1998 SUMMARY REPORT

ON THE

SILVERTIP PROPERTY,

BRITISH COLUMBIA

Geochemistry, Geophysics, Geology,
and Geotechnical Drilling

BULL 1, 2, 4Fr, 5, 7, 10, 11Fr, 15Fr, 16-23,
24Fr, 25Fr, 26Fr, 27Fr, 28Fr
BETH 1, RENEE 1, TOOTS 4, STAR 2Fr
CLIMAX 1, 2, 11, 12
WAY 8, 9, 11, 12

Liard Mining Division

59° 55' N, 130° 20' W
NTS 104-O/16W

Volume 1

Text
Appendix A, B, C

Owner: Silvertip Mining Corporation
Operator: Silvertip Mining Corporation,
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Submitted January 8, 1999 Chris Rees, P.Geo.

SUMMARY

Silvertip is a high grade, silver-lead-zinc, manto-type massive sulphide deposit, situated in the Cassiar Mountains just south of the British Columbia-Yukon border. It is owned and operated by Silvertip Mining Corporation, a subsidiary of Imperial Metals Corporation. Mineralization is hosted by middle Paleozoic carbonates, and consists of stratigraphically and structurally controlled bodies of pyrite-sphalerite-galena-sulphosalt massive sulphide, formed by carbonate replacement. The estimated geological resource (to January 1998) is 2.57 million tonnes grading 325 g/t silver, 6.4% lead, 8.8% zinc and 0.63 g/t gold.

The company is planning to develop a combined open pit and underground mining operation, and in the summer of 1998 entered the Environmental Assessment review process with the provincial government for project certification.

That part of the 1998 program documented in this report was carried out at a cost of $438,390. It was primarily concerned with pre-feasibility development work, with some geophysical exploration and geological mapping. The main focus was the viability of on-site disposal of open pit and underground waste rock, with respect to environmental impact avoidance. This involved the assessment of the acid-generating and metal-leachate potential of the projected open pit waste; geotechnical drilling of the overburden and bedrock on the proposed disposal site; and the characterization of the main drainages in terms of hydrology, water quality and fish habitat.

A magnetotelluric (CSAMT) geophysical survey, covering 3.8 line-kilometres over 5 lines, was aimed at the potential for structurally-controlled mineralization deeper in the host stratigraphy, an aspect that has not been effectively investigated by past exploration drilling. The result was the detection of several strongly conductive anomalies at various depths, which are provisionally interpreted as massive sulphide in fault-controlled feeders and deeper-level stratabound mantos.

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1.0 INTRODUCTION

1.1 LOCATION AND ACCESS

The Silvertip property is situated in northern British Columbia, just south of the Yukon border, approximately 90 km west-southwest of Watson Lake, Yukon (Fig. 1.1). The property is accessible via a 25-km gravel road starting from Mile 701 (kilometre 1128) of the Alaska Highway, about 15 km east of Rancheria, Yukon.

1.2 PHYSIOGRAPHY

The property lies on the northeastern flank of the Cassiar Mountains. The terrain is moderately mountainous, with generally rounded peaks and ridges separated by U-shaped valleys. The highest peaks are about 1950 metres; topographic relief is typically about 300 to 500 metres. Roughly 35% of the property is above tree line, which is at approximately 1450 metres.

1.3 LAND TENURE

The Silvertip property is owned and operated by Silvertip Mining Corporation (SMC), a wholly owned subsidiary of Imperial Metals Corporation of Vancouver. The property currently comprises 889 units in 63 claims and 26 fractional claims, covering an area of approximately 200 square kilometres (Fig. 1.1). The claims and their current status, pending acceptance of this report, are listed in Table 1.1.

1.4 STATUS OF PROJECT

Silvertip (formerly Midway) is an epigenetic massive sulphide deposit, formed by carbonate replacement in limestone. A blind deposit, it is characterized by high grade silver-lead-zinc mineralization. The project is at the pre-feasibility stage, accompanied by advanced exploration.

Following the 1997 exploration program (reported in Silvertip Mining Corporation, 1998) and a comprehensive re-interpretation of data from earlier work, SMC calculated a total geological resource of 2.57 million tonnes grading 325 grams per tonne silver, 6.4% lead, 8.8% zinc, and 0.63 grams per tonne gold (Appendix E in Silvertip Mining Corporation, 1998).

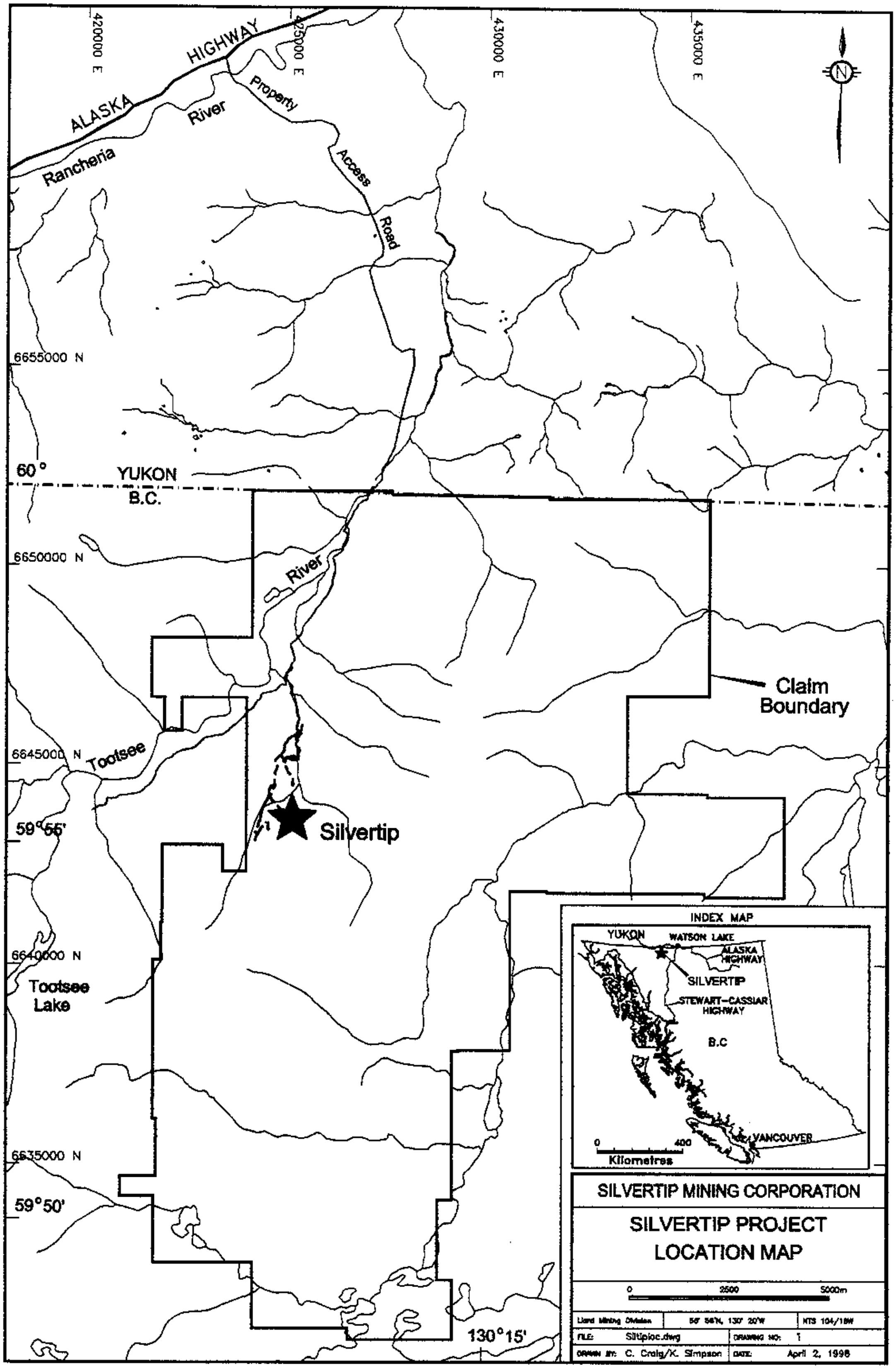

Fig. 1.1: Property location map

Table 1.1: List of claims and status

TITLE NAME	TITLE #	UNITS	RECORD DATE	EXPIRY DATE
BETH 1	222004	12	1980/08/08	2008/08/08
BETH 2	222005	20	1980/08/08	2008/08/08
BETH 3	222006	20	1980/08/08	2008/08/08
BETH 4	222007	20	1980/08/08	2008/08/08
BULL 7	222187	18	1982/08/24	2008/08/24
BULL 8	222244	15	1983/01/18	2008/01/18
BULL 1	222049	12	1980/11/12	2000/11/12
BULL 2	222050	20	1980/11/12	2000/11/12
BULL 4 FR	222064	1	1980/11/26	2000/11/26
BULL 5	222110	12	1981/07/21	2008/07/21
BULL 10	222245	2	1983/01/18	2008/01/18
BULL 11 FR	222246	1	1983/01/18	2008/01/18
BULL 12 FR	222247	1	1983/01/18	2008/01/18
BULL 15 FR	222272	1	1983/06/14	2008/06/14
BULL 16	222273	2	1983/06/14	2008/06/14
BULL 17	222274	2	1983/06/14	2008/06/14
BULL 18	222275	2	1983/06/14	2008/06/14
BULL 19	222276	2	1983/06/14	2008/06/14
BULL 20	222277	2	1983/06/14	2008/06/14
BULL 21	222278	2	1983/06/14	2008/06/14
BULL 22	222279	2	1983/06/14	2008/06/14
BULL 23	222280	2	1983/06/14	2008/06/14
BULL 24 FR	222281	1	1983/06/14	2008/06/14
BULL 25 FR	222282	1	1983/06/14	2008/06/14
BULL 26 FR	222283	1	1983/06/14	2008/06/14
BULL 27 FR	222333	1	1983/09/19	2008/09/19
BULL 28 FR	306683	1	1986/10/14	2000/10/14
CLIMAX 1	222055	8	1980/11/26	2000/11/26
CLIMAX 2	222052	20	1980/11/12	2000/11/12
CLIMAX 3	222053	20	1980/11/12	2000/11/12
CLIMAX 4	222056	20	1980/11/26	2000/11/26
CLIMAX 5	222057	20	1980/11/26	2000/11/26
CLIMAX 6	222058	15	1980/11/26	2000/11/26
CLIMAX 7	222059	15	1980/11/26	2000/11/26
CLIMAX 8	222060	15	1980/11/26	2000/11/26
CLIMAX 9	222061	15	1980/11/26	2000/11/26
CLIMAX 10	222062	20	1980/11/26	2000/11/26
CLIMAX 11	222063	6	1980/11/26	2000/11/26
CLIMAX 12	222183	12	1982/08/24	2008/08/24
CLIMAX 13	222233	1	1982/10/20	2000/10/20
CLIMAX 14 FR	222234	1	1982/10/20	2000/10/20
CLIMAX 15 FR	222345	1	1983/10/17	2000/10/17
CLIMAX 16 FR	222346	1	1983/10/17	2000/10/17
POST 1	222051	4	1980/11/12	2000/11/12
POST 2	222155	9	1982/04/20	2008/04/20
POST 3	222156	20	1982/04/20	2008/04/20
POST 4 FR	222284	1	1983/06/20	2008/06/20
POST 5 FR	222285	1	1983/06/20	2008/06/20
POST 11	222184	10	1982/08/24	2008/08/24
POST 12	222185	15	1982/08/24	2008/08/24

Table 1.1: List of claims and status (cont'd.)

TITLE NAME	TITLE #	UNITS	RECORD DATE	EXPIRY DATE
POST 13	222186	18	1982/08/24	2000/08/24
POST 14	222235	2	1982/10/20	2000/10/20
POST 15	222332	20	1983/09/19	2008/09/19
POST 16	222336	2	1983/10/03	2000/10/03
RENEE 1	221908	12	1979/11/02	2000/11/02
STAR 2 FR	222271	1	1983/06/14	2008/06/14
STAR 3	222299	4	1983/07/06	2008/07/06
TOOTS 4	221837	20	1979/07/06	2008/07/06
WAY 1	222040	20	1980/10/20	2000/10/20
WAY 2	222041	20	1980/10/20	2000/10/20
WAY 3	222042	20	1980/10/20	2000/10/20
WAY 4	222043	20	1980/10/20	2000/10/20
WAY 5	222044	20	1980/10/20	2000/10/20
WAY 6	222065	20	1980/11/26	2000/11/26
WAY 7	222066	20	1980/11/26	2000/11/26
WAY 8	222067	15	1980/11/26	2000/11/26
WAY 9	222068	20	1980/11/26	2000/11/26
WAY 10	222069	20	1980/11/26	2000/11/26
WAY 11	222070	20	1980/11/26	2000/11/26
WAY 12	222071	15	1980/11/26	2000/11/26
WAY 16	222072	20	1980/11/26	2000/11/26
WAY 17	222073	20	1980/11/26	2000/11/26
WAY 18	222074	15	1980/11/26	2000/11/26
WAY 19	222075	20	1980/11/26	2000/11/26
WAY 20	222076	20	1980/11/26	2000/11/26
WAY 21	222077	20	1980/11/26	2000/11/26
WAY 22	222078	10	1980/11/26	2000/11/26
WAY 23	222079	18	1980/11/26	2000/11/26
WAY 24 FR	222260	1	1983/06/14	2008/06/14
WAY 25 FR	222261	1	1983/06/14	2008/06/14
WAY 26 FR	222262	1	1983/06/14	2008/06/14
WAY 27 FR	222263	1	1983/06/14	2008/06/14
WAY 29 FR	222264	1	1983/06/14	2008/06/14
WAY 30 FR	222265	1	1983/06/14	2008/06/14
WAY 31 FR	222266	1	1983/06/14	2008/06/14
WAY 32 FR	222267	1	1983/06/14	2008/06/14
WAY 33 FR	222268	1	1983/06/14	2008/06/14
WAY 34 FR	222269	1	1983/06/14	2008/06/14
WAY 35 FR	222270	1	1983/06/14	2008/06/14

The company is undertaking to develop an open pit and underground mining operation for the deposit, and in August 1998 entered the Environmental Assessment process with the provincial government for project certification. The 1998 field program consisted of pre-feasibility assessment and some exploration, and was carried out between May 21 and October 23. The total cost incurred by the program was in excess of $438,390. The work was performed on the following claims:

Bull 1, 2, 4Fr, 5, 7, 10, 11Fr, 15Fr, 16-23,
24Fr, 25Fr, 26Fr, 27Fr, 28Fr
Beth 1, Renee 1, Toots 4, Star 2Fr
Climax 1, 2, 11, 12
Way 8, 9, 11, 12

1.5 THIS REPORT

The majority of the 1998 program documented in this assessment report concerned the viability of on-site disposal of open pit and underground waste rock. A primary issue is the acid-basic drainage and metal leachate potential of this waste rock. This was addressed by the systematic re-logging and geochemical sampling of selected drillcore representing projected open pit waste. The re-logging procedure and sample descriptions are reported in Chapter 3 and Appendix A, and the interpretation of the *analytical results is in Appendix B.*

The upper part of the Silvertip Creek valley is the proposed site for the disposal of the combined mine waste and tailings. Geotechnical drilling of the overburden and bedrock in this location was done to test the ground conditions, and this is described in Chapter 5.

As part of the assessment of the environmental impact of mine development, studies of the hydrology, water quality and aquatic habitat of the drainage system were carried out in 1998. Appendix D contains the hydrology and water quality reports, and water analyses, and Appendix E comprises the fisheries assessment. Terrain ecosystem mapping was also done in 1998, though it is not submitted herein for assessment.

The main exploration project in the program was a magnetotelluric geophysical survey, covering 4.0 line-kilometres over 5 lines (Chapter 4 and Appendix C). This was aimed at the potential for structurally-controlled mineralization deeper in the stratigraphy, an aspect which has been neglected in the past. In addition, some geological mapping was done to the west and southwest of the area covered in 1997 (Chapter 2).

1.6 PROPERTY HISTORY

The history of exploration in the Silvertip area from 1955 through 1997 was documented in the 1997 summary report. A summary and update is given here in Table 1.2.

Table 1.2: Summary of Silvertip Property History

Year	Work	Amount/Type	Surface Drilling				Underground			Mineral Resource Calculation				
			Diamond		Other		Development	Diamond Drilling		Size (mt)	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)
			Holes	Metres	Holes	Metres		Holes	Metres					
1955	Discovery Claim Staking							9						
1956	Claim Staking													
1957	Trenching Mapping Drilling						Upper adit 155 m Lower adit 393 m	6	204					
1958	Drilling							3	972					
1960	AFMAG													
1961/62	IP Survey Drilling	8.3 km	4	495										
1963	Geochemistry (THM) Mapping Photogeology Trenching Drilling Mercury Vapour Test	1650 samples 80 samples	1	51										
1966	Drilling	Rotary			4	684								
1967	Airborne EM Drilling		2	152						1.8	2778	50.3	1.22	
1968	Gravity Drilling		2	388										
1973	Claim Staking													
1980	Geochemistry Claim Staking													
1981	Drilling Geochemistry Line Cutting PEM, Gravity Trenches Claim Staking	 8000 samples 435 km 8.5 km, 8.9 km 19	6	857										
1982	Drilling Geochemistry Geophysics		15	5,283						3.6	452	6.7	12.5	
1983	Drilling Petrography, Mineralogy, Metallurgy		32	11,733						4.7	350	5.1	12.3	
1984/85	Drilling Geophysics Development		50	10,981			Main adit 1,453 m	170	12,383	5.4	390	6.4	12.3	0.54
1986	Drilling PEM Downhole PEM Magnetometer Geochemistry	RC 74.8 km 2,340 m 182.7 km 166.2 km	14	2,660	9	984				1.19	410	7	9.6	
1989	Explor. Development						765 m							
1990	Drilling							68	9620	1.74	352	6.4	10	
1997	Drilling Seismic Mapping	7 km, 12 lines	63	8594	4	844				2.57	325	6.4	8.8	0.63
1998	ARD Geochemistry CSAMT Geophysics Geotechnical Drilling Environmental	3.8 km, 5 lines			4	92.35								

1.7 ACKNOWLEDGEMENTS

The program was supervised by the project manager, Steve Robertson, and carried out in the field by the author and geologist Janice Letwin, with the assistance of Ivor Saunders, the camp manager. Core splitting and some sample collection were done by Richard Ney.

2.0 GEOLOGY

The regional and property geology pertaining to the Silvertip project was given in some detail in the 1997 summary report (Silvertip Mining Corporation, 1998). Other sources of good information are Cordilleran Engineering (1985), Curtis (1986), and Bradford (1988). As reference is made to the geology in various parts of the present report, a shortened account of the stratigraphy, structure and mineralization is presented here.

2.1 REGIONAL GEOLOGY

The Silvertip property is situated in the northern Omineca Belt of the Canadian Cordillera (Fig. 2.1). The most important element of this region is the Cassiar terrane, composed of Upper Proterozoic through Middle Devonian carbonate and clastic sedimentary rocks formed on a marine platform on the ancient continental margin of western North America (Cassiar Platform), and overlying Devono-Mississippian rift-related clastics (Earn Assemblage). Structurally overlying the Cassiar terrane is a tectonic assemblage of marginal basin and island arc sediments and igneous rocks of the Upper Paleozoic Sylvester allochthon, representing the Slide Mountain terrane (Fig.2.2).

