

APPENDIX 1.

NORANDA/KUROKO MASSIVE SULPHIDE Cu-Pb-Zn

By

Trygve Hoy,
British Columbia Geological Survey

From: Selected British Columbia Mineral Deposit Profiles, Volume 1

NORANDA/KUROKO MASSIVE SULPHIDE Cu-Pb-Zn

G06

by Trygve Höy
British Columbia Geological Survey

Høy, Trygve (1995): Noranda/Kuroko Massive Sulphide Cu-Pb-Zn, in Selected British Columbia Mineral Deposit Profiles, Volume 1 - Metallics and Coal, Lefebvre, D.V. and Höy, T, Editors, British Columbia Ministry of Energy of Employment and Investment, Open File 1995-20, pages 53-54.

IDENTIFICATION

SYNONYM: Polymetallic volcanogenic massive sulphide.

COMMODITIES (BYPRODUCTS): Cu, Pb, Zn, Ag, Au (Cd, S, Se, Sn, barite, gypsum).

EXAMPLES (British Columbia - Canada/International): Homestake (082M025), Lara (092B001), Lynx (092B129), Myra (092F072), Price (092F073), H-W (092F330), Ecstall (103h011), Tulsequah Chief (104K011), Big Bull (104K008), Kutcho Creek (104J060), Britannia (092G003); *Kidd Creek (Ontario, Canada), Buchans (Newfoundland, Canada), Bathurst-Newcastle district (New Brunswick, Canada), Horne-Quemont (Québec, Canada), Kuroko district (Japan), Mount Lyell (Australia), Rio Tinto (Spain), Shasta King (California, USA), Lockwood (Washington, USA).*

GEOLOGICAL CHARACTERISTICS

CAPSULE DESCRIPTION: One or more lenses of massive pyrite, sphalerite, galena and chalcopyrite commonly within felsic volcanic rocks in a calcalkaline bimodal arc succession. The lenses may be zoned, with a Cu-rich base and a Pb-Zn-rich top; low-grade stockwork zones commonly underlie lenses and barite or chert layers may overlie them.

TECTONIC SETTING: Island arc; typically in a local extensional setting or rift environment within, or perhaps behind, an oceanic or continental margin arc.

DEPOSITIONAL ENVIRONMENT / GEOLOGICAL SETTING: Marine volcanism; commonly during a period of more felsic volcanism in an andesite (or basalt) dominated succession; locally associated with fine-grained marine sediments; also associated with faults or prominent fractures.

AGE OF MINERALIZATION: Any age. In British Columbia typically Devonian; less commonly Permian-Mississippian, Late Triassic, Early (and Middle) Jurassic, and Cretaceous.

HOST/ASSOCIATED ROCK TYPES: Submarine volcanic arc rocks: rhyolite, dacite associated with andesite or basalt; less commonly, in mafic alkaline arc successions; associated epiclastic deposits and minor shale or sandstone; commonly in close proximity to felsic intrusive rocks. Ore horizon grades laterally

and vertically into thin chert or sediment layers called informally “exhalites”.

DEPOSIT FORM: Concordant massive to banded sulphide lens which is typically metres to tens of metres thick and tens to hundreds of metres in horizontal dimension; sometimes there is a peripheral apron of "clastic" massive sulphides; underlying crosscutting “stringer” zone of intense alteration and stockwork veining.

TEXTURE/STRUCTURE: Massive to well layered sulphides, typically zoned vertically and laterally; sulphides with a quartz, chert or barite gangue (more common near top of deposit); disseminated, stockwork and vein sulphides (footwall).

ORE MINERALOGY (Principal and subordinate): Upper massive zone: pyrite, sphalerite, galena, chalcopyrite, *pyrrhotite*, *tetrahedrite-tennantite*, *bornite*, *arsenopyrite*. Lower massive zone: *pyrite*, *chalcopyrite*, *sphalerite*, *pyrrhotite*, *magnetite*.

