contact	134	Pend Oreille
Mexico	Queen	141	Stevens
Midas	Glacier	517	Whatcom
Midas	Ries	115	Pend Oreille
Mineral Hill	Aichan Bee	142	Stevens
Mineral Hill	Morning Star	328	Ferry
Mineral Hill	Wheeler	427	Okanogan
Miners Ridge	Glacier Peak	554	Snohomish
Mint	Iowa	534	Snohomish
Molson	Poland China	402	Okanogan
Monica	New Light	510	Whatcom
Moonlite	Morning	252	Stevens
Morton	Roy	633	Lewis
Mother Lode	Crystal Butte	396	Okanogan
Mount Baker	Lone Jack	508	Whatcom
Mowhawk	Grandview	123	Pend Oreille
Mt. Logan	Guye	601	King
My Era	Myeerah	169	Stevens
Mystery	Monte Cristo	545	Snohomish
National Gold	Apex	595	King
Natural Aztec	Magnetic	412	Okanogan
Nellie S.	Chewelah Standard	186	Stevens
Neutral	Magnetic	412	Okanogan
New Discovery	Old Discovery Placer	502	Whatcom
New Deal	Antimony Queen	442	Okanogan
New London	Methow	397	Okanogan
Newland	Longshot	167	Stevens
North Star	Blewett camp	557	Chelan
North Star Uranium	Huffman	292	Spokane
Northern Cascade	Gold Hill	516	Whatcom
Northern Goold	Bodie	379	Okanogan
Northport	Deep Creek	277	Stevens
Northwest uranium	Sherwood	148	Stevens
Norton	Germania Consolidated	138	Stevens
O. K.	O.K.	371	Okanogan
O'Neal-Schenk	Gray Eagle	202	Stevens
O'Sullivan Placer	Sullivan Creek placer	105	Pend Oreille
OK Copper	O.K.	371	Okanogan
OK	O.K.	371	Okanogan
Olden	Blewett camp	557	Chelan
Omak	Johnson Creek	445	Okanogan
Ore Recoveries	Silverton mines	539	Snohomish
Orient Eureka	Eureka	211	Stevens
Oriental and Central	American Flag	446	Okanogan
Oro Cache	Ore Cache	173	Stevens
Overtop	Poland China	402	Okanogan
Owasco	Okanogan Free Gold	399	Okanogan
Owen	Lucile	281	Stevens
Pacific Mutual	Addison	308	Ferry
Pacific	Mount Vernon	525	Skagit
Painted Desert	C. I. Smith	296	Spokane
Paragon	Melrose	251	Stevens
Pateros	Sullivan	464	Okanogan
Patterson	Jennie	322	Ferry
Peacock	Nevada	429	Okanogan
Peacock	Littleton	611	Clallam
Peshastin	Blewett camp	557	Chelan
Peters lease	Sherwood	148	Stevens
Peterson	Gold Hill	516	Whatcom
Phil Sheridan	Sheridan	431	Okanogan
Phipps	Blewett camp	557	Chelan
Pioneer	Longshot	167	Stevens
Pitney Butte	Spokane Molybdenum	297	Lincoln
Pitney Butte	Spokane Molybdenum	297	Lincoln
Plata Fino	Plata Rica	257	Stevens
Pole Pick # 1	Blewett camp	557	Chelan
Post-Lambert	Lone Jack	508	Whatcom