The region was moderately deformed by folding and thrust faulting in the Jurassic, and later by extensional and dextral transcurrent faulting in the Late Cretaceous to early Tertiary (Fig.2.3). The Cassiar Batholith, a large, granite to granodiorite intrusion of mid-Cretaceous age, lies west of the property. Small intrusions and related hydrothermal alteration of possibly Late Cretaceous age are minor but important features of the region.

The main mineral deposits are syngenetic barite +/- lead, zinc prospects in Paleozoic sediments, and skarn and replacement deposits related to Cretaceous intrusive and hydrothermal activity. An account of mineralization in the Rancheria district, including the Silvertip area, is in Abbott (1983).

The principal sources of regional geology data are Gabrielse (1963), Nelson and Bradford (1993), and Nelson and Bradford's (1987) open file map of the Tootsee Lake area, from which Fig. 2.3 is adapted. The regional stratigraphy is shown in the stratigraphic column in Fig. 2.4.

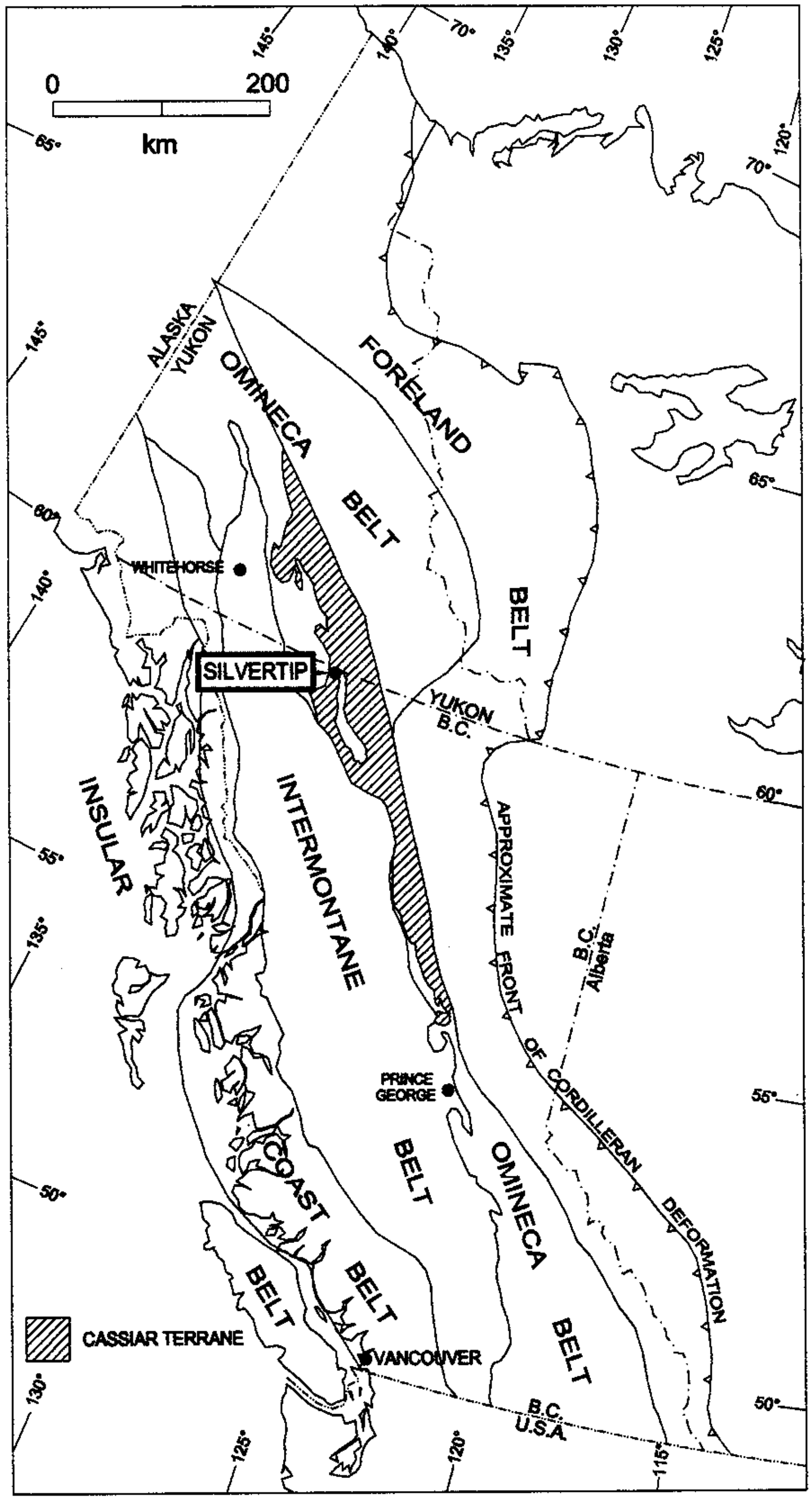

Fig. 2.1: Location of Silvertip with respect to Cassiar terrane and morphogeological belts of the Canadian Cordillera.

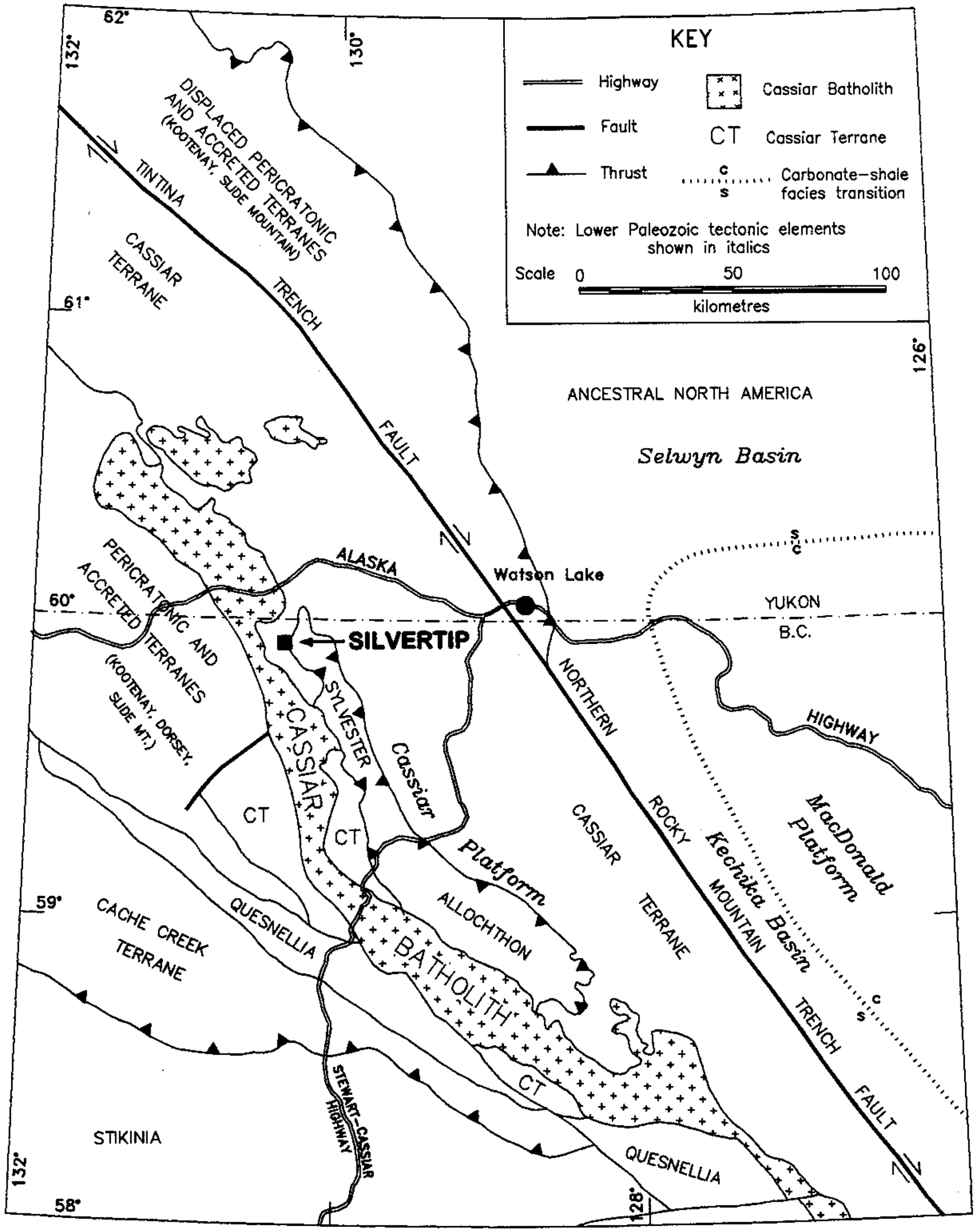

Fig. 2.2: Main tectonic elements of northern British Columbia and southern Yukon showing regional setting of Silvertip.

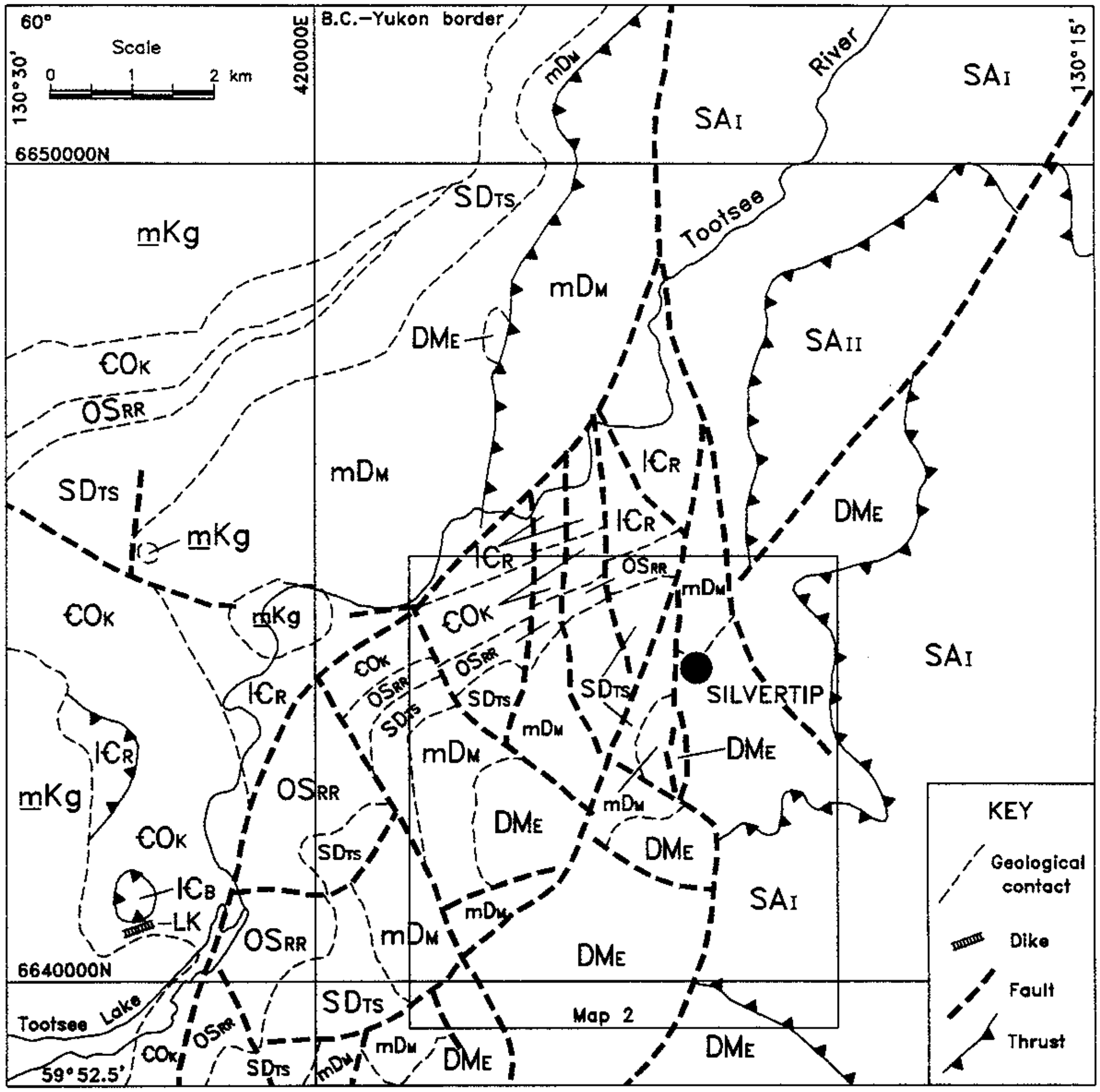

Fig. 2.3: Regional geological setting, showing location of Silvertip with respect to stratigraphic units of the Cassiar Platform, the eastern margin of the Cassiar Batholith, and the western margin of the Sylvester allochthon. Adapted from Nelson and Bradford (1987). Geology differs slightly from that in Map 2 (outlined). Array of faults are part of Tootsee River fault system. For Legend, see Fig. 2.4.

	Age	Unit	Symbol	Lithology
Intrusive Rocks	Late Cretaceous		LK	felsic dykes
Intrusive Rocks	mid-Cretaceous	CASSIAR BATHOLITH	mKg	granite, granodiorite
	Lower Mississippian to Upper Permian and Upper Triassic	SYLVESTER ALLOCHTHON	SAII	Division II: basalt, gabbro, serpentinite, chert
			SAI	Division I: argillite, chert, Slate, greenstone
	Upper Devonian to Lower Mississippian	EARN GROUP	DME	sandstone, conglomerate siltstone, shale carbonaceous argillite
	Middle (to Upper?) Devonian	McDAME GROUP	mDM	fossiliferous limestone, dolostone
	Silurian to Lower Devonian	TAPIOCA SANDSTONE (informal)	SDTS	dolostone, quartzite dolomitic siltstone, sandstone
	Ordovician to Silurian	ROAD RIVER GROUP	OSRR	carbonaceous, partly calcareous slate, siltstone, black limestone
	Middle? or Upper Cambrian to Lower Ordovician	KECHIKA GROUP	ꞒOK	argillaceous limestone, calcareous slate, siltstone
	Lower Cambrian	ATAN GROUP: Rosella Formation	lꞒR	limestone, dolomitized limestone Archeocyathid-bearing
		ATAN GROUP: Boya Formation	lꞒB	quartzite, argillite

Fig. 2.4: Regional geology stratigraphic column

2.2 PROPERTY GEOLOGY

2.2.1 Stratigraphy

The geology of the main part of the Silvertip property is shown in Map 2, and the stratigraphic column in Fig. 2.5. Essentially, the area comprises easterly to southeasterly-dipping Tapioca sandstone and McDame Group, overlain by the Earn Group. This package is structurally overlain by the Sylvester allochthon, outcropping in the eastern part of the property. All these rocks are deformed by generally north-trending faults related to the Tootsee River fault system (Nelson and Bradford, 1993).

Tapioca Sandstone

This is an informal unit, partly equivalent to the (formal) Sandpile Group. The Tapioca is Silurian to Lower Devonian in age, and roughly 475 metres thick. It consists of pale buff-grey dolomitic sandstone to quartzite, silty dolostone and dolostone. The characteristic texture is well-rounded sand grains in a dolomitic cement. Good cross-bedding is present locally.

McDame Group

This carbonate unit hosts the massive sulphide mineralization at Silvertip. It consists of a lower dolomitic unit, about 100 metres thick, and an upper limestone unit up to 260 metres thick. The McDame is mainly Middle Devonian, but may extend into the Upper Devonian.

The lower dolomitic unit consists of pale to dark buff-grey or blue-grey, very fine grained dolostone and silty dolostone, grading upwards into dolomitic limestone. The rocks are fairly well bedded, and locally have fine cryptalgal laminations. In contrast to the overlying limestone unit, this unit has a uniform, non-bioclastic texture. It is distinguished from the underlying Tapioca sandstone by the absence of sand grains or siliceous component, and by its colour and less blocky weathering.

The main, upper part of the McDame Group is composed of distinctive bioclastic limestone, noted for its rich fauna of stromatoporoids, corals and brachiopods. The limestone is pale to dark bluish-grey, and fine to medium grained with a crystalline texture. It is moderately to thickly bedded (up to 1 or 2 metres). Parts of the limestone have been hydrothermally altered to a buff-grey, medium-grained dolostone, or to a pink or white, crystalline 'marble'.

The stromatoporoid Amphipora is characteristic of the limestone, as are several forms of massive stromatoporoids. The stratigraphic distribution of these fossils and of solitary and colonial corals and thick- and thin-shelled brachiopods has been used to construct a detailed biostratigraphy of the McDame, resulting in its subdivision into 8 subunits (cf. Fig. 2.5). This scheme is the principal tool used in drillcore logging and the subsurface reconstruction of the McDame, although the bioclastic facies are generally not recognizable in surface outcrops because of weathering.

Brecciation is another important feature of the McDame limestone, again most conspicuous in drillcore. Some of these are primary depositional breccias related to

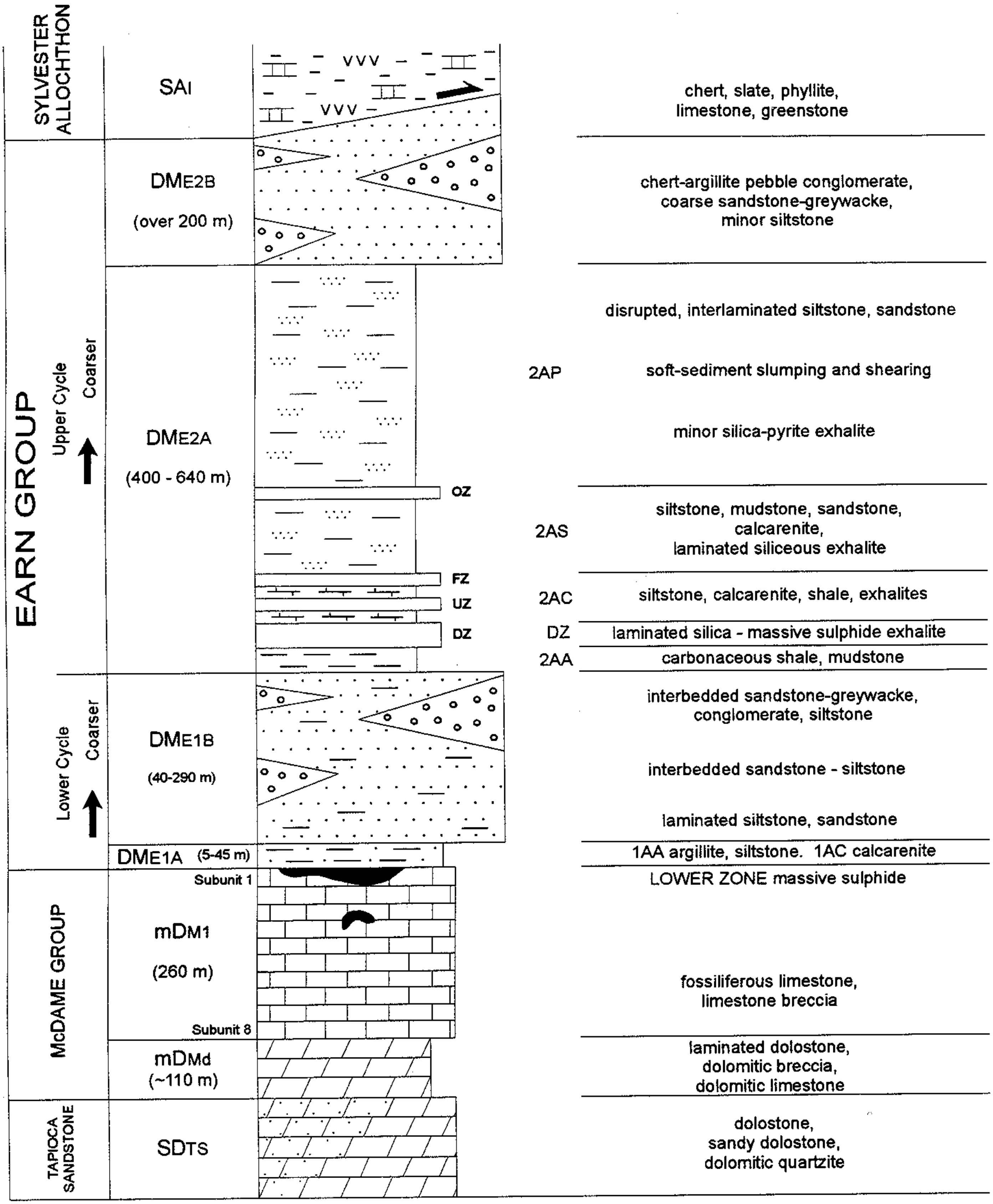

Fig. 2.5: Stratigraphic column of the Silvertip area

karst erosion (see below), and others were formed much later by solution collapse processes due to hydrothermal activity accompanying mineralization.