GANGUE MINERALOGY: Barite, chert, *gypsum*, *anhydrite* and *carbonate* near top of lens, carbonate quartz, chlorite and sericite near the base.

ALTERATION MINERALOGY: Footwall alteration pipes are commonly zoned from the core with quartz, sericite or chlorite to an outer zone of clay minerals, albite and carbonate (siderite or ankerite).

ORE CONTROLS: More felsic component of mafic to intermediate volcanic arc succession; near centre of felsic volcanism (marked by coarse pyroclastic breccias or felsic dome); extensional faults.

ASSOCIATED DEPOSIT TYPES: Stockwork Cu deposits; vein Cu, Pb, Zn, Ag, Au.

EXPLORATION GUIDES

GEOCHEMICAL SIGNATURE: Zn, Hg and Mg halos, K addition and Na and Ca depletion of footwall rocks; closer proximity to deposit - Cu, Ag, As, Pb; within deposit - Cu, Zn, Pb, Ba, As, Ag, Au, Se, Sn, Bi, As.

GEOPHYSICAL SIGNATURE: Sulphide lenses usually show either an electromagnetic or induced polarization signature depending on the style of mineralization and presence of conductive sulphides. In recent years borehole electromagnetic methods have proven successful.

OTHER EXPLORATION GUIDES: Explosive felsic volcanics, volcanic centres, extensional faults, exhalite (chert) horizons, pyritic horizons.

ECONOMIC FACTORS

GRADE AND TONNAGE: Average deposit size is 1.5 Mt containing 1.3% Cu, 1.9 % Pb, 2.0 % Zn, 0.16 g/t Au and 13 g/T Ag (Cox and Singer, 1986). British Columbia deposits range from less than 1 to 2 Mt to more than 10 Mt. The largest are the H-W (10.1 Mt with 2.0 % Cu, 3.5 % Zn, 0.3 % Pb, 30.4 g/t Ag and 2.1 g/t Au) and Kutcho (combined tonnage of 17 Mt, 1.6 % Cu, 2.3 % Zn, 0.06 % Pb, 29 g/t Ag

and 0.3 g/t Au).

IMPORTANCE: Noranda/Kuroko massive sulphide deposits are major producers of Cu, Zn, Ag, Au and Pb in Canada. Their high grade and commonly high precious metal content continue to make them attractive exploration targets.

REFERENCES

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February 5, 1995

[\[G01\]](#) [\[G04\]](#) [\[G05\]](#) [\[G06\]](#) [\[G07\]](#) [\[Published Profile Index\]](#)
[\[Deposit Profiles\]](#)

Last Updated

APPENDIX 2.

Certificate of Assays and Analyses

File no. AK 2003-158
Eco Tech Laboratory Ltd.



ASSAYING
GEOCHEMISTRY
ANALYTICAL CHEMISTRY
ENVIRONMENTAL TESTING

10041 Dallas Drive, Kamloops, BC V2C 6T4
Phone (250) 573-5700 Fax (250) 573-4557
E-mail: info@ecotechlab.com
www.ecotechlab.com

CERTIFICATE OF ASSAY AK 2003-158

KAMLOOPS GEOLOGICAL SERVICES LTD.
910 HEATHERTON COURT
KAMLOOPS, B.C.
V1S 1P5

5-Jun-03

ATTENTION: RON WELLS

No. of samples received: 3
Sample type: Rock
Project #:EH
Shipment #:01
Samples submitted by: Ron Wells

ET #.	Tag #	Au (g/t)	Au (oz/t)	Ag (g/t)	Ag (oz/t)	Cu (%)	Pb (%)	Zn (%)
1	EH01	38.4	1.120	66.4	1.94	0.82	6.48	2.06
2	EH02	8.36	0.244	64.8	1.89	0.53	7.65	2.94
3	EH03	0.94	0.027	72.8	2.12	0.43	11.6	2.70

QC/DATA:

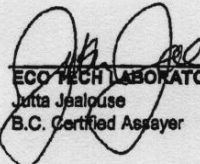
Resplit:

R/S 1	EH01	38.6	1.126	66.8	1.95	0.83	6.45	2.04
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Standard:

PM168		2.08	0.061					
Mp-1A				68.9	2.01	1.44	4.30	19.01
CU106				135.0	3.94	1.43		

XLS/03
FAX: 372-1012


ECO TECH LABORATORY LTD.
Jutta Jealous
B.C. Certified Assayer

6-Jun-03

ECO TECH LABORATORY LTD.
10041 Dallas Drive
KAMLOOPS, B.C.
V2C 8T4

Phone: 250-573-5700
Fax : 250-573-4557

ICP CERTIFICATE OF ANALYSIS AK 2003-0158

KAMLOOPS GEOLOGICAL SERVICES LTD.
940 HEATHERTON COURT
KAMLOOPS, B.C.
VIS 1P6

ATTENTION: RON WELLS
No. of samples received: 3
Sample type: Rock
Project #/E#:
Shipment #/Q#:
Samples submitted by: Ron Wells

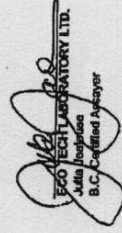
Values in ppm unless otherwise reported

El.#	Tag #	Ag	Al	As	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	La	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Sn	Sr	Ti	U	V	W	Y	Zn
1	EH01	>30	0.06	>10000	20	<5	0.06	<1	16	86	8160	>10	40	0.4	<1	164	<0.01	32	110	>10000	1190	<20	58	<0.01	20	20	<10	<1	>100000
2	EH02	>30	0.11	>10000	<5	<5	0.08	<1	13	84	6170	>10	20	0.29	<1	3	<0.01	14	210	>10000	235	<20	25	0.01	20	14	<10	4	>10000
3	EH03	>30	0.06	1660	<5	<5	0.04	55	9	88	4210	>10	20	0.23	<1	<1	<0.01	5	<10	>10000	1210	<20	3	<0.01	<10	4	<1	>10000	

QC/DATA:

Standard:
GE003

1.8 1.6 60 145 <5 1.46 <1 19 62 86 4.83 <10 0.84 547 2 0.02 31 610 982 85 <20 54 0.12 <10 82 <10 9 70


ECO TECH LABORATORY LTD.
Julia Hodgson
B.C. Certified Assayer

APPENDIX 3.

Minfile Data

Samatosum Mine – 082M 244

K-7 – 082M 277

Twin 3 – 082M 276

082M 244

Name	SAMATOSUM	Mining Division	Kamloops
Status	Past Producer	NTS	082M04W ^{NAD 27}
Latitude Longitude	51 08 40 N 119 48 30 W	UTM	11 5669419 303562
Commodities	Silver Gold Zinc Lead Copper Antimony	Deposit Types	G06 : Noranda/Kuroko massive sulphide Cu-Pb-Zn. I05 : Polymetallic veins Ag-Pb-Zn±Au.
Tectonic Belt	Omineca	Terranes	Kootenay.

**Capsule
Geology**

The Samatosum deposit is located in structurally complex metasedimentary and metavolcanic rocks of the Paleozoic (Lower Cambrian and older(?) to Mississippian) Eagle Bay Assemblage (Formation). The assemblage has a complex deformational history involving multiple stages of thrust faulting and folding during the Jura-Cretaceous which produced strongly foliated and overturned rocks trending northwest and dipping northeast. These Paleozoic rocks are intruded by mid-Cretaceous granodiorite and quartz monzonite (such as the Baldy batholith about 30 kilometres to the north of the deposit), and Early Tertiary quartz-feldspar porphyry, basalt and lamprophyre dykes. These are all locally overlain by Miocene plateau lavas, now represented in the area by occasional erosional remnants.