Appendix

Alternate site name	Primary site name	Site no.	County
President	Great Excelsior	507	Whatcom
Pride of Index	Lake Serene	536	Snohomish
Pride	Monte Cristo	545	Snohomish
Prospect	Blewett camp	557	Chelan
Pyrargyrite	Ruby	430	Okanogan
Pythias	Damon and Pythias	596	King
Queen & Seal	Queen	141	Stevens
Queen Seal	Queen	141	Stevens
Quinault	Egge	620	Grays Harbor
R.J.	R. J.	174	Stevens
Rainy	Quartz Creek	599	King
Reardon Copper	Turk	205	Stevens
Red Mountain	Boundary Red Mountain	499	Whatcom
Redwood	Eagle	243	Stevens
Reedy	Antimony Queen	442	Okanogan
Rightside	Gray Eagle	202	Stevens
Rinchaw	Middleport	283	Stevens
RJ	R. J.	174	Stevens
Robena	Young America	288	Stevens
Rocky Creek	Burrus	276	Stevens
Rogers	Rex	559	Chelan
Roselle	Germania	140	Stevens
Royal Gold	Hubbard	164	Stevens
Royal	Big Chief	152	Stevens
Royal	Red Mountain	556	Chelan
Ruby Silver	Little Chief	479	Okanogan
Ruby Creek Placer	Scougale Placer	521	Whatcom
Ruby Bar	Old Discovery Placer	502	Whatcom
Ruby Lode claim	Last Chance	477	Okanogan
Rudebeck-Florence Rae	Florence Rae	532	Snohomish
Samson	Margaret	639	Skamania
Sandell	Blewett camp	557	Chelan
Sandusky	Gold Hill	516	Whatcom
Saturday Night-Sunday Morning	Plata Rica	257	Stevens
Scandinavian	Lead Queen	113	Pend Oreille
Scriber	Kromona	535	Snohomish
Seattle-St. Louis	Minnesota	512	Whatcom
Seven Devils	Wheeler	427	Okanogan
Shallenberger	Copper Butte	198	Stevens
Sil;ver Dollar	Seattle-Cascade	603	King
Silver Key	Big Chief	152	Stevens
Silver Basin	Queen	141	Stevens
Silver Mountain	Daisy	242	Stevens
Silver Seal	Queen	141	Stevens
Silver Tip	Starr	440	Okanogan
Silver Star	Silver Mountain	433	Okanogan
Silver Peak	Mohawk	436	Okanogan
Silver Queen	Queen	141	Stevens
Silver Seal	Antimony Queen	442	Okanogan
Silver Dollar and Copper Plate	Seattle-Cascade	603	King
Silverado	Z Canyon	118	Pend Oreille
Silvertip	Silver Tip	495	Whatcom
Skipper	Mount Hawkins	568	Kittitas
Slate Creek	New Light	510	Whatcom
Smith	C. I. Smith	296	Spokane
Smoky Bullion	A and C	182	Stevens
Snoqualmie Copper	Clipper	605	King
Southern Republic	Princess Maude	333	Ferry
Spokane	American Rand	407	Okanogan
Squillchuck	Lovitt	566	Chelan
St. Helens	Sweden	636	Skamania
St. Louis	St. Louis and Jackson	552	Snohomish
Star	Lone Star	468	Okanogan
Starbuck Placer	Cedar Creek placer	615	Clallam
Stein	Breckenridge Creek	515	Whatcom
Stone	Kelsey	438	Okanogan
Strawberry Creek placer	Crounse placer	488	Okanogan
Sultan Queen	Sultan King	540	Snohomish
Sumas Mountain	Breckenridge Creek	515	Whatcom
Summit	Guye	601	King
Summit	Silver Summit	178	Stevens
Sunday Morning Star	Sunday	220	Stevens
Sunny Peak	Mohawk	436	Okanogan
Sunshine	Hidden Treasure	455	Okanogan
Surprise	Uncle Sam	181	Stevens
T-Bone	Golden Fleece	577	Kittitas
Tacoma	Golden Arrow	513	Whatcom
Teddy Roosevelt	Roosevelt	413	Okanogan
Three Friends	Black and White	617	Mason
Three Buttes	Pogue Flat	471	Okanogan
Tip Top	Blewett camp	557	Chelan
Tom Hal	Friday	453	Okanogan
Triangle	Hidden Treasure	455	Okanogan
Trinidad	Central	475	Okanogan
Triple S	Seattle-Cascade	603	King
United Treasurer	United Treasure	262	Stevens
United Silver Copper	United Copper	206	Stevens
Velvet Lode	King Tut	110	Pend Oreille
Velvet	North American	511	Whatcom
Victory Black	Victor	609	Clallam
Vigilant	Kulzer	235	Stevens
Virginia Dreyfus	Morning Star	328	Ferry
Virginia	Silverton mines	539	Snohomish
W. J. Bryan	Bechton	149	Stevens
W. B. Stuart	John Day	248	Stevens
War Eagle	Nevada	429	Okanogan
Washington Black Rock	Black Rock	275	Stevens
Washington Nickel	Blewett Iron	562	Chelan
Washington Chrome	Danny	493	Whatcom
Washington Rock	Washington	117	Pend Oreille
Washington Chrome	Ribbon	494	Whatcom
Washington Consolidated	Wheeler	427	Okanogan
Weden Creek	Mackinaw	537	Snohomish
Welcome	Boston & New York	360	Ferry
Wells Creek	Great Excelsior	507	Whatcom
Wenatchee	Lovitt	566	Chelan
West Contact	Metaline	129	Pend Oreille
West Contact	Blue Bucket	121	Pend Oreille
West Contact	Bella May	120	Pend Oreille
Western Molybdenum	June-Echo	192	Stevens

Alternate site name	Primary site name	Site no.	County
Western States Copper	Quartz Creek	599	King
Wilbur Index	Lake Serene	536	Snohomish
Wilder	Blewett camp	557	Chelan
Willis E. Everett	Willis and Everett	526	Skagit
Winesap	Dick	565	Chelan
Wolframite Mountain	Wolframite	484	Okanogan
Woohaa	Bechtol	149	Stevens
Yo Tambien	New Leadville	172	Stevens