Earn Group

In the Late Devonian, the carbonate platform emerged above sea level for a time, and the McDame limestone was karst eroded. This episode ended with crustal extension, *re-submergence, and the deposition of the succeeding Earn Group siliciclastics in the* Late Devonian through Early Mississippian. The basal Earn was deposited disconformably on the McDame with little or no angular discordance, but stratigraphic relief due to dissection at the unconformity is up to 165 metres. The top of the Earn is not preserved; the known thickness in the area varies between 600 and 1000 metres.

The Earn comprises two coarsening-upward cycles (1 and 2) of distal to proximal turbiditic siliciclastics. In each sequence, the lower part is characterized by carbonaceous, siltstone-mudstone and lesser sandstone or greywacke (1A and 2A), and the coarser, upper part by sandstone-greywacke and conglomerate (1B and 2B). The rocks were deposited as intertonguing turbidite fans in extensional basins or half-grabens with restricted circulation.

Unit 1A

The basal Earn Group consists of very carbonaceous mudstone to siltstone (1AA), deposited directly on top of the McDame limestone, or in cavities at some depth below the unconformity, due to the muddy sediment infiltrating the karst features. The rocks are fine grained and finely laminated, and indicate low energy deposition under euxinic conditions. Syngenetic or diagenetic pyrite is present, generally less than 2%. The bottom few metres of 1A are commonly calcareous (1AC). Total thickness is up to 45 metres.

Unit 1B

The upper, coarser part of the lower cycle begins with interlaminated siltstone and sandstone, which becomes predominantly medium- to thickly bedded sandstone up-section. The sandstone is grey, medium- to coarse-grained greywacke, characterized by *chert-rich detritus. Sandstone beds are generally centimetres to decimetres thick,* separated by beds of siltstone or interlaminated sandstone-siltstone. These lithologies are only rarely calcareous. Pyrite, mainly syngenetic or diagenetic, typically varies between 1 and 3 %, and is more prominent in the more argillaceous beds or laminae than in the sandstones. Graded beds of chert-argillite pebble conglomerate are common; they may be two metres thick in the upper part of the unit.

The higher energy conditions implied by unit 1B suggest increasingly active, fault-controlled block uplifts and erosion in the basin. This mode of formation probably contributes to the wide variation in the thickness of unit 1B, which ranges from as little as 60 metres to 200 to 300 metres.

Unit 2A

This is the lower, finer grained part of the upper cycle, and is the thickest and most inhomogeneous unit in the Earn Group. It is between 200 and 640 metres thick. Subunit 2AA at the base is recessive, dark grey to black carbonaceous mudstone to siltstone. Above it is the lowest and generally thickest and most important of the several exhalite subunits that are diagnostic of Unit 2A: the D-zone exhalite. It consists of pale grey to buff, fine-grained, siliceous and pyritic, laminated exhalite. Above the D-zone is 2AC, a calcareous interval comprising interlaminated siltstone, calcarenite and locally impure limestone; it is 5 to 80 metres thick. This is followed by a more siliceous subunit up to 100 metres thick, 2AS, consisting of thinly laminated siliceous siltstone, slate and fine sandstone. In addition to the D-zone, several other minor exhalites occur within subunits 2AC and 2AS. They are typically no more than a few metres thick, and are probably not very laterally continuous. It is not clear if they occur consistently at the same stratigraphic horizons from place to place.

The thickest (up to 450 metres) and most characteristic subunit of unit 2A is 2AP, which is composed of thinly to thickly interbedded and finely laminated slaty siltstone and fine- to medium-grained sandstone. The main feature of 2AP is the disrupted structure of the sandstone laminae which have been broken into discrete, sheared and rotated lenses millimetres to centimetres in size, due to slumping and soft-sediment deformation of a semi-consolidated turbidite sequence.

Unit 2B

The highest unit of the Earn is 2B, which is marked by the abrupt appearance of coarse, chert- and argillite pebble conglomerates above subunit 2AP. It represents the upper coarse-grained component of the second cycle. These polymictic conglomerates are thickly bedded, and commonly grade into very well bedded greywacke-sandstone. They are typically matrix supported, and the clasts are rounded to subrounded. Unit 2B is at least 200 metres thick. It is quite similar to unit 1B, but is distinguished by its coarser components, thicker bedding, and a lower amount of siltstone.

Sylvester allochthon

Rocks of the Sylvester allochthon outcrop on the eastern part of the property. The base of the allochthon is a thrust which is paraconformable with the underlying Earn Group strata, and similarly dips gently to moderately east to southeast. The lithologies present are mainly argillaceous sediments and minor volcanics, which belong to Division I (Mississippian and Upper Pennsylvanian to Lower Permian) of the Sylvester assemblage (Nelson and Bradford, 1993). Thinly interbedded, grey to green-grey chert, argillite and 'phyllite', and minor lenses of limestone are most common, with local tuffaceous siltstone and meta-basaltic greenstone.

2.2.2 Structure

The basic structure of the Silvertip area is not complicated. Like the rest of the region, it is dominated by faulting rather than folding. Strata generally strike north to northeast and dip gently to moderately east to southeast. There are no fold closures affecting the local map pattern, which is characterized by a general younging of units eastwards, broken up by faults.

The main regional ductile deformation resulted from crustal shortening in the Jurassic, when the Sylvester allochthon was tectonically emplaced onto the Cassiar stratigraphy and all units were subjected to folding, thrusting and foliation development, accompanied by very low grade metamorphism. The main foliation is generally parallel to bedding. A prominent extension lineation, trending north-northwest, is represented by elongated clasts in the Earn conglomerates, and is kinematically related to the foliation. A north-northwest-striking, moderately dipping crenulation of this foliation is discernible in argillaceous laminae. Drilling and mapping in the main Silvertip deposit area indicates that no significant folds or thrusts are present here, but thrusts are known to exist farther west towards the Cassiar Batholith and elsewhere in the Cassiar terrane.

Faults related to the Tootsee River fault system are Late Cretaceous through early Tertiary in age. The faults are mainly extensional with dominantly dip slip to oblique slip, east-side-down displacement. They strike predominantly north, ranging between northwest and northeast, and dip steeply. The most important fault in the deposit area is the Camp Creek fault, which in cross-section has a vertical separation in the order of several hundred metres, down to the east. Several other faults with the same general geometry are known in the area from drillhole information and surface mapping, but have much smaller, down-to-the-east displacements, in the range of metres to tens of metres.

2.2.3 Mineralization and Alteration

The Silvertip mineralization is manto-type, silver-lead-zinc massive sulphide, formed by hydrothermal replacement processes in McDame Group limestone. In Silvertip terminology it is known as "Lower Zone" (Fig. 2.5). Although gossans related to this mineralization are exposed in limestone on part of the property (and constituted the original discovery in 1955), the main mineralized zones are not exposed, lying between about 50 and several hundred metres beneath the surface, and covered by the Earn Group. These zones are mainly north of Silvertip Mountain and east of Camp Creek (Map 2). The 'Silver Creek' area is the shallowest zone and the target of the proposed open pit development. The 'Discovery' area lies farther east and at greater depth, and would be exclusively an underground mining operation. To the north, the 'Discovery North' area has received relatively little attention to date, but is likely continuous with the other zones.

Another type of lead-zinc sulphide mineralization is present on the property, namely Early Mississippian syngenetic 'sedex' deposits associated with siliceous to baritic exhalite subunits in unit 2A of the Earn Group (see 2.2.1, above). These were the original exploration target on the property in 1980, but they are not considered economic, although they are of interest because they contain a sulphide overprint that may be related to the much younger hydrothermal event that mineralized the McDame carbonates structurally below.

The main, manto deposits formed by the interaction of magmatically-derived, metal-enriched hydrothermal fluids with McDame carbonate rocks. The source of the fluids has not been found, but an area of quartz-sericite-pyrite alteration south and southeast of Silvertip Mountain might indicate a buried intrusion. This alteration has a fluorine signature, and has been dated at around 70 Ma (Late Cretaceous), the same age as felsic intrusions exposed elsewhere in the region. On this basis, the mineralization event is assumed to be Late Cretaceous.

Most of the mineralization occurs at or near the unconformable contact with the Earn Group, although significant sulphides are also present much deeper in the McDame. The massive sulphide is in the form of anastomosing, stratabound tubes up to 20 metres thick and 30 metres wide, and extending for at least 200 metres in places. Contacts with the host limestone can be remarkably sharp, but transitional zones of alteration and recrystallization and brecciation are common. The mineralization consists of massive, early-formed pyrite, pyrrhotite and sphalerite and lesser galena, and a slightly younger, higher temperature, sulphosalt-sulphide suite of minerals. The latter contain the main silver-bearing phases including pyrargyrite-proustite, boulangerite-jamesonite and tetrahedrite (freibergite), as well as silver-rich galena. Quartz and calcite are the main gangue minerals and locally fill late-stage vugs and cavities. Brecciation of sulphides, mixed with limestone and vein quartz and calcite, attest to syn-mineral, solution collapse processes.

The main control on the mineralization so far defined is the Earn unconformity which formed a relatively impermeable cap to the upwelling fluids, concentrating the development of stratabound mantos. The mantos are believed to have been fed by structurally-controlled feeders or chimneys, probably channelled in faults such as the Camp Creek fault. Evidence for this includes strong brecciation and alteration and vertically oriented mineralization throughout much of the McDame stratigraphy, and even at the Tapioca sandstone contact at its base.

2.3 1998 Geological Mapping

A small amount of reconnaissance geological mapping was done to the south (south of Tour Ridge) and west (Tricorne Mountain) of the area mapped at 1:5,000 scale in 1997 (Map 2).

<u>South of Tour Ridge</u>

- To investigate the southern extension of the Camp Creek fault
- To see if the Earn Group has any quartz-sericite-pyrite alteration
- To see if outcrops of Earn Group exhalites contain the hydrothermal overprint present in equivalent exhalites above the Silver Creek deposit area

On the west flank of Tour Peak, south of Tour Ridge, is a fairly good section through unit 2A of the Earn Group, along with the bottom of 2B. The best exposures are in gullies cut into the slope. The 2A/2B contact north of Tour Peak (east of the Camp Creek fault) should project through to about half way up the western slope, but it does not outcrop until the 1700-metre contour. This apparent displacement is explained by movement on the southern extension of the Camp Creek fault, dropping the east side down. The vertical separation appears to be about 200 metres, which is not inconsistent with the amount of separation estimated on the fault to the north (Silvertip Mining Corporation, 1998).

None of the Earn Group mapped in this area exhibited any sign of quartz-sericite-pyrite alteration.

Previous mapping west of Tour Peak by Nelson and Bradford (1987) recorded baritic exhalite in the Earn Group, 850 metres west of the summit. These outcrops were checked and sampled. They occur at a fairly high stratigraphic position within unit 2A, above the base of subunit 2AP, and do not obviously correlate with any exhalite in the Silvertip Mountain area. The surrounding Earn rocks are bluish-grey weathering, fine-grained, thinly laminated siliceous siltstone and slate. The exhalites form small exposures comprising zones or beds at least a metre thick. The rocks are pale to mid-grey, siliceous and baritic in composition, and thinly to thickly laminated with micaceous partings. They weather rusty orange to buff or pinkish-buff. Disseminated pyrite has been oxidized to spotty limonite. Some pieces of bull quartz are present, and *in situ* thin vuggy quartz veinlets, locally with 1 to 3-mm long barite crystals. Neither the exhalites nor the siltstone host rocks are altered or hydrothermally overprinted. Analysis shows they contain only background values of base metals.

Tricorne Mountain

- To examine the Earn-McDame unconformity exposed west of the summit of Tricorne Mountain
- To see if the Earn Group showed any signs of quartz-sericite-pyrite alteration
- To see if the McDame in this area showed signs of replacement mineralization or alteration

The eastern slope and top of Tricorne Mountain are underlain by Earn Group comprising grey, medium- to coarse-grained greywacke, sandstone and siltstone, and minor pebbly sandstone to conglomerate, dipping gently to moderately eastwards. Overall, this appears to be a coarse lithofacies of the Earn, equivalent to 1B or 2B on Silvertip Mountain. No quartz-sericite-pyrite alteration was seen. West and downslope of the summit, these coarse and thickly bedded rocks change (down stratigraphic section) to slaty siltstone with sandstone laminae, resembling the 2B-2A or 1B-1A transition.

A little farther below this transition, on the saddle 500 metres northwest of Tricorne Mountain summit, the unconformity contact between the McDame Group and the Earn Group is poorly exposed. The limestone is grey, medium grained, and strongly crackle-veined with calcite in places. It is locally dolomitized, and also recrystallized in blebby or fracture-controlled patches to sugary white, medium-grained calcite. Apart from these effects, and rare 0.5-mm thick limonitic stringers, no significant alteration or mineralization is present in the McDame here, nor on the ridge extending northwestwards.

The northwest-trending fault shown on Nelson and Bradford's (1987) map, 500 metres northeast of Tricorne Mountain, was examined. On the ridge crest, lower Earn Group slaty siltstone is present to the southwest of the fault, and McDame limestone to the northeast. The fault is marked by fault breccia, closely-spaced fracturing, and a 50-cm thick calcite vein, and the limestone is partly dolomitized. A sample of rusty weathering rock between the vein and altered limestone was not anomalous.

3.0 GEOCHEMISTRY - ACID-BASE ACCOUNTING

3.1 INTRODUCTION

As part of the development plan for the open pit mine of the Silvertip deposit, the potential for acid drainage in the waste rock must be assessed in order to devise a means of waste disposal that is both economically feasible and environmentally safe. This assessment is called acid-base accounting (ABA). Acid rock drainage potential is largely a function of the amount and form of sulphides in the Earn Group siliciclastics, which will form the bulk of the waste.

Systematic geochemical sampling of rocks in drillcore representing the proposed waste material is therefore necessary to determine its chemical composition, especially properties such as total sulphur and pH. Almost as important as this is the physical character of the rocks, including the mineralogy, form and grain size of the sulphides and the degree of fracturing in the rock, as these factors affect the kinetics of possible acid-forming reactions and rock decomposition.

Much of the sulphide in the Earn Group at Silvertip is fine-grained pyrite of syngenetic or diagenetic origin, and is probably no different in form or quantity from that in Earn rocks exposed elsewhere in the northern Cordillera. This pyrite is a minor component of the rock and of no direct economic importance, and consequently previous logging of the drillcore during exploration did not provide the textural details of its occurrence that are required for ABA purposes. Therefore, the sampling was accompanied by a detailed re-logging of the core for each sample interval to aid the interpretation of the associated chemical analysis.

3.2 SELECTION OF DRILLHOLES FOR RE-LOGGING

Within the outline of the proposed open pit, approximately 77 surface holes were drilled between 1981 and 1984 (by the previous operator), and in 1997 by SMC. Five were selected for re-logging (Fig. 3.1), based on the following criteria:

a. Good geographic distribution, with a preference for the centre of the pit.
b. Representative stratigraphy, including that in the zone of near-surface oxidation which affects rocks in the northern part of the pit footprint.

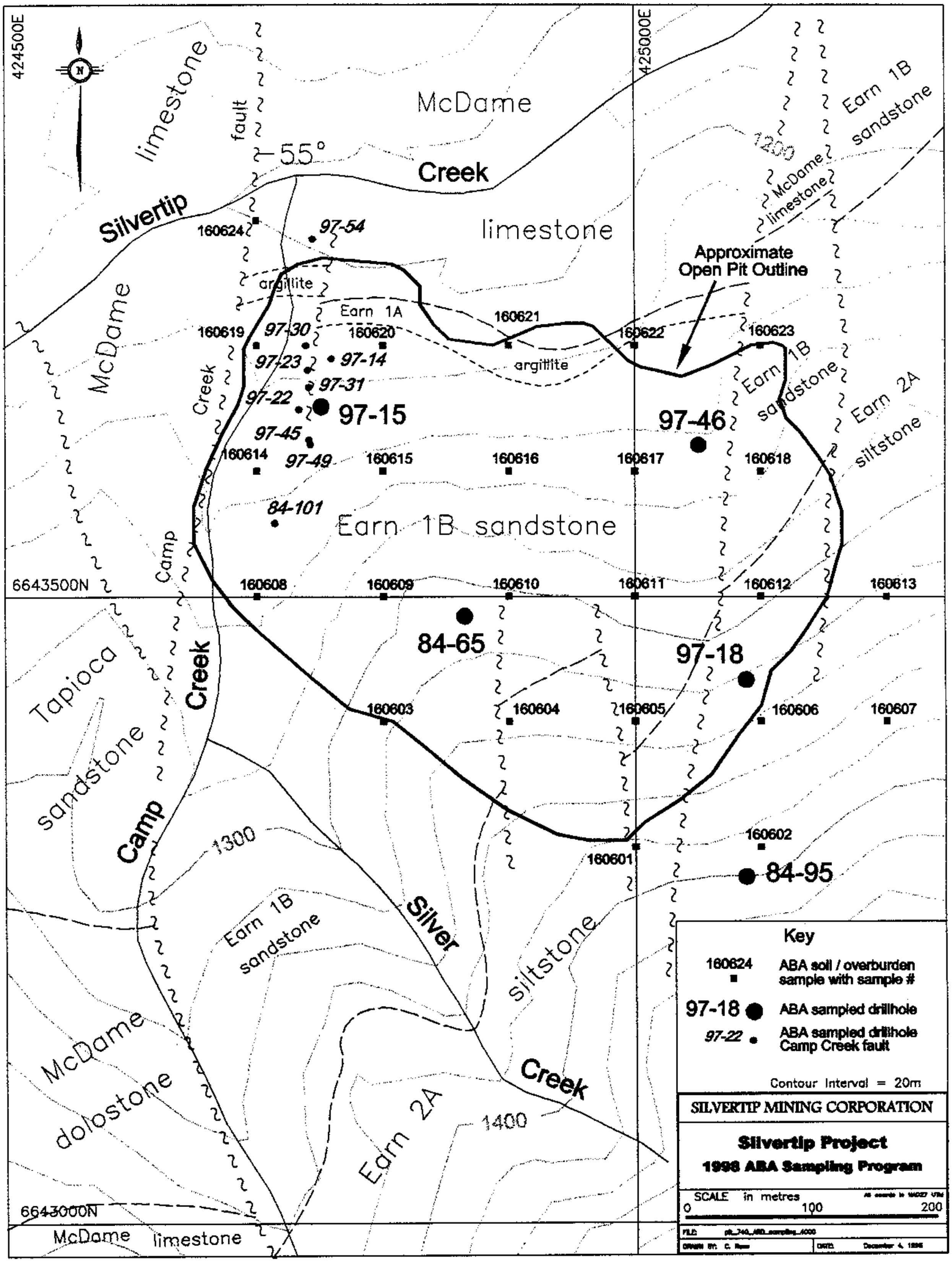

Fig. 3.1: Map of proposed open pit showing ABA drillhole and soil sampling.

c. At least two sections through the sulphide-rich exhalite subunits, which will form the upper part of the high wall, towards the south and southeast of the pit.
d. Good recovery and condition of the core (especially relevant to 1980s core).