The deposit area can be divided into several northwest trending, northeast dipping units. From northeast to southwest these are: 1) the Tshinikan Limestone which forms steep, massive landforms dominating the area; 2) mixed sediments consisting of interbedded cherts and argillite; 3) mafic volcanics; 4) the "Mine Series" of rocks which consist of a zone of more mixed sediments and mafic volcanics, with minor felsic to intermediate volcanics, which form the host stratigraphy for both the Samatosum and Discovery or Rea Gold zone (082M 191) deposits; and finally 5) a thick unit of argillites and wackes and a package of felsic rocks which lie in the structural footwall of the Mine Series.

The generalized ore stratigraphy reveals the apparent stratabound nature of the orebody within the hanging wall portion of the heavily strained and highly altered Mine Series rocks. The orebody lies near the interface of altered mixed sediments and predominantly altered argillites/wackes. Original terms such as "sericitic tuffs" for the mixed sediments, and "muddy tuffs" for the altered argillite/wackes are now largely out of favour as it is really alteration products that one sees rather than original lithologies (Friesen, 1990).

The mixed sedimentary unit (SERT) is characterized by a strong yellow to white sericitic content, interbedded with up to 30 per cent cherty/quartz lenses. The altered argillites (MUT) are characterized by light silvery grey muscovite and sericite. They may also often locally contain up to 60 per cent very fine-grained pyrite and host low grade values of base and precious metals. Both units represent altered lithologies; their protoliths were

probably variations of an original argillite/wacke/tuff sequence.

Both the SERT and MUT lie structurally below a thick unit of chloritic mafic volcanics, which in the deposit area are most commonly tuffaceous to lapilli in texture; but with an occasional pillowed component.

Both the Samatosum and original Discovery zone or Rea Gold zone (082M 191) 500 metres to the southwest are contained in a very similar stratigraphy: within a package of mixed sediments, argillites and their sericitic equivalents of SERT and MUT, and both are structurally overlain by mafic pyroclastics. There is much speculation regarding their structural and genetic associations. There is a strong suggestion of repetition by folding and/or faulting (which supports a long favoured theory of a thrust fault zone located between the deposits). Alternatively, but currently discounted, the two deposits may exist within similar stratigraphic cycles overprinted by a crosscutting alteration package (Friesen, 1990).

The Samatosum deposit is an early, highly deformed quartz vein system containing massive to disseminated components of tetrahedrite, sphalerite, galena and chalcopryrite hosted in structurally complex wallrocks. The upper portion of the orebody is tabular, averages about 5 metres in thickness, has a northwesterly strike length of about 500 metres and dips at an average of 30 degrees northeasterly for 100-150 metres. In the northern half of the deposit the tabular nature of the orebody gives way down dip to an apparent synformal structure, which is currently interpreted to be caused by slicing and imbrication by local overturning and thrust faulting. The northern half of the orebody has a northwesterly plunge of about 20 degrees, whereas the southern half displays a very slight plunge to the southeast (phase 2 folding?).

Tetrahedrite is the most valuable mineral in the ore zone, followed by sphalerite, chalcopryrite and galena. The tetrahedrite contains 36 per cent copper, 25 per cent sulphur, 23 per cent antimony, 5 per cent zinc, 4 per cent silver, 3 per cent arsenic and 2 per cent iron. Tetrahedrite appears to be the most uniformly distributed, while the sphalerite, galena and chalcopryrite often appear more erratically distributed in the northern end of the orebody as semimassive to massive lenses within the quartz vein host; perhaps indicating more than one mineralizing episode. It is important to note that whereas chalcopryrite, sphalerite and galena can be present in minor amounts in virtually any quartz vein occurrence throughout the property; tetrahedrite has so far been rarely found outside the immediate ore zone (Friesen, 1990).

The principal ore-related gangue minerals are quartz (30 per cent), dolomite (19 per cent) and pyrite (11 per cent).