Northwest: SSD-97-15
From the Silver Creek Extension zone. Not a long hole, but a representative section through Earn subunits 1B and 1A in this area. Has the thickest massive sulphide (Lower Zone or LZ) of the re-logged holes.
Samples 160301 to 160318

Central: 84-65
A good, representative hole for 1B sandstone, the predominant waste rock, from near the centre of the pit. Core had very good recovery. No Lower Zone in this hole.
Samples 160319 to 160350

Northeast: SSD-97-46
In the oxidized zone. All sulphides in Earn and in Lower Zone are oxidized to limonite and other iron/manganese oxides or hydroxides.
Samples 160401 to 160410

East: SSD-97-18
Another representative section through 1B, and overlying 2A including the D-zone exhalite.
Samples 160411 to 160447

South: 84-95
Actually outside the pit footprint, but representative. This hole also has a good exhalite section, very similar to that in 97-18. Sampled only a few metres into the underlying 1B sandstone.
Samples 160451 to 160486

In addition, 18 samples of the Camp Creek fault zone, which will form the western wall of the open pit, were taken from several holes that intersected the fault.

SSD-97-22:	Samples	160351 to 160353
SSD-97-23:	Samples	160354 to 160356
SSD-97-30:	Samples	160357 to 160358
SSD-97-31:	Samples	160359 to 160360
SSD-97-14:	Sample	160361
SSD-97-45:	Samples	160362 to 160363
SSD-97-49:	Sample	160364
SSD-97-54:	Samples	160365 to 160366
84-101:	Samples	160367 to 160368

3.3 RE-LOGGING PROCEDURE

In each of the holes, the entire core was re-logged and sampled (at least down to an appropriate depth). There were three main criteria for delimiting the sample intervals: lithology, sulphide content, and carbonate content. Reasonably significant changes in one or more of these features were used to subdivide the core. The maximum interval was 10 metres (the likely bench height in the pit), and the minimum about 1 metre. The average sample length was close to 5 metres.

It was generally not practical to define a sample length in the core directly on the basis of subtle changes in pyrite content or of patchy matrix calcite, although this was done if the variation was significant. Lithology was the most practical criterion, especially as changes in sulphide or carbonate content tended to correspond to the change from sandstone, for example, to siltstone/slate, anyway. If sulphide content overlapped a lithological change, it was given priority.

For simplicity, the sampled rock intervals were named according to general composition, e.g. sandstone, siltstone, limestone) rather than the less informative stratigraphic subunits otherwise used in exploration logging (i.e. 2AS, 1B etc.). The number of rock terms used was limited to seven basic lithologies:

Sandstone (± conglomerate and minor siltstone)
Siltstone (± lesser sandstone, slate/mudstone)
Slate/mudstone (± siltstone)
Limestone
High sulphide (applicable to replacement massive sulphides [LZ] or to exhalites)
Exhalite (where sulphides are relatively low)
Oxide (oxidized equivalent of exhalite or LZ massive sulphide)

plus a few other special cases like altered dike, and quartz vein.

(Except for very distinctive rocks such as the massive sulphide, exhalite or the thicker veins, sample intervals generally bare little relation to the divisions in the original exploration logs.)

The sampling in each hole began at the base of the overburden. Holes 84-65, 97-15, 97-18 and 97-46 were re-logged down to the Earn-McDame limestone contact, plus an additional 10 to 20 metres into the limestone. Hole 84-95 was logged from the top down to 10 metres below the 2A-1B contact within the Earn Group.

Camp Creek fault

In most places in the projected open pit, the Camp Creek fault zone is within the McDame Group carbonates, and is marked by foliaceous, calcareous gouge with limestone porphyroclasts. The immediate hangingwall in the pit area appears to be limestone as well, commonly strongly brecciated and crackle-veined with calcite. The footwall of the fault is either limestone or dolomitized limestone. It too is generally brecciated and veined by calcite. The hangingwall in the extreme southwest may be

Earn Group; however it could not be sampled as no drillholes in the open pit footprint intersect it.

The samples taken of the fault zone were of the gouge zone and, if present in the core, a few metres of the footwall also. The latter is necessary because the gouge is soft and would probably not withstand prolonged exposure in the pit, so that in time the footwall would effectively form the pit wall. In a couple of the holes, a hangingwall sample was also taken. Note that in hole SSD-97-14, the fault zone is in altered dike (known as 'YBR' rock), rather than McDame limestone.

Soils

The overburden in the pit footprint was sampled by collecting the B horizon of the soil. A total of 24 samples were taken, based on a 100-metre grid (Fig. 3.1). The typical depth in the soil was 50 cm. These soil samples are listed in the summary tables (see section 4.6, below), but obviously there are no detailed logs for them.

3.4 SAMPLING

Sample intervals were marked off with flagging tape in the core boxes. Most of them were split in half with the core splitter, taking care to avoid bias where sulphides or carbonate were unevenly distributed. Zones of rubble or fault gouge were halved by hand-picking. Any segments that were already split or sawn during previous logging/sampling were quartered. The splitter was cleaned by brushing and with an air hose after every sample, and special care was taken after a zone of high sulphide.

The larger samples required between 3 and 5 large plastic sample bags each. The sample bags were put into 'rice' sacks and shipped to Intertek Testing Services (Bondar Clegg) in Vancouver, by Points North Transportation.

No duplicates or blanks were submitted.

3.5 ANALYSIS

The analysis of the samples and interpretation of the results are provided in Appendix B. For the record, the analysis consists of

- Total sulphur
- Sulphate sulphur
- Neutralization potential
- Paste pH
- Elemental scan (32 elements) using ICP

In addition, every fifth sample was also analyzed for

- Total barium
- Selenium

- Total inorganic carbon
- Water soluble metals
- HCl soluble metals

In both the main logs and the summary tables (Appendix A), those samples that have the extra analyses are indicated by a double asterisk (**) after the sample number, e.g. 160302 **.

The soil samples were subjected to the same analysis as the drillcore samples, including the extra analyses of every fifth sample.

3.6 REPORTS

Main Logs

The main ABA logs are in Appendix A. Each sample is presented in the form of a template denoting the drillhole, interval in metres, sample number, and rock type. The basic mineralogy and texture of the main components is given in terms of mode of occurrence and grain size or thickness. The degree of fracturing of the core is also recorded. The chemical analysis of each sample is reported in Appendix B.

Locally, the Earn sediments contain very fine grained calcium carbonate in the matrix, most commonly as calcareous siltstone laminae, millimetres to centimetres thick. The percentage of carbonate in these laminae, or in the whole sample interval, is difficult to estimate, so instead it is generally presented in the main logs in the form of a numerical ranking from 1 to 5, based on the strength of the rock's reaction to dilute (10%) hydrochloric acid, as follows.

1. None
2. Very weak (audible, not visible)
3. Weak (just visible)
4. Moderate (visible but not rapid)
5. Rapid brief
6. Rapid sustained (as with pure carbonate, i.e. calcite crystals)

This "rank" is shown in the "matrix" column in the log tables, and is marked by an asterisk (*) to distinguish it from a 'percentage' number.

Notes:

a. "Base Metal" refers to the minerals sphalerite and galena.
b. Minerals evenly distributed in the rock can be denoted as 'disseminated' or as 'matrix'. The distinction was not applied rigorously, but such minerals judged to be primary and intrinsic to the rock were logged as 'matrix', and those that were likely secondary or a hydrothermal overprint were logged as 'disseminated'. However, fine-grained pyrite in the matrix was always logged as disseminated, even though much of it is probably primary.
c. "Fe-carbonate" refers to brown or orange carbonate that may be iron-stained calcite or iron-dolomite. It should not be interpreted as siderite.

d. The limestone is locally silicified. This is indicated in the detailed logs as 'disseminated quartz'.
e. In the main, detailed logs, the calcium carbonate forming limestone rock is generally recorded under 'matrix'. 'Massive' calcite would indicate a calcite vein.

Summary Reports

For convenience, another set of tables has been provided for quick reference which summarizes the essential information in the main logs. These tables are also in Appendix A, and follow the main logs. The summary tables are the only place the soil samples are listed. In these 'Summary Tables':

Notes:

a. "bm" means base metal, i.e. sphalerite and galena.
b. "% Sulphides" and "py" (for pyrite) may include a small amount of pyrrhotite, but it is generally rare and negligible. Where pyrrhotite is more significant, it is noted in the Notes column.
c. "% carbonate" can be read as calcite. A few per cent dolomite or Fe-carbonate occurs locally (quantified in detailed logs) but they are generally negligible except where noted.
d. In the 'Strat. Unit' column (stratigraphic unit), the abbreviations correspond to the units described in Chapter 2 (Geology). MLS is McDame Group limestone; LZ is the Lower Zone mineralization; YBR is the name given to altered intrusive rock present very locally in both the Earn and McDame groups.

4.0 GEOPHYSICS - CSAMT SURVEY

4.1 INTRODUCTION

A CSAMT (controlled source audio magnetotellurics) survey was carried out on part of the property during August 7-27, 1998, by Whytecliff Geophysics of Vancouver. Past experience with seismic reflection in 1997 (Silvertip Mining Corporation, 1998) showed that while it is effective at imaging sub-horizontal bodies of massive sulphides (mantos), it is not so suitable for locating vertically-oriented bodies, i.e. the feeders or chimneys that may exist below and connect with the mantos. The CSAMT technique was considered to be more appropriate for the detection of such fault-controlled feeders, and five areas were selected for surveying (Map 2). Each of the five lines was oriented east-west, as the main structures strike approximately north-south. The total length surveyed was 4 kilometres. The theory, implementation, results and interpretation of the survey are reported in Appendix C. A summary follows.

4.2 SUMMARY OF RESULTS

Line 1 - A test line over known mantos in the Silver Creek deposit area.

> Result: A strong conductive response over the larger unconformity manto massive sulphides, but not over smaller sulphide bodies. A fault, probably the YBR fault, shows up well. The Earn Group is resistive.

Line 2 - East of Tour Ridge, south of the area of QSP (quartz-sericite-pyrite) alteration, and crossing the Camp Creek fault.

> Result: The Camp Creek fault is revealed at depth by the distinction between very resistive McDame limestone west of the fault and weakly conductive rocks to the east. The latter conductive zone is roughly vertical and its centre is in the lower half of the McDame limestone. Local conductivity within the Earn may be due to exhalite zones.

Line 3 - In Silvertip Creek valley, north of known deposits (Discovery North), in an area of convergence of major faults (Silvertip Creek, Camp Creek, YBR faults).

> Result: Generally very resistive rocks. An area of stronger, but still weak, conductivity appears adjacent to the projected Camp Creek fault, over 500 metres below the surface.

Line 4 - Over the Silver Creek South deposit area, where previous drilling indicates southward plunging, steeply-oriented mineralization well below the Earn-McDame unconformity.

Result: A strong, vertically-oriented conductor in the immediate hangingwall of the Camp Creek fault, that may coincide with a splay of the fault. Tentatively interpreted as a structurally-controlled, massive sulphide feeder to nearby mineralization in Silver Creek South in the adjacent McDame limestone. The conductive zone expands at depth and to the east, towards the McDame-Tapioca sandstone contact, which may represent another prospective horizon for mantos.

Line 5 - Over the main QSP alteration on Silvertip Hill and the west flank of Silvertip Mountain, and crossing the Silvertip Hill and Camp Creek faults.

Result: Moderately conductive anomaly at about 1000 metres depth, crossing Camp Creek and other faults with a gentle apparent dip. Structurally lower (although stratigraphically higher) than the anomaly in Line 4, and may connect with it along north-south faults.

4.3 CONCLUSIONS

- The CSAMT method is capable of revealing electromagnetically conductive bodies of massive sulphides at depths of up to a thousand metres, and is thus an effective exploration tool for this deposit. The Earn Group is essentially resistive and 'transparent', and its response is not enhanced by typical concentrations of disseminated pyrite and carbonaceous matter.

- Tested areas west of the Camp Creek fault are consistently lacking in conductive anomalies, whereas areas with identical stratigraphy east of the fault show zones of high conductivity of variable strength. This proves that the method does indeed discriminate between conductive (i.e. mineralized) and non-conductive rocks in the subsurface.

- The method is sufficiently 'coarse' that small sulphide bodies do not show up and exaggerate the degree of mineralization: this provides a form of filtering such that only significant conductors are revealed. However, the converse is not true: vague or apparently weak conductors should not be assumed to be insignificant, because in fact they may be major bodies of mineralization that are distant from the survey line and at the limit of detection.

5.0 GEOTECHNICAL DRILLING

5.1 INTRODUCTION

The present plan for the development of the open pit and underground mining of the Silvertip deposit calls for the disposal of waste rock and tailings in the Silvertip Creek valley (Fig. 5.1). Subject to the results of ongoing ARD studies, there is potential for exposed waste in this setting to leach metals and generate acidity, and contaminate the drainage system downstream. To limit these adverse effects, after mine closure the waste would be permanently immersed in water by impounding the natural drainage in the valley by a dam at the lower (downstream) end of the waste dump.

At the outset, another dam at the upper end of the waste dump would be required to feed the temporary creek diversion on the west side of the valley until the end of mining operations, and thereafter to supply a head of water above the surface of the waste rock.

Part of the preliminary work to test the feasibility of the wet impoundment concept was the drilling of four test holes in the creek valley towards the front of the impoundment (Fig. 5.1). The objectives were to:

- Determine the nature of the overburden, specifically the presence or absence of glacial till
- Determine the lithological composition, grain size and texture of the bedrock
- Test the stability of the ground
- Assess the groundwater flow and permeability to find out if the foundation of the Silvertip Creek valley would be sufficiently impervious to prevent seepage from the impoundment, and hence maintain saturation of the waste

5.2 GEOLOGICAL SETTING

There is no known rock exposure in the Silvertip Creek valley bottom, which is covered by colluvium and glacial sand and gravel. Previous geological mapping and structural projections indicate that the bedrock beneath this overburden is almost entirely Tapioca sandstone (informal), a Silurian-Devonian unit widespread in the region and consisting

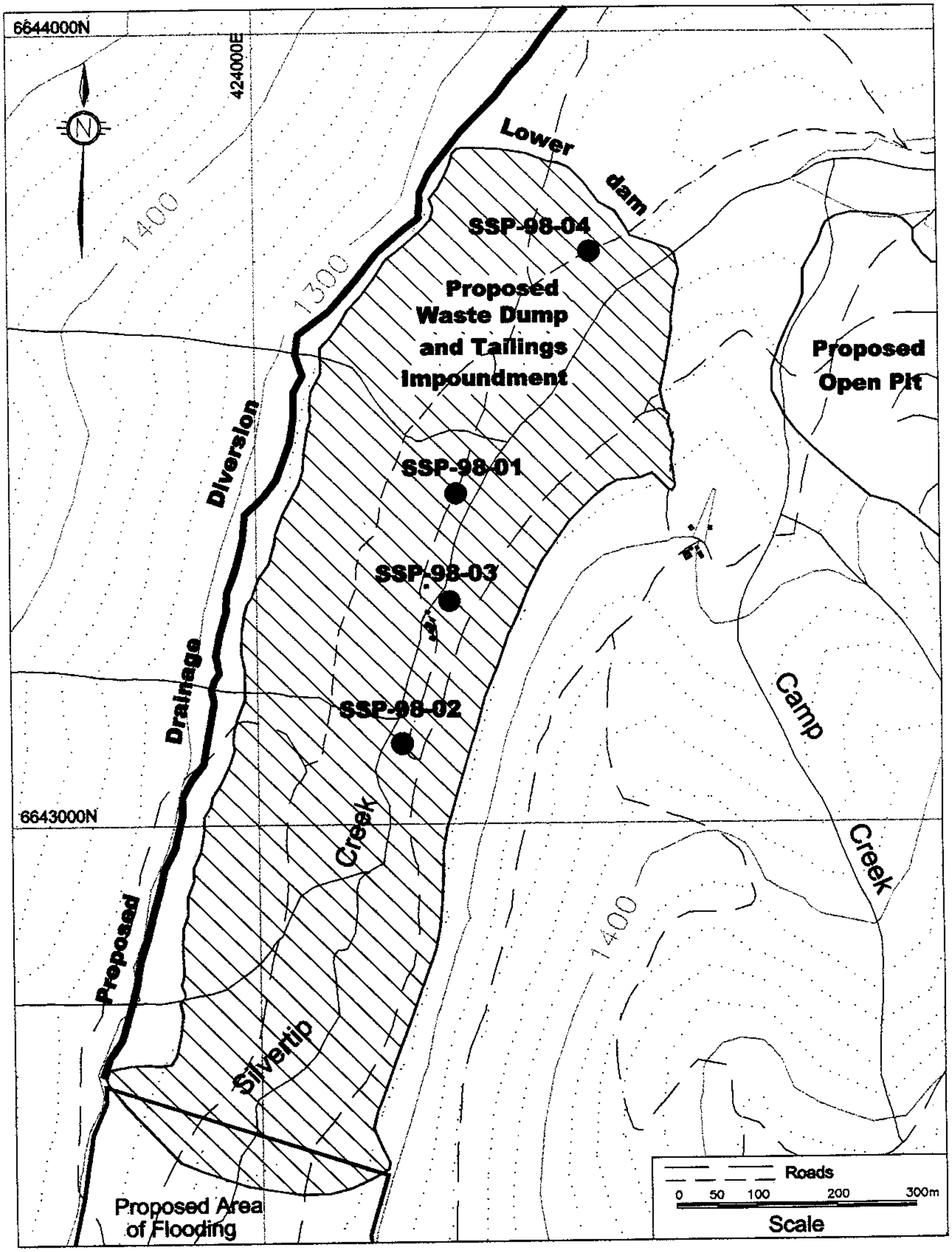

Fig. 5.1: Location of geotechnical drillholes in Silvertip Creek valley

of dolomitic sandstone and quartzite, and dolostone (see section 2.2 for more details). At the southern end of the impoundment area, however, the Tapioca sandstone may be overlain by a few metres or tens of metres of the lower McDame Group, consisting of fine-grained, massive and laminated dolostone.

A fault, the Silvertip Creek fault, has been postulated to run down the west side of the valley bottom. The fault is part of the Tootsee River fault system (Nelson and Bradford, 1993), *and is probably an east-side-down extensional fault.*

5.3 IMPLEMENTATION

Watson Lake Well Drilling was contracted to perform the work, which was carried out between July 16 and 28, 1998. A truck-mounted, 71 Star percussion drill was used, operated by two 2-man shifts of 10 hours each, over each 24 hours, seven days a week. Suitable sites for the test holes were found on existing property roads (Fig. 5.1). All holes were vertical. The diameters of the holes were 8 inches in overburden and 6 inches in bedrock. Sample cuttings were collected by the drillers or the geologist, and logged promptly by the geologist. The cuttings are stored on site. No geochemical analysis was performed on this material.

5.4 RESULTS

Drilling showed that there is no significant fine-grained glacial till in the Silvertip Creek valley bottom. Rather, the overburden is relatively pervious glaciofluvial sand and gravel. *It varies in thickness from 14.3 feet (4.36 m) to 117 feet (35.66 m) in the four* holes drilled, being thickest at the northern end of the impoundment area (test hole 4), and decreasing upstream to the south to around 15 feet (4.6 m). This is still near the northern end of the disposal area; the overburden thickness may thicken again to the south, so the overall depth profile of the valley still has to be determined.

The phreatic surface (water table) in the overburden generally coincides with the creek level.

Descriptions of the overburden samples recovered from the test holes are given below (Table 5.1). The dominant valley fill is sand, with minor components of silt and gravel. From visual classification, this material has a permeability on average of about 5×10^{-5} m/s, possibly rising to about 10^{-3} m/s in the coarsest sections.

Drilling confirmed that below the overburden the bedrock in the tested area is exclusively Tapioca sandstone. The bedrock is hard and the upper surface is irregular. This variable thickness of the overburden probably reflects erosional features in the paleo-topography. The bedrock chips recovered are typically angular chips of quartzite and sandstone up to a few millimetres across. Well-rounded quartz grains reworked *from the original rock are common, as is a strong fetid smell.* Colour varies from pale grey to dark grey to brown, and there is some orange or reddish iron oxide staining occasionally. The finer, powdery matrix is dolomitic and effervesces strongly with dilute hydrochloric acid.

Table 5.1: Logs of overburden drilling samples, Silvertip Creek

SSP-98-01

TYPE	DEPTH	LITHOLOGY	DESCRIPTION
OVERBURDEN	10 feet	Gravel	Fine, sandy, angular to subangular, grey. Some exotic rocks.
	20 feet	Sand	Medium to fine; trace silt, brown to black.
	25 feet	Sand	Silty, subangular, grey-brown.
	26 feet	Sand	Medium to coarse; trace fine gravel, silt, subangular, grey-brown.
	30 feet	Sand	Coarse; trace fine gravel, trace to some silt, subangular, brown-dark grey.
	35 feet	Sand	Trace fine gravel, trace silt, subangular, grey-brown.
	38 feet	Sand	Coarse; fine gravelly, some fine to medium sand, angular, grey.
	40 feet	Sand	Well-sorted; trace fine gravel, trace silt, subangular, grey-brown. Wood chips, bark.
	50 feet	Sand	Trace fine gravel, trace silt, subangular, grey-brown. Wood chips.
BEDROCK	57 feet	Sandstone	Tapioca sandstone; chips of beige and grey quartzite, sandstone.
	83 feet		End of Hole
Notes: Bedrock at 57 feet (17.4 m). Creek at approximately 15 feet (4.6 m).			

SSP-98-02

TYPE	DEPTH	LITHOLOGY	DESCRIPTION
OVERBURDEN			Hard pack, boulders
BEDROCK	16.5 feet	Sandstone	Tapioca sandstone; angular chips of grey-brown quartzite, sandstone
	40 feet		End of Hole
Notes: No samples taken. Bedrock at 16.5 feet (5 m). Creek at approximately 5 to 10 feet.			

SSP-98-03

TYPE	DEPTH	LITHOLOGY	DESCRIPTION
OVERBURDEN	10 feet	Sand	Medium to coarse; some fine gravel and silt, angular to subangular, grey-brown
	13 feet	Sand	Trace silt, trace fine gravel, subangular, grey
BEDROCK	14.3 feet	Sandstone	Tapioca sandstone; chips of beige and grey quartzite, round sand grains, limonite
	37 feet		End of Hole
Notes: Bedrock at 14.3 feet (4.36 m). Creek at approximately 10 feet (3.0 m).			

Table 5.1: Summary logs of overburden drilling samples, Silvertip Creek (cont'd.)

SSP-98-04

TYPE	DEPTH	LITHOLOGY	DESCRIPTION
OVERBURDEN	10 feet	Sand	Coarse; some silt, trace fine gravel, subangular, grey.
	12 feet	Silt, fine sand	Some coarse sand, trace fine gravel, subangular, grey.
	15 feet	Sand	Fine to medium; some coarse sand, some coarse gravel, trace silt, subangular, grey.
	20 feet	Silt, fine sand	Trace to minor medium and coarse sand, grey.
	25 feet	Sand	Silty, trace fine gravel, subangular, grey-brown.
	30 feet	Sand	Coarse to medium; some fine sand, trace silt, angular to subangular, grey-brown.
	35 feet	Sand	Medium to fine; trace coarse sand, angular, grey.
	40 feet	Silt, fine sand	Some coarse sand, some fine gravel, subangular, grey.
	45 feet	Silt, fine sand	Some medium to coarse sand, trace fine gravel, subangular, grey-brown.
	50 feet	Sand	Silty, trace fine gravel, subangular, grey-brown.
	55 feet	Sand	Medium; some silt, angular, grey-brown.
	60 feet	Sand	Medium; some silt, angular, grey-brown.
	65 feet	Sand	Medium to coarse; some fine sand, trace to minor silt, angular to subangular, grey-brown.
	70 feet	Gravel	Fine, pebbly; coarse sand, some fine to medium sand, trace to some silt, subangular, grey.
	75 feet	Sand	Fine; trace medium sand; some silt, grey-brown.
	80 feet	Sand	Medium to fine; trace coarse sand; trace silt, brown.
	85 feet	Sand	Fine, silty, grey-brown. Somewhat cohesive.
	90 feet	Sand	Fine, silty, grey-brown. Somewhat cohesive.
	100 feet	Fine sand, silt	Trace coarse sand, trace fine gravel, brown.
	105 feet	Gravel	Some fine sand and silt, angular, grey; broken cobbles?
	110 feet	Gravel	Some coarse sand, angular, grey. Some exotic rocks.
	115 feet	Gravel	Some coarse sand; pebbly, angular, grey.
BEDROCK	117 feet	Sandstone	Tapioca sandstone; chips of beige and grey quartzite, sandstone.
	143 feet		End of Hole.
Notes: Bedrock at 117 feet (35.7 m). Static level of water (creek) at approx. 80 feet (24.4 m).			

A pump test could not be done because the drillers had difficulty establishing a seal at the bottom of the drill casing because of the hard, irregular bedrock surface. However, based on water level recovery measurements, the Tapioca sandstone appears to be inherently 'tight' and capable of supporting the proposed impoundment.

5.5 CONCLUSIONS

Provisional conclusions based on the 1998 work are:

- There is no significant fine-grained glacial till in the Silvertip Creek valley bottom. Rather, the overburden is relatively pervious glaciofluvial sand and gravel.
- The bedrock beneath the overburden is hard, competent and tight dolomitic sandstone (Tapioca sandstone), with very little potential for karst development. It is relatively impermeable. The Silvertip Creek fault does not appear to be a strong conduit of groundwater.
- The permeability in the bedrock should not represent any obstacle to the retention of water within the waste rock above it, permitting the construction of a dam.

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PROJECT STATEMENTS FOR 1998

On-Site Personnel - Silvertip 1998

	Name	Position	Days on site
Staff	Steve Robertson	Project Geologist - Manager	11
	Peter Campbell	Manager, Environmental Affairs	3
	Chris Rees	Geologist	74
	Janice Letwin	Geologist	34
	Ivor Saunders	Camp Manager	145
	Richard Ney	Core Splitter/Technician	33
	Gary Agar	Equipment Operator	12
Contract	Laurie Allen	Hydrology Technician	10
	Paul Amann	Equipment Operator	2
	James Carlick	Linecutter	7
	Everett Chief	Linecutter	7
	Albert Herzog	Equipment Operator	3
	Michael Kearney	GPS Surveyor	4
	Sandra Lussier	Camp Cook	46
	Ken Nordine	Hydrologist	3
	Linda Valade	Cook	10
	Peter Von Zuben	Equipment Operator	3
	Stu Withers	Hydrologist	3
	Larry	Equipment Operator	2
Consultants	Dan Royea	Hydrologist	13
	Steven Day	Geochemist	7
	Peter Megaw	Geologist	6
	John Jemmett	Fisheries Scientist	16
	Josie Turner	Fisheries Scientist	16
	Roy Mayfield	Engineer	4
	Ed Livingston	Hydrogeologist	5
	Jim Poriz	Terrain Mapping Scientist	10
	Joe Fitzpatrick	Terrain Mapping Scientist	10
	Clint Smyth	Terrain Mapping Scientist	10
	Irene Teske	Terrain Mapping Scientist	10
Watson Lake Well Drilling	Don Stone Sr.	Drilling Foreman	15
	Don Stone Jr.	Driller	15
	Shawn Stone	Driller	15
	George Frank	Helper	15
	Edward Frank	Helper	15
Whytecliff Geophysics	David Butler	Geophysicist	21
	Kevin Jarvis	Geophysicist	21
	Greg Zembik	Geophysics Assistant	21
	Lanie McLachlan	Geophysics Assistant	21
		Total Person-days on Site	678

Individual Personnel Expenditures - Silvertip 1998

	Name	Position	Days Worked in field	Rate ($/day)	Cost ($)
Staff	Steve Robertson	Project Geologist - Manager	11	345	3,795
	Peter Campbell	Manager, Environmental Affairs	3	406	1,218
	Chris Rees	Geologist	74	310	22,940
	Janice Letwin	Geologist	34	217	7,378
	Ivor Saunders	Camp Manager	145	185	26,825
	Richard Ney	Core Splitter/Technician	33	154	5,082
	Gary Agar	Equipment Operator	12	329	3,948
			Total cost		71,186
Contract	Sandra Lussier	Camp Cook	46	180	8,280
	Linda Valade	Cook	9	165	1,485
	Laurie Allen	Hydrology Technician	10	150	1,500
	James Carlick	Linecutter	6	200	1,200
	Everett Chief	Linecutter	6	200	1,200
	Albert Herzog	Equipment Operator	2	200	400
	Peter Von Zuben	Equipment Operator	2	200	400
			Total cost		14,465

Expenditures - Silvertip 1998

Salaries				
	Staff		71,186	
	Contract		14,465	
				85,651
Camp Support				
	Food		10,861	
	Accommodation	(678 person/days @ $20/day)	13,560	
				24,421
Transportation and Travel				
	Airfares		27,843	
	Vehicle Rental		10,587	
	Vehicle Insurance		1,508	
	Fuel		7,767	
	Hotels		3,550	
	Meals in Transit		2,116	
	Shipping and Courier		11,540	
				64,911
Laboratory Analysis				
	ARD Geochemistry	(175 samples @ 38.36)	6,713	
	Water Quality	(130 samples @ 150.80)	19,604	
				26,317
Survey				
	CSAMT Geophysics	(5 lines, 4.0 km)		60,089
Drilling				
	Geotechnical Drilling	(4 holes, 92.35 metres)		39,520
Consulting Services				
	ARD Assessment (Steffen, Robertson & Kirsten)		16,794	
	Fisheries Assessment (J. Jemmett & Associates)		17,634	
	Hydrology and Water Quality (Ecotech, Laberge Env. Serv.)		62,903	
				97,331
Supplies and Services				
	Field & Hardware supplies		15,815	
	Repair & Maintenance		1,488	
	Construction Materials		575	
	Mechanical Labour		1,090	
				18,968
Communications				
	Satellite Phone, Radiophone, Long Distance			10,637
Other Costs				
	Permits and Licences		2,292	
	Drafting, Reproduction		3,253	
				5,545
Report Writing				5,000
Subtotal				438,390
Amount filed for Assessment				415,771
Filing Fees				27,090
TOTAL				442,861

STATEMENT OF QUALIFICATIONS

I, Christopher John Rees, currently of Imperial Metals Corporation, Suite 420-355 Burrard Street, Vancouver, British Columbia, certify that

- I hold degrees in geology from Carleton University (Ph.D., 1987), University of Regina (M.Sc., 1980) and University College of Wales (B.Sc., 1976)
- I have been engaged in geological mapping and mineral exploration services in Canada since 1976
- I am a professional Geoscientist registered with the Association of Professional Engineers and Geoscientists of British Columbia

Signed

PROFESSIONAL PROVINCE OF C. J. REES BRITISH COLUMBIA GEOSCIENTIST

C. J. Rees
January 1999

APPENDIX A

ABA REPORTS – MAIN LOGS

DRILLHOLE SSD-97-15

SAMPLES 160301 to 160318

HOLE: SSD-97-15 | Interval From 9.14 To 17.7 m | Sample Number: 160301

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	1	Pyrite	100	96	0	0	3	1	0	0.2			1	1.2		Weakly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	97	100	0	0	0	0	4*	0.1						
			Dolomite	1	100	0	0	0	0	0	0.1						
			Fe-Carb.	2	100	0	0	0	0	0	0.1						
	SILICATES	98	Quartz	75	0	0	0	0	0	100						0.3	
			Albite	15	0	0	0	0	0	100						0.2	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15 | Interval From 17.7 To 21.5 m | Sample Number: 160302 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	2	Pyrite	100	97	0	0	3	0	0	0.1			0.2			Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	100	0	0	0	100	0	0				0.2			
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97	Quartz	80	0	0	0	4	0	96				2		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15 | Interval From 21.5 To 25.0 m | Sample Number: 160303

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	3	Pyrite	100	96	1	0	2	1	0	0.1	3		1	2		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	90	0	0	0	5	0	4*				0.4		< 0.1	
			Dolomite	0													
			Fe-Carb.	10	0	0	0	100	0	0				0.4			
	SILICATES	95	Quartz	70	0	0	0	2	0	98				2		0.1	
			Albite	15	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15 | Interval From 25.0 To 28.0 m | Sample Number: 160304

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	3	Pyrite	100	88	5	0	5	2	0	< 0.1	3		1	2		Fractured platy
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	3	Calcite	80	0	80	0	10	0	10		5		0.7		< 0.1	
			Dolomite	0													
			Fe-Carb.	20	0	0	0	100	0	0				0.7			
	SILICATES	94	Quartz	70	0	0	0	5	0	95				1		0.1	
			Albite	15	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15	Interval From 28.0 To 33.5 m	Sample Number: 160305

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	5	Pyrite	100	80	2	0	17	1	0	< 0.1	1		1	0.5		Highly fractured, minor gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	98	0	89	0	1	0	10		8		1		< 0.1	
			Dolomite	0													
			Fe-Carb.	2	0	0	0	100	0	0				0.5			
	SILICATES	93	Quartz	82	0	0	0	1	0	99				1		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15	Interval From 33.5 To 36.8 m	Sample Number: 160306

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	3	Pyrite	100	90	5	0	5	0	0	< 0.1	0.5		1			Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	3	Calcite	100	10	90	0	0	0	2*	< 0.1	5				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	94	Quartz	75	0	0	0	1	0	99				1		0.2	
			Albite	15	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15	Interval From 36.8 To 42.6 m	Sample Number: 160307 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	4	Pyrite	99	84	10	0	5	1	0	0.1	0.5		1	1		Platy, fissile
			Pyrrhotite	0													
			Base Metal	1	0	0	0	100	0	0				0.5			
	CARBONATES	2	Calcite	99	9	90	0	1	0	4*	< 0.1	5		0.3		< 0.1	
			Dolomite	0													
			Fe-Carb.	1	0	0	0	100	0	0				0.5			
	SILICATES	94	Quartz	80	0	0	0	10	0	90				2		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15	Interval From 42.6 To 47.55 m	Sample Number: 160308

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Slate, mudstone	SULPHIDES	2	Pyrite	100	95	0	0	5	0	0	< 0.1			1			Rubble, gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	3	Calcite	100	0	0	5	3	5	4*			50	0.3	5	< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	95	Quartz	60	0	0	0	2	0	98				1		< 0.1	
			Albite	20	0	0	0	0	0	100						< 0.1	
			Sericite	20	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 47.55 To 54.5 m			Sample Number: 160309												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
High Sulphide	SULPHIDES	40	Pyrite	80	10	0	70	5	15	0	0.1		500	3	10		Fractured
			Pyrrhotite	0													
			Base Metal	20	50	0	15	25	10	0	0.5		30	3	10		
	CARBONATES	35	Calcite	100	30	0	20	40	10	0	0.1		75	20	10		
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	25	Quartz	90	10	0	0	30	15	45	0.1			3	8	< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 54.5 To 56.2 m			Sample Number: 160310												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate	SULPHIDES	1	Pyrite	100	10	0	0	10	80	0	< 0.1			0.5	1.5		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	29	Calcite	100	20	0	0	80	0	5*	< 0.1			5		< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	70	Quartz	80	0	0	0	5	0	95				1		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 56.2 To 58.0 m			Sample Number: 160311												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
High Sulphide	SULPHIDES	35	Pyrite	70	25	0	25	25	25	0	0.1		15	2	5		Fractured, rubble
			Pyrrhotite	0													
			Base Metal	30	30	0	40	0	30	0	0.1		15		5		
	CARBONATES	3	Calcite	100	100	0	0	0	0	0	< 0.1						
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	62	Quartz	92	10	0	0	10	10	70	0.1			1	5	< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	3	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 58.0 To 60.8 m			Sample Number: 160312 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	100	0	0	0	0	0	< 0.1						Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	6	Calcite	100	0	0	0	50	0	50			1			< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93	Quartz	92	0	0	0	20	0	80			1			< 0.1	
			Albite	8	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 60.8 To 66.15 m			Sample Number: 160313												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	100	0	0	0	0	0	< 0.1						Rubble chips
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	100	0	0	0	30	0	70				0.5		< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	89	0	0	0	15	0	85				1		< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 66.15 To 70.1 m			Sample Number: 160314												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate to mudstone (breccia)	SULPHIDES	1	Pyrite	97	70	0	0	0	30	0	< 0.1				3		Fractured Some gouge
			Pyrrhotite	0													
			Base Metal	3	100	0	0	0	0	0	0.1						
	CARBONATES	30	Calcite	100	0	0	0	5	75	20				1	15	< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	69	Quartz	89	0	0	0	7	5	88				1	3	< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 70.1 To 74.5 m			Sample Number: 160315												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1	Pyrite	85	25	0	0	45	30	0	0.1			2	5		Competent
			Pyrrhotite	0													
			Base Metal	15	10	0	0	90	0	0	0.1			2			
	CARBONATES	84	Calcite	95	0	0	95	5	0	0			0.5	2			
			Dolomite	0													
			Fe-Carb.	5	0	0	0	100	0	0				5			
	SILICATES	15	Quartz	100	100	0	0	0	0	0	0.1						
			Albite	0													
			Sericite	0													

HOLE: SSD-97-15		Interval From 74.5 To 84.25 m			Sample Number: 160316												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1	Pyrite	75	0	0	0	100	0	0				10			Competent
			Pyrrhotite	0													
			Base Metal	25	0	0	0	100	0	0				15			
	CARBONATES	95	Calcite	90	0	0	90	10	0	0			1	2			
			Dolomite	5	0	0	0	0	100	0					3		
			Fe-Carb.	5	0	0	0	0	100	0					3		
	SILICATES	4	Quartz	100	100	0	0	0	0	0	0.1						
			Albite	0													
			Sericite	0													