Sericite and muscovite are by far the dominant alteration minerals in the Mine Series rocks and are thought to be a deformational product of the original ore-related alteration. All units from the lower portion of the mafics through the entire Mine Series stratigraphy are sericitic. Muscovite/sericite alteration fronts producing MUT commonly crosscut bedding and foliation, often leaving behind unaltered argillite/wacke remnants.

Other significant alteration in the deposit area includes: silicification or silica flooding of portions of wallrock surrounding the orebody (eg. many original "quartzites" and black cherts are now believed to be silicified MUT and argillites); dolomite, much more intense than previously believed, the bulk of which is probably a late-stage fault-related overprint; pyritization, as a replacement feature of lapilli in the mafic pyroclastics; and the green mica fuchsite, so far almost entirely restricted to a several metre thick

occurrence associated with the argillites/MUT along the immediate sheared footwall portion of the ore zone.

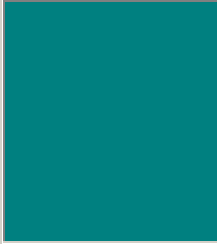
Underground mineable reserves at Samatosum are 80,278 tonnes grading 1.2 per cent copper, 2.9 per cent zinc, 1.7 per cent lead, 1021.5 grams per tonne silver and 1.7 grams per tonne gold (Northern Miner - August 5, 1991). Both open pit and underground reserves are expected to be exhausted by October 1992. The underground reserve is the strike extension of the open pit deposit and extends approximately 198 metres beyond the pit wall before it is structurally terminated.

The Samatosum deposit was discovered in 1986. During 1988 a feasibility study determined the deposit could be mined economically by open pit methods, despite an unusually high 25:1 waste-to-ore stripping ratio. Mine stripping began in March 1989; ore production and milling began in May 1989; shipments began in June 1989.

Mining ceased in July 1992 and milling ceased in September 1992.

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EMPR MINING 1988
EMPR OF 1992-1; 1998-9; 1998-10; 1999-14; 2000-31
EMPR PF (Friesen, R.G. (1990): Geology of the Samatosum Deposit - Field Trip B2, GAC-MAC Joint Annual Meeting, Vancouver 1990, Mineral Deposits of the Canadian Cordillera; Preliminary Engineering Geology, Hydrogeology and Rock Mechanics Assessments for the Proposed Underground Mine, Samatosum Project - May 1991; Memorandum to Geological Survey Branch, P. Schiarizza - June 14, 1990; Press Release, Rea Gold Corporation, Feb.21, 1991; M.E.G Luncheon Talk notes, Jan.13, 1988)
GSC MAP 48-1963; 5320G
GSC OF 637
CMH 1987-88, pp. 272,330
GCNL #4,#57,#131,#135,#153,#172,#177,#210, 1986; #8,#76,#96,#108, #111,#112,#116,#117,#118,*#133, 1987; #33,#70,#78,#207, 1988; #1(Jan.3),#56(Mar.21),#123(June 27),#205(Oct.25), 1989; #19(Jan.26),#52(Mar.14),#90(May 9),#179(Sept.17),#186(Sept.26), 1990; #38(Feb.22),#52(Mar.14),#68(Apr.9),#127(Jul.3),#147(Jul.31), #200(Oct.17), 1991
IPDM Feb. 1986
N MINER Dec.30, 1985; Jan.13, March 31, July 14,21, Aug.4, 1986; Jan. 26, May 11, 1987; March 7, May 2,23, Oct.24, 1988; June 5,12, Nov.6,13, 1989; Feb.6, Mar.19, Sept.10, 1990; Apr.1,15, May 6, Jul.15, Aug.5, Oct.21, 1991
N MINER MAG *June 1989, pp. 15-18
NAGMIN Jan.15, March 30, July 6, Nov.9, 1984
NW PROSP Jan. 1987
V STOCKWATCH Nov.28, 1986; May 22,28, July 13, Dec.17, 1987
WWW http://www.infomine.com/index/properties/SAMATOSUM_MINE.html
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Database last posted: April 01, 2004

Production Report

MINFILE Number: 082M 244

Name: SAMATOSUM

Status: Past Producer

Production Year	Tonnes Mined	Tonnes Milled	Commodity	Grams Recovered	Kilograms Recovered
1992	71,950	129,374	Silver Gold Copper Lead Zinc	66,346,000 100,977	594,597 571,995 1,624,135
1991	78,229	177,615	Silver Gold Copper Lead Zinc	142,704,089 166,160	1,158,895 1,167,141 2,515,683
1990	174,738	169,152	Silver Gold Copper Lead Zinc	166,154,000 279,907	1,462,819 2,050,850 3,220,028
1989	28,212	78,732	Silver Gold Copper Lead Antimony Zinc	54,152,687 92,074	461,705 1,279,141 97,620 2,178,417

Summary Totals

		Metric	Imperial
	Mined:	353,129 tonnes	389,148 tons
	Milled:	554,873 tonnes	611,470 tons

Recovery:	Silver :	429,356,776	grams	13,804,139	ounces
	Gold :	639,118	grams	20,548	ounces
	Copper :	3,678,016	kilograms	8,108,554	pounds
	Lead :	5,069,127	kilograms	11,175,397	pounds
	Antimony :	97,620	kilograms	215,213	pounds
	Zinc :	9,538,263	kilograms	21,028,055	pounds

Database last posted: April 01, 2004

Inventory Report *(Reserves/Resources not compliant with National Instrument 43-101 unless specified in comments)*

MINFILE Number: 082M 277

Name: K-7

Status: Developed Prospect

Ore Zone / Year	Tonnage / Category	Commodity	Grade	Reference / Comments
LENS 1991	375 kt Unclassified	Silver Gold Copper Lead Zinc	55.00 g/t 4.00 g/t 0.500 % 4.800 % 6.100 %	Assessment Report 22389, page 1. This inventory is based on several drill holes.

Database last posted: April 30, 2004

Run Date: 2004/Apr/27

MINFILE / www

Run Time: 12:17 PM

MASTER REPORT
GEOLOGICAL SURVEY BRANCH
MINISTRY OF ENERGY & MINES

MINFILE Number: **082M 277**

National Mineral Inventory:

Name(s): **K-7, KAMAD 7, K7**

Status: Developed Prospect

Mining Division: Kamloops

Regions: British Columbia

NTS Map: 082M04W (NAD 83)

UTM Zone: 11 (NAD 83)

Latitude: 51 08 26 N

Northing: 5669218

Longitude: 119 48 47 W

Easting: 303223

Elevation: 1520 Metres

Location Accuracy: Within 500M

Comments: The K-7 zone on the northern slopes of Samatosum Mountain, 25 kilometres east of Barriere and 60 kilometres north of Kamloops (Assessment Report 18822, Map No. 2).

Commodities: Silver Gold Zinc Lead Copper

MINERALS

Significant: Sphalerite Galena Chalcopyrite

Mineralization Age: Unknown

DEPOSIT

Character: Stratabound Massive

Classification: Volcanogenic

Type: [Noranda/Kuroko massive sulphide Cu-Pb-Zn.] [Polymetallic veins Ag-Pb-Zn±Au.]

Shape: Unknown

HOST ROCK

Dominant Host Rock: Metasedimentary

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Paleozoic	Undefined Group	Eagle Bay	

Lithology: Altered Cherty Sediment/Sedimentary
Altered Argillite
Altered Wacke

GEOLOGICAL SETTING

Tectonic Belt: Omineca

Physiographic Area: Shuswap Highland

Terrane: Kootenay

Metamorphic Type: Regional

Relationship:

Grade: Greenschist

INVENTORY

(Reserves/Resources not compliant with National Instrument 43-101 unless specified in comments)

Ore Zone: DRILLHOLE

Report On: N

Category: Assay/analysis

Year: 1888

Sample Type: Drill Core

Commodity	Grade
Silver	77.80 g/t

Gold	3.56 g/t
Copper	0.560 %
Lead	6.850 %
Zinc	8.400 %

Comments: From an 11.6-metre drill interval.