HOLE: SSD-97-15		Interval From 84.25 To 85.0 m			Sample Number: 160317 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone (breccia)	SULPHIDES	1	Pyrite	100	100	0	0	0	0	0	< 0.1						Quasi-rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	20	Calcite	96	60	0	0	0	40	5*	< 0.1				5	< 0.1	
			Dolomite	1	0	0	0	0	100	0					3		
			Fe-Carb.	3	0	0	0	0	100	0					3		
	SILICATES	79	Quartz	93	0	0	0	0	5	95					1	< 0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	4	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-15		Interval From 85.0 To 92.66 m			Sample Number: 160318												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1	Pyrite	100	0	0	0	100	0	0				0.8			Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98	Calcite	100	0	0	0	10	0	90				3		< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	1	Quartz	100	0	0	0	0	100	0					10		
			Albite	0													
			Sericite	0													

DRILLHOLE 84-65

SAMPLES 160319 to 160350

HOLE: 84-65 | Interval From 4.8 To 13.0 m | Sample Number: 160350

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1	Pyrite	100	85	5	0	5	5	0	< 0.1	1		2	2		Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	80	0	0	0	3	20	77				3	1	0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 13.0 To 21.0 m | Sample Number: 160319

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1	Pyrite	100	85	5	0	5	5	0	< 0.1	1		2	2		Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	80	0	0	0	3	20	77				3	1	0.1	
			Albite	10	0	0	0	0	0	100						0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 21.0 To 28.0 m | Sample Number: 160320

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1.5	Pyrite	100	82	10	0	3	5	0	< 0.1	2		1	1		Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	98.5	Quartz	80	0	0	0	3	10	87				5	1	0.1	
			Albite	10	0	0	0	0	0	100						0.1	
			Sericite	10	0	0	0	0	0	100						0.1	

HOLE: 84-65 | Interval From 28.0 To 34.55 m | Sample Number: 160321 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1.5	Pyrite	100	70	0	0	10	20	0	0.1			3	2		Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	20	0	100	0	0	0	5*		5					
			Dolomite	0													
			Fe-Carb.	80	10	0	0	90	0	0	0.1			4			
	SILICATES	96.5	Quartz	80	0	0	0	15	0	85				10		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 34.55 To 37.3 m			Sample Number: 160322												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	< 1	Pyrite	100	100	0	0	0	0	0	0.1						Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	0	0	0	100	0	0				1			
	SILICATES	98	Quartz	80	0	0	0	5	0	95				6		0.1	
			Albite	10	0	0	0	0	0	100						0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 37.3 To 40.2 m			Sample Number: 160323												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	< 1	Pyrite	100	100	0	0	0	0	0	< 0.1						Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	100	0	100	0	0	0	5*		10				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97	Quartz	80	0	0	0	0	0	100						0.1	
			Albite	10	0	0	0	0	0	100						0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 40.2 To 45.0 m			Sample Number: 160324												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1	Pyrite	100	80	0	0	20	0	0	0.1			2			Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	80	0	0	0	5	0	95				8		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 45.0 To 52.4 m			Sample Number: 160325												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1	Pyrite	100	93	0	0	2	5	0	0.1			1	1		Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	100	0	100	0	0	0	4*		10				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	80	0	0	0	0	0	100						0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 52.4 To 58.15 m			Sample Number: 160326 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1	Pyrite	100	60	0	0	10	30	0	0.1			0.5	0.5		Fractured to competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	90	100	0	0	0	0	0	< 0.1						
			Dolomite	0													
			Fe-Carb.	10	0	0	0	100	0	0				3			
	SILICATES	98	Quartz	80	0	0	0	2	0	98				3		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 58.15 To 67.65 m			Sample Number: 160327												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	< 1	Pyrite	100	80	0	0	10	10	0	0.1			1	1		Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	< 1	Calcite	100	0	100	0	0	0	4*		20				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	99	Quartz	80	0	0	0	5	0	95				8		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 67.65 To 70.1 m			Sample Number: 160328												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone, conglomerate	SULPHIDES	1	Pyrite	100	80	0	0	10	10	0	0.1			1	1		Fractured to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	< 1	Calcite	85	0	100	0	0	0	5*		10				< 0.1	
			Dolomite	0													
			Fe-Carb.	15	0	0	0	100	0	0				0.5			
	SILICATES	98	Quartz	80	0	0	0	15	0	85				5		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 70.1 To 79.4 m			Sample Number: 160329												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	2	Pyrite	100	40	10	0	10	40	0	0.1	3		1	2		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	97	0	100	0	0	0	5*		10				< 0.1	
			Dolomite	0													
			Fe-Carb.	3	0	0	0	100	0	0				3			
	SILICATES	96	Quartz	75	0	0	0	6	0	94				2		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 79.4 To 86.35 m			Sample Number: 160330												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	1	Pyrite	100	50	0	0	10	40	0	0.1			1	10		Fractured to competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	< 1	Calcite	100	0	100	0	0	0	0		5					
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	80	0	0	0	3	0	97				3		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 86.35 To 92.0 m			Sample Number: 160331 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	3	Pyrite	94	67	10	0	8	15	0	0.1	1		2	2		Fractured
			Pyrrhotite	6	100	0	0	0	0	0	< 0.1						
			Base Metal	0													
	CARBONATES	4	Calcite	100	30	68	0	2	0	5*	< 0.1	6		1		< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93	Quartz	80	0	0	0	0	0	100						0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 92.0 To 94.3 m			Sample Number: 160332												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	80	0	0	0	20	0	0.1				1		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	100	0	100	0	0	0	4*		5				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97	Quartz	80	0	0	0	0	0	100						0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 94.3 To 98.7 m			Sample Number: 160333												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	1	Pyrite	100	88	1	0	1	10	0	0.1	0.5		1	0.8		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	100	5	95	0	0	0	5*	< 0.1	5				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97	Quartz	80	0	0	0	3	0	97				5			
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 98.7 To 103.3 m | Sample Number: 160334

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	1	Pyrite	100	97	0	0	2	1	0	0.1			1	1		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	10	Calcite	99	0	100	0	0	0	5*		5				< 0.1	
			Dolomite	0													
			Fe-Carb.	1	0	0	0	100	0	0				1			
	SILICATES	89	Quartz	80	0	0	0	5	0	95				4		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 103.3 To 111.3 m | Sample Number: 160335

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	1	Pyrite	100	80	0	0	15	5	0	0.1			1	1		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	80	0	100	0	0	0	5*		6				< 0.1	
			Dolomite	0													
			Fe-Carb.	20	0	0	0	100	0	0				3			
	SILICATES	98	Quartz	80	0	0	0	10	0	90				5		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 111.3 To 116.9 m | Sample Number: 160336 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	2	Pyrite	100	65	10	0	15	10	0	0.1	2		2	2		Fractured to highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	6	Calcite	95	0	100	0	0	0	5*		8				< 0.1	
			Dolomite	0													
			Fe-Carb.	5	0	0	0	100	0	0				3			
	SILICATES	92	Quartz	80	0	0	0	12	0	88				5		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 116.9 To 127.0 m | Sample Number: 160337

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	1	Pyrite	98	85	0	0	10	5	0	0.1			2	0.5		Fractured
			Pyrrhotite	1	0	0	0	0	100	0					8		
			Base Metal	0													
	CARBONATES	2	Calcite	99	10	90	0	0	0	5*	< 0.1	6				< 0.1	
			Dolomite	0													
			Fe-Carb.	1	0	0	0	100	0	0				1			
	SILICATES	97	Quartz	80	0	0	0	2	0	98				4		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 127.0 To 133.1 m | Sample Number: 160338

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	1	Pyrite	80	40	0	0	50	10	0	0.1			1	1		Fractured
			Pyrrhotite	20	75	0	0	0	25	0	0.1				8		
			Base Metal	0													
	CARBONATES	1	Calcite	30	0	100	0	0	0	4*		4				< 0.1	
			Dolomite	0													
			Fe-Carb.	70	0	0	0	100	0	0				2			
	SILICATES	98	Quartz	80	0	0	0	5	0	95				1		0.4	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 133.1 To 137.7 m | Sample Number: 160339

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	80	0	0	10	10	0	< 0.1			1	1		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	85	0	0	0	3	0	97				1		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 137.7 To 140.5 m | Sample Number: 160340

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	1	Pyrite	90	40	0	0	60	0	0	0.2			1			Fractured
			Pyrrhotite	10	0	0	0	0	100	0					8		
			Base Metal	0													
	CARBONATES	1	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	0	0	0	100	0	0				2			
	SILICATES	98	Quartz	80	0	0	0	10	0	90				2		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 140.5 To 144.0 m | Sample Number: 160341 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	10	0	0	90	0	0	0.1			0.5			Fractured to highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	80	0	0	0	5	0	95				3		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 144.0 To 154.0 m | Sample Number: 160342

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	36	2	0	60	2	0	0.1	0.3		1	2		Variable. Competent to highly fractured or fissile
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	80	0	100	0	0	0	5*		7				< 0.1	
			Dolomite	0													
			Fe-Carb.	20	0	0	0	100	0	0				1			
	SILICATES	98	Quartz	80	0	0	0	2	0	98				2		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 154.0 To 158.35 m | Sample Number: 160343

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	2	Pyrite	100	63	20	0	5	12	0	0.1	0.6		1	5		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	5	Calcite	100	0	100	0	0	0	5*		5				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93	Quartz	78	0	0	0	5	0	95				2		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	12	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 158.35 To 165.5 m | Sample Number: 160344

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	2	Pyrite	98	86	5	0	4	5	0	0.1	0.5		1	3		Highly fractured. Locally fissile
			Pyrrhotite	2	0	0	0	0	100	0					5		
			Base Metal	0													
	CARBONATES	< 1	Calcite	90	0	0	0	0	0	4*						< 0.1	
			Dolomite	0													
			Fe-Carb.	10	0	0	0	100	0	0				1			
	SILICATES	97	Quartz	78	0	0	0	3	0	97				2		0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	12	0	0	0	0	0	100						< 0.1	

HOLE: 84-65 | Interval From 165.5 To 172.5 m | Sample Number: 160345

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	2	Pyrite	100	79	5	0	1	15	0	0.1	2		0.5	6		Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	4	Calcite	100	0	100	0	0	0	5*		4				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	94	Quartz	75	0	0	0	1	0	99				2		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 172.5 To 176.8 m			Sample Number: 160346 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
	SULPHIDES	1	Pyrite	100	45	10	0	15	30	0	0.1	1		1	2		
			Pyrrhotite	0													
			Base Metal	0													Fissile, rubble, local gouge
Slate, mudstone	CARBONATES	5	Calcite	100	0	0	0	10	0	5*	< 0.1			2		< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	94	Quartz	80	0	0	0	15	0	85				4		< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 176.8 To 182.7 m			Sample Number: 160347												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
	SULPHIDES	2	Pyrite	100	95	0	0	5	0	0	0.1			0.5			
			Pyrrhotite	0													
			Base Metal	0													Highly fractured, rubble
Slate, mudstone	CARBONATES	12	Calcite	100	0	0	0	5	0	5*				2		< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	86	Quartz	80	0	0	0	10	0	90				2		< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: 84-65		Interval From 182.7 To 193.0 m			Sample Number: 160348												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
	SULPHIDES	0	Pyrite														
			Pyrrhotite														
			Base Metal														
Limestone	CARBONATES	99	Calcite	100	0	0	0	12	0	88				3		< 0.1	
			Dolomite	0													Competent
			Fe-Carb.	0													
	SILICATES	1	Quartz	100	0	0	0	100	0	0				10			
			Albite	0													
			Sericite	0													

HOLE: 84-65		Interval From 193.0 To 203.3 m			Sample Number: 160349												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
	SULPHIDES	tr	Pyrite	100	0	0	0	100	0	0				0.5			
			Pyrrhotite	0													
			Base Metal	0													
Limestone	CARBONATES	99	Calcite	98	0	0	0	20	0	80				3		< 0.1	
			Dolomite	2	0	0	0	0	0	100						0.4	Competent
			Fe-Carb.	0													
	SILICATES	1	Quartz	100	0	0	0	100	0	0				2			
			Albite	0													
			Sericite	0													

DRILLHOLE SSD-97-46

SAMPLES 160401 to 160410

HOLE: SSD-97-46 | Interval From 20.42 To 27.0 m | Sample Number: 160401 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate	SULPHIDES	2	Pyrite	99	80	0	0	20	0	0	< 0.1			0.5			Rubble, fissile
			Pyrrhotite	0													
			Base Metal	tr	0	0	0	100	0	0				1			
	CARBONATES	tr	Calcite	100	0	100	0	0	0	4*		5				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	55	0	0	0	2	0	98				0.5		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	35	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-46 | Interval From 27.0 To 33.5 m | Sample Number: 160402

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	80	10	0	5	5	0	< 0.1	1		1	8		Rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite	100	0	100	0	0	0	4*		5				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	75	0	0	0	1	0	99				1		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-46 | Interval From 33.5 To 39.1 m | Sample Number: 160403

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone (virtually all sulphides oxidized)	SULPHIDES	2 (ox.)	Pyrite	100	80	0	0	20	0	0	< 0.1			1			Highly fractured, to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	8	Calcite	100	0	0	0	0	0	100						< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	90	Quartz	70	0	0	0	2	0	98				0.5		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	20	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-46 | Interval From 39.1 To 44.0 m | Sample Number: 160404

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone (all sulphides oxidized)	SULPHIDES	2	Pyrite	100	40	0	0	60	0	0	0.1			2			Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	98	Quartz	75	0	0	0	5	0	95				2		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-46 | Interval From 44.0 To 49.0 m | Sample Number: 160405

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone (all sulphides oxidized)	SULPHIDES	4	Pyrite	100	25	0	0	75	0	0	0.1			2			Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	96	Quartz	80	0	0	0	10	0	90				2		< 0.1	
			Albite	10	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-46 | Interval From 49.0 To 56.6 m | Sample Number: 160406 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Oxide (all sulphides oxidized	SULPHIDES	40	Pyrite	100	35	0	35	30	0	0	0.2		100	2			Rubble to highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	60	Quartz	94	0	0	0	30	10	60				5		< 0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	3	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-46 | Interval From 56.6 To 59.7 m | Sample Number: 160407

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone (all sulphides oxidized)	SULPHIDES	3 (oxid.)	Pyrite	100	0	0	0	100	0	0				1			Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	97	Calcite	100	0	0	0	5	0	95				4		0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SSD-97-46 | Interval From 59.7 To 65.2 m | Sample Number: 160408

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone (all sulphides oxidized)	SULPHIDES	2 (oxid.)	Pyrite	100	0	0	0	100	0	0				1			Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98	Calcite	100	0	0	0	5	0	95				2		0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SSD-97-46		Interval From 65.2 To 66.35 m			Sample Number: 160409												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
High sulphide (about 10% oxidized)	SULPHIDES	22	Pyrite	100	10	10	20	10	50	0	0.1	3	20	1	2		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	78	Calcite	100	0	0	0	0	0	100						1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SSD-97-46		Interval From 66.35 To 68.27 m			Sample Number: 160410												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone (sulphides about 60% oxidized)	SULPHIDES	5	Pyrite	100	0	0	0	100	0	0				2			Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	95	Calcite	100	0	0	0	0	0	100						1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

DRILLHOLE SSD-97-18

SAMPLES 160411 to 160447

HOLE: SSD-97-18		Interval From 25.8 To 28.4 m			Sample Number: 160411 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone (sulphides oxidized)	SULPHIDES	2	Pyrite	100	50	0	0	50	0	0	< 0.1			1			Highly fractured, to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite	100	0	100	0	0	0	3*		4				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	82	0	0	0	5	0	95				1		< 0.1	
			Albite	8	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18		Interval From 28.4 To 33.7 m			Sample Number: 160412												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	5	Pyrite	100	40	10	10	15	25	0	0.1	1	20	2	1.5		Rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	95	Quartz	84	0	0	0	5	0	95						< 0.1	
			Albite	6	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18		Interval From 33.7 To 34.2 m			Sample Number: 160413												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
High sulphide (not oxidized)	SULPHIDES	40	Pyrite	100	0	0	50	0	50	0			35		4		Highly fractured to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	60	Quartz	90	0	0	0	40	0	60				30		0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	100	0	0	0	0		0.5					

HOLE: SSD-97-18		Interval From 34.2 To 35.3 m			Sample Number: 160414												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Exhalite (N.B. Much of sample taken for ARD sample 199734)	SULPHIDES	6	Pyrite	100	35	0	0	15	50	0	< 0.1			0.5	1		Rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	94	Quartz	96	0	0	0	10	0	90						0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	2	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 35.3 To 39.6 m	Sample Number: 160415															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
High sulphide	SULPHIDES	20	Pyrite	90	15	20	5	10	50	0	0.1	2	8	2	2		Fractured, with local rubble
			Pyrrhotite	0													
			Base Metal	10	20	0	0	60	20	0	0.5			8	4		
	CARBONATES	3	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	50	50	0	0	0	0	0.1	1					
	SILICATES	75	Quartz	95	0	0	0	0	0	100						0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	3	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 39.6 To 41.6 m	Sample Number: 160416 **															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	3	Pyrite	100	73	2	0	10	15	0	0.1	0.3		1.5	1.5		Highly fractured to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	97	Quartz	90	0	0	0	5	0	95				1		< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 41.6 To 45.25 m	Sample Number: 160417															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
High sulphide	SULPHIDES	25	Pyrite	90	15	0	15	5	65	0	0.1		30	2	4		Fractured
			Pyrrhotite	0													
			Base Metal	10	60	0	0	40	0	0	1			8			
	CARBONATES	12	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	65	30	0	5	0	0	0.5	4		1			
	SILICATES	63	Quartz	92	0	0	0	5	0	95				2		0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	3	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 45.25 To 46.75 m	Sample Number: 160418															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Exhalite	SULPHIDES	5	Pyrite	100	40	10	0	20	30	0	0.1	0.8		1.5	1		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	7	Calcite	10	0	100	0	0	0	4*		< 0.1				< 0.1	
			Dolomite	0													
			Fe-Carb.	90	50	50	0	0	0	0	0.1	2					
	SILICATES	88	Quartz	95	0	0	0	10	0	90				5		0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	3	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 46.75 To 48.4 m	Sample Number: 160419

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	4	Pyrite	95	25	0	0	25	50	0	0.1			2	2		Rubble
			Pyrrhotite	0													
			Base Metal	5	0	0	0	100	0	0				1			
	CARBONATES	2	Calcite	100	0	0	0	100	0	0				2			
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	94	Quartz	89	0	0	0	4	0	96				1		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 48.4 To 49.2 m	Sample Number: 160420

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Exhalite	SULPHIDES	20	Pyrite	100	50	0	0	0	50	0	0.1				3		Rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	80	Quartz	94	0	0	0	0	0	100						< 0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 49.2 To 53.7 m	Sample Number: 160421 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	7	Pyrite	100	80	5	0	5	10	0	0.1	0.8		0.5	0.8		Rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	93	Quartz	92	0	0	0	1	0	99				1		< 0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 53.7 To 60.5 m	Sample Number: 160422

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	2	Pyrite	100	75	5	0	10	10	0	0.3	5		1	1		Rubble to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	98	Quartz	82	0	0	0	5	0	95				5		< 0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	15	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 60.5 To 67.15 m | Sample Number: 160423

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	1.5	Pyrite	100	90	0	0	5	5	0	0.1			0.5	1		Gouge (some rubble)
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	98.5	Quartz	90	0	0	0	1	0	99				1		0.5	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 67.15 To 72.85 m | Sample Number: 160424

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	2	Pyrite	100	93	2	0	3	2	0	0.3	0.5		1	2		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	3	Calcite	100	0	100	0	0	0	5*		5				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	95	Quartz	90	0	0	0	1	0	99				1		0.5	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 72.85 To 76.3 m | Sample Number: 160425

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	1.5	Pyrite	100	84	2	0	4	10	0	0.5	0.5		0.5	1		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	100	0	100	0	0	0	5*		8				< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97.5	Quartz	90	0	0	0	1	0	99				1		0.2	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	7	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 76.3 To 82.0 m | Sample Number: 160426 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	2	Pyrite	100	93	2	0	3	2	0	0.3	1		1	5		Fractured to highly fractured.
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	100	0	100	0	0	0	5*		6				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97	Quartz	89	0	0	0	0.5	0	99.5				1		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 82.0 To 86.0 m | Sample Number: 160427

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	1	Pyrite	100	93	2	0	2	3	0	0.1	0.5		0.5	1		Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0.5	Calcite	100	0	100	0	0	0	5*		5				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98.5	Quartz	91	0	0	0	0	0	100						0.3	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 86.0 To 91.2 m | Sample Number: 160428

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	2	Pyrite	100	97	2	0	1	0	0	0.2	1		1			Varies: Fractured, highly fractured, rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0.5	Calcite	100	0	100	0	0	0	5*		5				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97.5	Quartz	91	0	0	0	1	0	99				1		0.3	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 91.2 To 94.5 m | Sample Number: 160429

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	3	Pyrite	100	92	1	0	7	0	0	0.3	0.5		2			Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	100	0	100	0	0	0	5*		6				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	96	Quartz	90	0	0	0	3	0	97				3		0.3	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	7	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 94.5 To 97.1 m | Sample Number: 160430

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	2	Pyrite	97	88	2	0	5	5	0	0.1	0.5		2	4		Fractured
			Pyrrhotite	3	0	0	0	0	100	0					5		
			Base Metal	0													
	CARBONATES	2	Calcite	100	0	100	0	0	0	5*		5				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	96	Quartz	89	0	0	0	2	0	98				7		0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 97.1 To 101.65 m | Sample Number: 160431 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	3.5	Pyrite	99	93	1	0	4	2	0	0.5	0.5		2	8		Competent to fractured
			Pyrrhotite	0													
			Base Metal	1	0	0	0	100	0	0				2			
	CARBONATES	1	Calcite	100	0	100	0	0	0	5*		6				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	95.5	Quartz	92	0	0	0	1	0	99				2		0.3	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 101.65 To 105.6 m | Sample Number: 160432

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	2	Pyrite	100	98	0	0	1	1	0	0.5			0.5	7		Competent with local rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	98	Quartz	92	0	0	0	2	0	98				1		0.3	
			Albite	4	0	0	0	0	0	100						0.1	
			Sericite	4	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 105.6 To 111.0 m | Sample Number: 160433

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	2	Pyrite	98	89	0	0	10	1	0	0.3			2	4		Highly fractured
			Pyrrhotite	0													
			Base Metal	2	0	0	0	100	0	0				2			
	CARBONATES	2	Calcite	100	0	100	0	0	0	4*		8				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	96	Quartz	92	0	0	0	2	0	98				2		0.3	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 111.0 To 118.8 m | Sample Number: 160434

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Sandstone	SULPHIDES	1	Pyrite	100	85	0	0	10	5	0	0.3			1	3		Highly fractured, locally rubble
			Pyrrhotite	0													
			Base Metal	tr	0	0	0	100	0	0				0.5			
	CARBONATES	1	Calcite	100	0	100	0	0	0	5*		8				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	91	0	0	0	3	0	97				3		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 118.8 To 120.7 m				Sample Number: 160435											
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)					Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	2	Pyrite	98	78	0	0	20	2	0	0.4			1	5		Highly fractured
			Pyrrhotite	0													
			Base Metal	2	0	0	0	100	0	0				1			
	CARBONATES	1	Calcite	99	0	100	0	0	0	5*		8				0.1	
			Dolomite	0													
			Fe-Carb.	1	0	0	0	100	0	0				1			
	SILICATES	97	Quartz	91	0	0	0	5	0	95				20		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 120.7 To 122.9 m				Sample Number: 160436 **											
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)					Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	5	Pyrite	98	80	2	0	15	3	0	0.5	0.5		1	2		Highly fractured
			Pyrrhotite	0													
			Base Metal	2	0	0	0	100	0	0				1			
	CARBONATES	1	Calcite	99	0	100	0	0	0	5*		8				0.1	
			Dolomite	0													
			Fe-Carb.	1	0	0	0	100	0	0				1			
	SILICATES	94	Quartz	98	0	0	0	5	0	95				6		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 122.9 To 128.15 m				Sample Number: 160437											
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)					Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	65	0	0	30	5	0	0.1			1	2		Highly fractured
			Pyrrhotite	0													
			Base Metal	tr	0	0	0	0	100	0					0.5		
	CARBONATES	5	Calcite	100	0	0	0	0	0	5*						0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	94	Quartz	91	0	0	0	2	0	98				2		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18	Interval From 128.15 To 132.5 m				Sample Number: 160438											
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)					Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	2.5	Pyrite	100	95	1	0	2	2	0	0.1	2		1	2		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	5	Calcite	100	0	0	0	0	0	100						0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	92.5	Quartz	92	0	0	0	2	0	98				3		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18		Interval From 132.5 To 137.0 m			Sample Number: 160439												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1.5	Pyrite	100	76	15	0	6	3	0	0.1	1		1	2		Highly fractured (poker chip, mainly)
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	5	Calcite	100	0	0	0	0	0	100						0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93.5	Quartz	91	0	0	0	0	0	100						0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18		Interval From 137.0 To 141.5 m			Sample Number: 160440												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1.5	Pyrite	100	96	3	0	1	0	0	0.1	2		1			Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	5	Calcite	100	0	0	0	0	0	100						0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93.5	Quartz	91	0	0	0	0	0	100						0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18		Interval From 141.5 To 144.75 m			Sample Number: 160441 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	2	Pyrite	100	74	20	0	3	3	0	0.1	3		1	4		Fractured to highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	5	Calcite	100	0	0	0	0	0	5*						0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93	Quartz	89	0	0	0	1	0	99				2		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18		Interval From 144.75 To 148.1 m			Sample Number: 160442												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate	SULPHIDES	2	Pyrite	100	91	5	0	3	1	0	0.2	3		5	2		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	5	Calcite	100	0	0	0	0	0	5*						0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93	Quartz	85	0	0	0	3	0	97				2		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	12	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 148.1 To 155.5 m | Sample Number: 160443

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate	SULPHIDES	1	Pyrite	100	95	2	0	1	2	0	0.1	2		1	4		Fractured to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	100	0	10	0	90	0	4*		5		2		0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	89	0	0	0	1	0	99				2		< 0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 155.5 To 159.9 m | Sample Number: 160444

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate	SULPHIDES	1	Pyrite	100	50	0	0	50	0	0	0.1			0.5			Rubble to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	100	0	0	0	60	0	4*40				1		0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97	Quartz	89	0	0	2	3	0	95			10	2		< 0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 159.9 To 166.7 m | Sample Number: 160445

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	3	Pyrite	100	0	0	0	100	0	0				3			Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	92	Calcite	100	0	0	0	2	0	98				2		0.4	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	5	Quartz	90	0	0	0	0	0	100						< 0.1	
			Albite	0													
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-18 | Interval From 166.7 To 169.7 m | Sample Number: 160446 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	2	Pyrite	100	30	0	0	70	0	0	0.3			1			Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98	Calcite	25	0	0	0	60	0	40				2		0.4	
			Dolomite	75	0	0	0	0	0	100						0.5	
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SSD-97-18		Interval From 169.7 To 176.78 m			Sample Number: 160447												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1.5	Pyrite	100	0	0	70	30	0	0			12	0.5			Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98.5	Calcite	100	0	0	0	2	0	98				1		0.3	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

DRILLHOLE 84-95

SAMPLES 160451 to 160486

HOLE: 84-95			Interval From 5.2 To 13.5 m		Sample Number: 160451												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone/ siltstone (sulphides partly oxidized)	SULPHIDES	1	Pyrite	100	50	0	0	50	0	0	0.1			0.4			Highly fractured to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	82	0	0	0	5	0	95				10		0.1	
			Albite	8	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95			Interval From 13.5 To 22.4 m		Sample Number: 160452												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone/ sandstone	SULPHIDES	1	Pyrite	100	80	0	0	20	0	0	0.1			0.3			Highly fractured to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	0	0	0	100	0	0				1			
	SILICATES	99	Quartz	82	0	0	0	1	0	99				1		0.1	
			Albite	8	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95			Interval From 22.4 To 26.6 m		Sample Number: 160453												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1.5	Pyrite	100	90	0	0	5	5	0	0.1			0.5	1		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite	50	0	100	0	0	0	4*		1				< 0.1	
			Dolomite	0													
			Fe-Carb.	50	0	0	0	100	0	0				0.5			
	SILICATES	98.5	Quartz	84	0	0	0	5	0	95				1		0.1	
			Albite	6	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95			Interval From 26.6 To 32.5 m		Sample Number: 160454 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone/ sandstone	SULPHIDES	1	Pyrite	100	93	0	0	2	5	0	0.1			0.5	1		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite	20	0	100	0	0	0	4*		1				< 0.1	
			Dolomite	0													
			Fe-Carb.	80	0	0	0	100	0	0				0.5			
	SILICATES	99	Quartz	84	0	0	0	2	0	98				3		0.1	
			Albite	6	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 32.5 To 39.1 m	Sample Number: 160455															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone/ siltstone	SULPHIDES	1	Pyrite	100	85	0	0	10	5	0	0.1			0.5	1		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	0	0	0	100	0	0				1			
	SILICATES	99	Quartz	87	0	0	1	2	0	97			60	1		0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 39.1 To 42.9 m	Sample Number: 160456															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate/ siltstone	SULPHIDES	1	Pyrite	100	100	0	0	0	0	0	< 0.1						Fissile to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	87	0	0	0	0	0	100						< 0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 42.9 To 52.7 m	Sample Number: 160457															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone/ siltstone	SULPHIDES	2	Pyrite	95	87	0	0	8	5	0	0.2			1	1		Highly fractured to rubble
			Pyrrhotite	0													
			Base Metal	5	0	0	0	100	0	0				2			
	CARBONATES	tr	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	0	0	0	100	0	0				1			
	SILICATES	98	Quartz	87	0	0	1	1	0	98			20	2		0.2	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 52.7 To 62.7 m	Sample Number: 160458															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1.5	Pyrite	100	90	0	0	10	0	0	0.1			1			Highly fractured to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	tr	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	0	0	0	100	0	0				1			
	SILICATES	98.5	Quartz	85	0	0	0	1	0	99				2		0.2	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 62.7 To 69.1 m			Sample Number: 160459 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate/ siltstone	SULPHIDES	1	Pyrite	100	95	0	0	5	0	0	0.1			1			Fissile to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	84	0	0	0	1	0	99				2		< 0.1	
			Albite	6	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 69.1 To 75.5 m			Sample Number: 160460												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	3.5	Pyrite	98	48	2	0	25	25	0	0.3	1		2	2		Fractured to highly fractured
			Pyrrhotite	0													
			Base Metal	2	0	0	0	100	0	0				3			
	CARBONATES	1	Calcite	10	0	100	0	0	0	4*		5				< 0.1	
			Dolomite	0													
			Fe-Carb.	90	0	0	0	100	0	0				2			
	SILICATES	95.5	Quartz	87	0	0	0	8	0	92				6		0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 75.5 To 81.3			Sample Number: 160461												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone/ siltstone	SULPHIDES	1.5	Pyrite	99	50	1	0	39	10	0	0.1	1		1	1		Fractured
			Pyrrhotite	1	0	0	0	0	100	0					1		
			Base Metal	tr	0	0	0	100	0	0				1			
	CARBONATES	1	Calcite	50	0	100	0	0	0	4*		6				< 0.1	
			Dolomite	0													
			Fe-Carb.	50	0	0	0	100	0	0				0.5			
	SILICATES	97.5	Quartz	85	0	0	0	5	0	95				3		0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 81.3 To 83.9 m			Sample Number: 160462												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone/ slate	SULPHIDES	4	Pyrite	100	95	0	0	5	0	0	0.2			1			Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	80	50	50	0	0	0	5*	< 0.1	3				< 0.1	
			Dolomite	0													
			Fe-Carb.	20	0	0	0	100	0	0				1			
	SILICATES	95	Quartz	84	0	0	0	3	0	97				6		0.1	
			Albite	6	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 83.9 To 86.75 m | Sample Number: 160463

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	1	Pyrite	85	40	0	0	60	0	0	0.1			0.5			Fractured
			Pyrrhotite	0													
			Base Metal	15	0	0	0	100	0	0				1			
	CARBONATES	tr	Calcite	0													
			Dolomite	0													
			Fe-Carb.	100	0	0	0	100	0	0				1			
	SILICATES	99	Quartz	87	0	0	0	5	0	95				2		0.1	
			Albite	5	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 86.75 To 89.9 m | Sample Number: 160464 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone (cherty)	SULPHIDES	1.5	Pyrite	95	40	5	0	50	5	0	0.1	1		1	1		Fractured
			Pyrrhotite	0													
			Base Metal	5	0	0	0	100	0	0				1			
	CARBONATES	1	Calcite	100	0	100	0	0	0	5*		20				0.2	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97.5	Quartz	92	0	0	0	2	0	98				2		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 89.9 To 91.4 m | Sample Number: 160465

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Exhalite	SULPHIDES	1	Pyrite	97	35	20	0	25	20	0	0.1	0.8		2	3		Competent
			Pyrrhotite	0													
			Base Metal	3	0	0	0	100	0	0				1			
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	94	0	0	0	2	0	98				3		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 91.4 To 93.8 m | Sample Number: 160466

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone (siliceous)	SULPHIDES	1.5	Pyrite	95	40	40	0	10	10	0	0.1	2		1	2		Competent to fractured
			Pyrrhotite	0													
			Base Metal	5	0	0	0	100	0	0				1			
	CARBONATES	1	Calcite	100	0	100	0	0	0	5*		50				0.5	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	97.5	Quartz	94	0	0	0	1	0	99				2		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 93.8 To 96.1 m			Sample Number: 160467												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	92	79	15	0	3	3	0	0.1	0.5		0.5	1		Fractured
			Pyrrhotite	0													
			Base Metal	8	0	0	0	100	0	0				3			
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	90	0	0	0	2	0	98				4		0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 96.1 To 96.8 m			Sample Number: 160468												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone/ limestone	SULPHIDES	1	Pyrite	100	100	0	0	0	0	0	0.2						Fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	40	Calcite	100	0	0	0	5	0	95				1		0.7	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	59	Quartz	94	0	0	0	20	0	80				10		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 96.8 To 99.6 m			Sample Number: 160469 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1.5	Pyrite	95	70	20	0	5	5	0	0.2	1		1	1		Highly fractured
			Pyrrhotite	0													
			Base Metal	5	0	0	0	100	0	0				1			
	CARBONATES	tr	Calcite	100	0	80	0	0	20	5*		8			4	0.2	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98.5	Quartz	93	0	0	6	2	0	92			200	4		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: 84-95		Interval From 99.6 To 100.1 m			Sample Number: 160470												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Exhalite	SULPHIDES	1	Pyrite	95	10	15	0	75	0	0	0.1	1		1.5			Fractured
			Pyrrhotite	0													
			Base Metal	5	0	0	0	100	0	0				1.5			
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	99	0	0	0	5	0	95				1		0.1	
			Albite	0													
			Sericite	1	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 100.1 To 102.6 m	Sample Number: 160471

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	100	91	3	0	1	5	0	0.1	0.5		0.5	2		Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	3	Calcite	100	0	85	0	15	0	5*		30		4		0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	96	Quartz	91	0	0	0	1	0	99				1		0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 102.6 To 105.5 m	Sample Number: 160472

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Exhalite and siliceous siltstone	SULPHIDES	1.5	Pyrite	95	68	25	0	5	2	0	0.1	2		0.7	2		Competent to fractured
			Pyrrhotite	0													
			Base Metal	5	0	0	0	100	0	0				2			
	CARBONATES	5	Calcite	100	0	100	0	0	0	5*		50				0.2	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	93.5	Quartz	96	0	0	0	1	0	99				5		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	3	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 105.5 To 108.0 m	Sample Number: 160473 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Siltstone	SULPHIDES	1	Pyrite	75	20	40	0	40	0	0	0.1	1		2			Fractured
			Pyrrhotite	0													
			Base Metal	25	0	0	0	100	0	0				8			
	CARBONATES	1	Calcite	50	0	0	0	100	0	4*				3		0.5	
			Dolomite	0													
			Fe-Carb.	50	0	0	0	100	0	4*				3		0.5	
	SILICATES	98	Quartz	93	0	0	0	1	0	99				3		0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: 84-95	Interval From 108.0 To 108.75 m	Sample Number: 160474

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	0.5	Pyrite	90	80	20	0	0	0	0	0.1	1					Competent
			Pyrrhotite	0													
			Base Metal	10	0	0	0	100	0	0				1			
	CARBONATES	84.5	Calcite	100	0	0	0	3	0	97				2		0.7	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	15	Quartz	97	0	0	0	10	0	90				1		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	2	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 108.75 To 115.0 m | Sample Number: 160475

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone	SULPHIDES	1	Pyrite	99	63	30	0	2	5	0	0.1	1		1	1		Highly fractured
			Pyrrhotite	0													
			Base Metal	1	0	0	0	100	0	0				1			
	CARBONATES	1	Calcite	100	0	88	0	12	0	5*		10		4		0.3	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	90	0	0	0	1	0	99				1		0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	8	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 115.0 To 121.1 m | Sample Number: 160476

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Slate/ siltstone	SULPHIDES	1	Pyrite	100	69	30	0	0	1	0	0.2	1			1		Rubble to fissile
			Pyrrhotite	0													
			Base Metal	tr	0	0	0	100	0	0				0.5			
	CARBONATES	tr	Calcite	100	0	0	0	100	0	0				5			
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	99	Quartz	85	0	0	0	10	0	90				70		< 0.1	
			Albite	3	0	0	0	0	0	100						< 0.1	
			Sericite	12	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 121.1 To 126.3 m | Sample Number: 160477

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Siltstone (calcareous)	SULPHIDES	1	Pyrite	100	97	1	0	1	1	0	0.2	1		1	2		Fractured to highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	35	Calcite	100	0	0	0	3	0	5*97				2		0.5	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	64	Quartz	93	0	0	0	12	0	88				10		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	6	0	50	0	0	0	50		0.5				< 0.1	

HOLE: 84-95 | Interval From 126.3 To 132.3 m | Sample Number: 160478 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dimensions of Forms (mm): Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	Condition of Rock in Core
Exhalite/ High sulphide	SULPHIDES	7	Pyrite	90	70	5	0	10	15	0	0.5	2		4	5		Competent to rubble
			Pyrrhotite	0													
			Base Metal	10	0	0	0	80	20	0				5	2		
	CARBONATES	13	Calcite	20	50	0	0	50	0	0	0.3			15			
			Dolomite	0													
			Fe-Carb.	80	50	0	0	50	0	0	0.7			15			
	SILICATES	80	Quartz	96	0	0	0	15	0	85				50		0.1	
			Albite	1	0	0	0	0	0	100						< 0.1	
			Sericite	3	0	100	0	0	0	0		1					

HOLE: 84-95		Interval From 132.3 To 133.9 m			Sample Number: 160479												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Quartz vein	SULPHIDES	2	Pyrite	90	0	0	0	80	20	0				3	2		Competent
			Pyrrhotite	0													
			Base Metal	10	0	0	0	50	50	0				1	2		
	CARBONATES	1.5	Calcite	90	0	0	0	100	0	0				5			
			Dolomite	0													
			Fe-Carb.	10	0	0	0	100	0	0				5			
	SILICATES	96.5	Quartz	100	0	0	100	0	0	0			1000				
			Albite	0													
			Sericite	0													