Reference: Assessment Report 18822, page 17.

Ore Zone: LENS

Report On: Y

Category: Unclassified

Year: 1991

Quantity: 375 kt

Commodity	Grade
Silver	55.00 g/t
Gold	4.00 g/t
Copper	0.500 %
Lead	4.800 %
Zinc	6.100 %

Comments: This inventory is based on several drill holes.

Reference: Assessment Report 22389, page 1.

Capsule Geology and Bibliography

Printable Report

Capsule Geology

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The area can be divided into several northwest trending, northeast dipping units. From northeast to southwest these are: 1) the Tshinikan Limestone which forms steep, massive landforms dominating the area; 2) mixed sediments consisting of interbedded cherts and argillite; 3) mafic volcanics; 4) the "Mine Series" of rocks which consist of a zone of more mixed sediments and mafic volcanics, with minor felsic to intermediate volcanics, which form the host stratigraphy for both the Samatosum and Discovery or Rea Gold zone (082M 191) deposits; and finally 5) a thick unit of argillites and wackes and a package of felsic rocks which lie in the structural footwall of the Mine Series. See the Samatosum past producer (082M 244) for further details of area geology.

There is no record of work in the K-7 area prior to the discovery of the Rea Gold zone (082M 191) to the north. The Rea find resulted in geophysics and minor diamond drilling to be carried out in 1983 on the Kamad 7 claim. Further geophysics followed in 1984. Five holes totalling 369.7 metres were drilled on the Kamad 7 claim in 1985 for a company called "259146 B.C. Limited". Esso Minerals Canada optioned the property from Kamad Silver Company in 1985. In 1986, Esso carried out basic linecutting, geochemical sampling, HLEM - EM geophysical surveying and 1814 metres of drilling in 11 diamond drill holes. In 1988, Esso drilled 17 holes on the Kamad 7 claim and 7 holes intersected massive sulphide mineralization within the "Rea zone" and called it the K-7 lens.

One diamond drill hole (K88033) intersected intensely dolomitized mafic volcanics from 2.6 metres to 32.1 metres which forms the footwall of the Rea zone. Massive, polymetallic sulphides (32.1 to 34.0 metres) were found in sharp contact with the volcanics. The sulphides were medium-grained and crudely banded on a centimetre scale. Bands of massive chalcopyrite and sphalerite/galena were also observed as were "splashes" of galena and chalcopyrite up to 2 centimetres across. A weighted average of 4 assays yielded 1.82 metres of 1.26 per cent copper, 6.51 per cent lead, 6.87 per cent zinc, 53.51 grams per tonne silver, 7.54 grams per tonne gold and 5.30 per cent arsenic (Assessment Report 18822, page 9). Another drill hole (K88040) intersected semi-massive sulphide from 108.8 to 110.6 metres and banded, medium-grained, polymetallic massive sulphide from 110.6 to 120.0 metres. Assays from an 11.60 metre section yielded 0.56 per cent copper, 6.85 per cent lead, 8.40 per cent zinc, 77.8 grams per tonne silver, 3.56 grams per tonne gold and 2.65 per cent arsenic (Assessment Report 18822, page 17). A rough estimate of the K-7 zone surface area as shown on Map 2 (Assessment Report 18822) is 100 by 200 metres.

A resource for the K-7 zone, attributed to Kamad Silver Company, was reported to be 375,000 tonnes grading 4 grams per tonne gold, 55 grams per tonne silver, 0.5 per cent copper, 4.8 per cent lead and 6.1 per cent zinc (Assessment Report 22389, page 1).

No work occurred on the property after the 1988 work was completed.

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Database last posted: April 01, 2004

082M 276

Name	TWIN 3	Mining Division	Kamloops
Status	Prospect	NTS	082M04W ^{NAD 27}
Latitude Longitude	51 08 05 N 119 47 47 W	UTM	11 5668300 304350
Commodities	Gold Silver Zinc Lead Copper	Deposit Types	G06 : Noranda/Kuroko massive sulphide Cu-Pb-Zn.
Tectonic Belt	Omineca	Terranes	Kootenay.

Capsule Geology	<p>The Twin 3 occurrence is underlain by Devonian or older rocks of the Eagle Bay Formation consisting of calcareous chlorite-sericite-quartz schist within unit EBG (Map 56). The schists were derived largely from mafic to intermediate volcanic and volcanoclastic rocks. The metavolcanics contain several thin layers of limestone and dolomite, as well as remnant pillow basalt structures. The Tshinakin limestone member lies to the northeast of the property.</p> <p>In this area, the Rea zone is a continuous, well-defined stratigraphic horizon which hosts several massive sulphide lenses (such as the Rea Gold (092M 191). A second mineralized stratigraphic horizon parallels the Rea zone to the northeast and is referred to as the Silver zone. This zone hosts the Samatsum deposit (082M 244).</p> <p>Mineral exploration on the Twin property started in the 1930s. The Twin Mountain occurrence (082M 020) is located about 1.5 kilometres to the southeast and is a silver-lead-zinc bearing quartz-dolomite vein discovered in 1936 and explored sporadically by several operators. The Twin claims were staked in 1980. In 1983, Lincoln Resources Inc. entered into an option agreement with Apex Energy Corp to work on the Twin property. A grid was established and a soil survey carried out. Falcobridge Copper acquired the property in 1984 and conducted mapping, rock sampling, Max-Min II and VLF-EM geophysical surveys. Two diamond drill holes were completed also. Lincoln Resources received the property back in 1985 and conducted a limited fill-in soil survey. In 1986, Lincoln extended the grid and conducted further rock and soil sampling and mapping. Genie EM and trenching were also conducted. In late 1986, Esso Minerals Canada optioned the property from Lincoln Resources and Apex Energy. Early in 1987, Esso Minerals conducted a VLF EM geophysical survey over geochemical target areas. This was followed by 2269 metres of diamond drilling which resulted in the discovery of a small gold-rich massive sulphide/barite lens on the Twin 3 claim. During the summer of 1988, Esso Minerals drilled 1278 metres in 8 holes and did additional geophysics and geological mapping. Homestake Canada acquired Esso's option in 1989 and did a limited amount of trenching on the Twin Mountain zone. In 1990, Homestake completed 4017 metres of diamond drilling in nine holes, and 2235 metres of down-hole Pulse EM geophysical surveying in six of the holes. Homestake conducted a further 4069 metres of diamond drilling in 6 holes in 1991. During this program the Silver zone, was</p>
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intersected by 4 holes on the Twin property.

In 1987, Apex reported a 1.83-metre drill interval (Hole Twin 3 on the Rea Zone) that assayed 30.86 grams per tonne gold, 250.29 grams per tonne silver, 0.77 per cent zinc, 2.1 per cent lead and 0.24 per cent copper (George Cross Newsletter, No. 237, December 10, 1987). A 4.1-metre drill interval from the Twin property was reported to have yielded 12.8 grams per tonne gold, 108 grams per tonne silver, 0.2 per cent copper, 1.5 per cent lead and 0.6 per cent zinc (Assessment Report 22389, page 1). It may be that the former assay was a sub-interval of the latter.

The Silver zone consists of 50 metres of interbedded graphitic argillite and siltstone, sericitic chert, and pyritic sediments. The pyritic sediments range from fine siltstone to coarse chert pebble conglomerates. Chert pebble conglomerate with interbedded wacke contain 30 to 40 per cent pyrite occurring both as very fine-grained matrix and recrystallized granoblasts. Traces of blebby sphalerite, galena and chalcopyrite also occur. This zone remains open along strike and down dip.

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