HOLE: 84-95		Interval From 133.9 To 137.5 m			Sample Number: 160480												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Exhalite/ quartz vein	SULPHIDES	6	Pyrite	90	30	0	0	50	20	0	0.3			6	4		Fractured
			Pyrrhotite	0													
			Base Metal	10	0	0	0	100	0	0				8			
	CARBONATES	tr	Calcite	100	30	0	0	70	0	0	0.2			2			
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	94	Quartz	99	0	0	65	0	0	35			300			0.2	
			Albite	0													
			Sericite	1	100	0	0	0	0	0	< 0.1						

HOLE: 84-95		Interval From 137.5 To 141.9 m			Sample Number: 160481												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
High sulphide (mineralogy tentative)	SULPHIDES	40	Pyrite	97	15	5	20	0	60	0	0.2	1	15		4		Fractured
			Pyrrhotite	0													
			Base Metal	3	0	0	0	0	100	0					3		
	CARBONATES	5?	Calcite	100	50	0	0	0	50	0	1				3		
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	55	Quartz	75	0	0	0	20	0	80				50		0.3	
			Albite	0													
			Sericite	25	0	0	0	0	0	100						0.4	

HOLE: 84-95		Interval From 141.9 To 145.5 m			Sample Number: 160482												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Exhalite (mineralogy tentative)	SULPHIDES	12	Pyrite	85	45	15	0	0	40	0	0.5	2			6		Competent to fractured
			Pyrrhotite	0													
			Base Metal	15	20	0	0	30	50	0	1			15	3		
	CARBONATES	2	Calcite	50	50	0	0	0	50	0	0.5				2		
			Dolomite	0													
			Fe-Carb.	50	50	50	0	0	0	0	0.2	0.5					
	SILICATES	86	Quartz	97	0	0	15	5	0	80			40	10		0.3	
			Albite	0													
			Sericite	3	0	100	0	0	0	0		0.8					

HOLE: 84-95 | Interval From 145.5 To 150.3 m | Sample Number: 160483 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate/ mudstone	SULPHIDES	2.5	Pyrite	99	5	5	80	5	5	0	0.2	2	20	1	3		Highly fractured
			Pyrrhotite	0													
			Base Metal	1	0	50	0	50	0	0		1		1			
	CARBONATES	tr	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	97.5	Quartz	88	0	2	0	5	0	93		1		10		< 0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 150.3 To 154.9 m | Sample Number: 160484

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Slate/ mudstone	SULPHIDES	1	Pyrite	99	30	25	0	15	30	0	0.1	1		1	2		Highly fractured to rubble
			Pyrrhotite	0													
			Base Metal	1	0	0	0	0	100	0					2		
	CARBONATES	1	Calcite	100	0	100	0	0	0	4*		5				0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	98	Quartz	88	0	5	0	0	0	95		1				0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	10	0	0	0	0	0	100						< 0.1	

HOLE: 84-95 | Interval From 154.9 To 160.0 m | Sample Number: 160485

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	1	Pyrite	100	96	0	0	2	2	0	0.5			1	2		Rubble to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	0	Calcite														
			Dolomite														
			Fe-Carb.														
	SILICATES	99	Quartz	92	0	0	5	1	0	94			35	6		0.6	
			Albite	3	0	0	0	0	0	100						0.3	
			Sericite	5	0	0	0	0	0	100						0.1	

HOLE: 84-95 | Interval From 160.0 To 165.4 m | Sample Number: 160486

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Sandstone	SULPHIDES	2	Pyrite	100	95	2	0	1	2	0	0.5	1		0.5	2		Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	1	Calcite	50	0	100	0	0	0	4*		5				< 0.1	
			Dolomite	0													
			Fe-Carb.	50	0	0	0	100	0	0				1			
	SILICATES	97	Quartz	91	0	0	0	0	0	100						0.8	
			Albite	4	0	0	0	0	0	100						0.3	
			Sericite	5	0	0	0	0	0	100						0.1	

CAMP CREEK FAULT

SAMPLES 160351 to 160368

HOLE: SSD-97-22	Interval From 98.35 To 104.0 m				Sample Number: 160351													
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	tr	Pyrite	100	0	0	0	100	0	0				0.1			Competent
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98	Calcite	90	0	0	0	10	0	90				2		0.1	
			Dolomite	10	0	0	0	0	100	0					8		
			Fe-Carb.	0													
	SILICATES	2	Quartz	95	100	0	0	0	0	0	0.1						
			Albite	0													
			Sericite	5	0	0	0	100	0	0				< 0.1			

HOLE: SSD-97-22	Interval From 104.0 To 105.2 m				Sample Number: 160352 **													
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	2	Pyrite	100	100	0	0	0	0	0	0.1						Gouge - rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	93	Calcite	100	0	0	0	0	40	60					4	0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	5	Quartz	0													
			Albite	0													
			Sericite	100	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-22	Interval From 105.2 To 109.73 m				Sample Number: 160353													
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1	Pyrite	100	0	0	0	100	0	0				0.1			Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	96	Calcite	100	0	0	0	1	0	99				1		< 0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	3 (silicif.)	Quartz	100	100	0	0	0	0	0	0.1						
			Albite	0													
			Sericite	0													

HOLE: SSD-97-23		Interval From 93.0 To 96.0 m			Sample Number: 160354												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone/ slate breccia	SULPHIDES	1	Pyrite	94	30	0	0	5	65	0	0.2			0.2	2		Fractured to rubble
			Pyrrhotite	0													
			Base Metal	6	0	0	0	100	0	0				3			
	CARBONATES	87	Calcite	92	0	0	0	15	0	85				3		0.1	
			Dolomite	3	0	0	0	0	100	0					3		
			Fe-Carb.	5	20	0	0	80	0	0	2			3			
	SILICATES	12	Quartz	93	0	0	0	5	0	95				5		< 0.1	
			Albite	2	0	0	0	0	0	100						< 0.1	
			Sericite	5	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-23		Interval From 96.0 To 104.85 m			Sample Number: 160355												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	2	Pyrite	100	90	0	0	5	5	0	0.1			1	2		Gouge, rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98	Calcite	99	0	0	0	2	1	97				2	3	0.1	
			Dolomite	1	0	0	0	0	100	0					3		
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SD-97-23		Interval From 104.85 To 109.5 m			Sample Number: 160356												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	tr	Pyrite	100	0	0	0	100	0	0				0.1			Rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	99	Calcite	95	0	0	0	30	0	70				2		0.1	
			Dolomite	5	0	0	0	0	0	100						0.1	
			Fe-Carb.	0													
	SILICATES	tr	Quartz	100	0	0	0	100	0	0				2			
			Albite	0													
			Sericite	0													

HOLE: SSD-97-30		Interval From 89.15 To 91.44 m			Sample Number: 160357												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1	Pyrite	100	50	0	0	30	20	0	0.2			0.2	1		Competent to fractured
			Pyrrhotite	0													
			Base Metal	tr	0	0	0	100	0	0				0.3			
	CARBONATES	99	Calcite	92	0	0	0	8	0	92				3		0.1	
			Dolomite	6	0	0	0	0	0	100						0.2	
			Fe-Carb.	2	0	0	0	100	0	0				1			
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SSD-97-30		Interval From 91.44 To 94.49 m			Sample Number: 160358 **												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	2	Pyrite	100	100	0	0	0	0	0	0.1						Fractured to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	96	Calcite	100	0	0	20	0	0	80			1			0.1	
			Dolomite	0													
			Fe-Carb.	0													
	SILICATES	2	Quartz	100	0	100	0	0	0	0		100					
			Albite	0													
			Sericite	0													

HOLE: SSD-97-31	Interval From 103.75 To 106.55 m	Sample Number: 160359															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	2	Pyrite	100	90	0	0	10	0	0	< 0.1			0.5			Fractured to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98	Calcite	99	0	0	40	0	0	60			0.5			0.1	
			Dolomite	1	0	0	0	0	100	0					0.2		
			Fe-Carb.	0													
	SILICATES	5	Quartz	2	0	0	0	0	100	0					0.1		
			Albite	0													
			Sericite	98	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-31	Interval From 106.55 To 109.73 m	Sample Number: 160360															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	tr	Pyrite	100	100	0	0	0	0	0	0.1						Competent to rubble
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	99	Calcite	70	0	0	0	65	0	35				1		0.1	
			Dolomite	30	0	0	0	0	0	100						0.1	
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SSD-97-14		Interval From 100.58 To 106.68 m									Sample Number: 160361 **						
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Altered dike	SULPHIDES	12	Pyrite	100	34	65	0	1	0	0	0.1	6		0.5			Rubble/ highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	2	Calcite	100	0	0	0	1	99	0				0.5	120		
			Dolomite	0													
			Fe-Carb.	tr	0	0	0	100	0	0				0.5			
	SILICATES	86	Quartz	15	0	0	0	0	0	100						< 0.1	
			Albite	tr													
			Sericite	85	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-45		Interval From 120.0 To 123.44 m			Sample Number: 160362												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1	Pyrite	100	5	0	0	40	0	55	0.1			0.8		0.2	Competent to fractured to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	96	Calcite	92	0	0	0	25	0	75				4		0.3	
			Dolomite	8	0	0	0	0	100	0					5		
			Fe-Carb.	0													
	SILICATES	3	Quartz	0													
			Albite	0													
			Sericite	100	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-45		Interval From 123.44 To 126.49 m			Sample Number: 160363												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	2	Pyrite	100	0	0	0	10	3	87				3	2	0.1	Rubble to gouge
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	93	Calcite	97	0	0	0	4	0	96				3		0.2	
			Dolomite	3	0	0	0	0	100	0					3		
			Fe-Carb.	0													
	SILICATES	5	Quartz	0													
			Albite	0													
			Sericite	100	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-49	Interval From 111.65 To 116.43 m	Sample Number: 160364															
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	1.5	Pyrite	100	0	0	0	100	0	0				2			Highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	98.5	Calcite	97	0	0	0	15	0	85				5		0.2	
			Dolomite	3	0	0	0	0	100	0					6		
			Fe-Carb.	0													
	SILICATES	0	Quartz														
			Albite														
			Sericite														

HOLE: SSD-97-54 | Interval From 64.85 To 68.8 m | Sample Number: 160365

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	2	Pyrite	100	3	0	0	2	0	95	0.2			0.5		0.1	Gouge to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	97	Calcite	100	0	0	0	1	0	99				1		0.1	
			Dolomite	tr	0	0	0	0	100	0					5		
			Fe-Carb.	0													
	SILICATES	1	Quartz	10	0	0	0	0	0	100						< 0.1	
			Albite	0													
			Sericite	90	0	0	0	0	0	100						< 0.1	

HOLE: SSD-97-54 | Interval From 68.8 To 72.8 m | Sample Number: 160366 **

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone	SULPHIDES	0.5	Pyrite	100	0	0	0	100	0	0				0.5			Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	99.5	Calcite	99	0	0	0	8	0	92				2		0.1	
			Dolomite	1	0	0	0	0	100	0					5		
			Fe-Carb.	0													
	SILICATES	tr	Quartz	100	0	0	0	100	0	0				2			
			Albite	0													
			Sericite	0													

HOLE: 84-101		Interval From 101.4 To 105.65 m			Sample Number: 160367												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone (plus altered dike)	SULPHIDES (slightly ox.)	8	Pyrite	100	50	0	0	0	0	50	0.1					< 0.1	Gouge to highly fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	67	Calcite	95	0	0	3	1	0	96			5	2		< 0.1	
			Dolomite	0													
			Fe-Carb.	5	100	0	0	0	0	0	< 0.1						
	SILICATES	25	Quartz	5	0	0	0	0	0	100						0.1	
			Albite	0													
			Sericite	95	0	0	0	0	0	100						< 0.1	

HOLE: 84-101		Interval From 105.65 To 109.4 m			Sample Number: 160368												
ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
Limestone (dolomitized)	SULPHIDES	tr	Pyrite	100	100	0	0	0	0	0	< 0.1						Competent to fractured
			Pyrrhotite	0													
			Base Metal	0													
	CARBONATES	75	Calcite	25	0	0	0	20	0	80				0.5		< 0.1	
			Dolomite	75	0	0	0	0	0	100						0.2	
			Fe-Carb.	0													
	SILICATES	25	Quartz	100	60	0	0	40	0	0	0.1			3			
			Albite	0													
			Sericite	0													

APPENDIX A (cont'd.)

ABA REPORTS – SUMMARY LOGS

ABA Logging Summary - Diamond Drillholes

Sample #	Drillhole	Depth Interval	Thickn.(m)	Strat.Unit	ABA Rock	% Sulph.	bm/bm+py	% Carb.	Notes
160301	97-15	9.14 - 17.7	8.56	1B	sandstone	1	0	1	
160302**	97-15	17.7 - 21.5	3.8	1B	sandstone	2	0	1	**extra analyses: Total Ba, Se etc.
160303	97-15	21.5 - 25.0	3.5	1B	siltstone	3	0	2	
160304	97-15	25.0 - 28.0	3	1B	siltstone	3	0	3	
160305	97-15	28.0 - 33.5	5.5	1B	siltstone	5	0	2	
160306	97-15	33.5 - 36.8	3.3	1B	sandstone	3	0	3	
160307**	97-15	36.8 - 42.6	5.8	1B	siltstone	4	1	2	
160308	97-15	42.6 - 47.55	4.95	1AA	slate	2	0	3	
160309	97-15	47.55 - 54.5	6.95	LZ	hi sulphide	40	20	35	
160310	97-15	54.5 - 56.2	1.7	1AA	slate	1	0	29	
160311	97-15	56.2 - 58.0	1.8	LZ	hi sulphide	35	30	3	
160312**	97-15	58.0 - 60.8	2.8	1AA	siltstone	1	0	6	
160313	97-15	60.8 - 66.15	5.35	1AA	siltstone	1	0	1	
160314	97-15	66.15 - 70.1	3.95	1AA	slate	1	3	30	mudstone; carbonate breccia
160315	97-15	70.1 - 74.5	4.4	MLS	limestone	1	15	84	
160316	97-15	74.5 - 84.25	9.75	MLS	limestone	1	25	95	
160317**	97-15	84.25 - 85.0	0.75	1AA	siltstone	1	0	20	breccia, with limestone
160318	97-15	85.0 - 92.66	7.66	MLS	limestone	1	0	98	EOH
160350	84-65	4.8 - 13.0	8.2	1B	sandstone	1	0	0	
160319	84-65	13.0 - 21.0	8	1B	sandstone	1	0	0	
160320	84-65	21.0 - 28.0	7	1B	sandstone	1.5	0	0	
160321**	84-65	28.0 - 34.55	6.55	1B	sandstone	1.5	0	2	
160322	84-65	34.55 - 37.3	2.75	1B	sandstone	< 1.0	0	1	
160323	84-65	37.3 - 40.2	2.9	1B	sandstone	< 1.0	0	2	
160324	84-65	40.2 - 45.0	4.8	1B	sandstone	1	0	0	
160325	84-65	45.0 - 52.4	7.4	1B	sandstone	1	0	1	
160326**	84-65	52.4 - 58.15	5.75	1B	sandstone	1	0	1	
160327	84-65	58.15 - 67.65	9.5	1B	sandstone	< 1.0	0	< 1.0	
160328	84-65	67.65 - 70.1	2.45	1B	sandstone	1	0	< 1.0	
160329	84-65	70.1 - 79.4	9.3	1B	siltstone	2	0	2	
160330	84-65	79.4 - 86.35	6.95	1B	sandstone	1	0	< 1.0	
160331**	84-65	86.35 - 92.0	5.65	1B	siltstone	3	0	4	6% of sulphides = pyrrhotite
160332	84-65	92.0 - 94.3	2.3	1B	siltstone	1	0	2	
160333	84-65	94.3 - 98.7	4.4	1B	sandstone	1	0	2	

ABA Logging Summary - Diamond Drillholes

Sample #	Drillhole	Depth Interval	Thickn.(m)	Strat.Unit	ABA Rock	% Sulph.	bm/bm+py	% Carb.	Notes
160334	84-65	98.7 - 103.3	4.6	1B	siltstone	1	0	10	
160335	84-65	103.3 - 111.3	8	1B	sandstone	1	0	1	
160336**	84-65	111.3 - 116.9	5.6	1B	siltstone	2	0	6	
160337	84-65	116.9 - 127.0	10.1	1B	sandstone	1	0	2	1% of sulphides = pyrrhotite
160338	84-65	127.0 - 133.1	6.1	1B	sandstone	1	0	1	75% of sulphides = pyrrhotite
160339	84-65	133.1 - 137.7	4.6	1B	siltstone	1	0	0	
160340	84-65	137.7 - 140.5	2.8	1B	sandstone	1	0	1	10% of sulphides = pyrrhotite
160341**	84-65	140.5 - 144.0	3.5	1B	siltstone	1	0	0	
160342	84-65	144.0 - 154.0	10	1B	siltstone	1	0	1	
160343	84-65	154.0 - 158.35	4.35	1B	siltstone	2	0	5	
160344	84-65	158.35 - 165.5	7.15	1B	sandstone	2	0	< 1.0	2% of sulphides = pyrrhotite
160345	84-65	165.5 - 172.5	7	1BA	siltstone	2	0	4	
160346**	84-65	172.5 - 176.8	4.3	1AA	slate	1	0	5	
160347	84-65	176.8 - 182.7	5.9	1AA	slate	2	0	12	some limestone fragments.
160348	84-65	182.7 - 193.0	10.3	MLS	limestone	0	-	99	
160349	84-65	193.0 - 203.3	10.3	MLS	limestone	tr	0	99	
160401**	97-46	20.42 - 27.0	6.58	1AA	slate	2	tr	tr	
160402	97-46	27.0 - 33.5	6.5	1AA	siltstone	1	0	tr	
160403	97-46	33.5 - 39.1	5.6	1AA	siltstone	2	0	8	% = original sulph. Now ~oxidiz.
160404	97-46	39.1 - 44.0	4.9	1AA	siltstone	2	0	tr	% = original sulph. Now oxidiz'd.
160405	97-46	44.0 - 49.0	5	1AA	siltstone	4	0	0	% = original sulph. Now oxidiz'd.
160406**	97-46	49.0 - 56.6	7.6	LZOX	oxide	40	0	0	% = estimated original sulphide
160407	97-46	56.6 - 59.7	3.1	MLS	limestone	3	0	97	% = original sulph. Now oxidiz'd.
160408	97-46	59.7 - 65.2	5.5	MLS	limestone	2	0	98	% = original sulph. Now oxidiz'd.
160409	97-46	65.2 - 66.35	1.15	MLS	hi sulphide	22	0	78	about 10% of sulphides oxidized
160410	97-46	66.35 - 68.27	1.92	MLS	limestone	5	0	95	about 60% of sulphides oxidized
160411**	97-18	25.8 - 28.4	2.6	2A	siltstone	2	0	tr	% = original sulph. Now oxidiz'd.
160412	97-18	28.4 - 33.7	5.3	2A	siltstone	5	0	0	
160413	97-18	33.7 - 34.2	0.5	D-ZONE	hi sulphide	40	0	0	not oxidized
160414	97-18	34.2 - 35.3	1.1	D-ZONE	exhalite	6	0	0	sample depleted by ARD 199734
160415	97-18	35.3 - 39.6	4.3	D-ZONE	hi sulphide	20	10	3	mostly Fe-carbonate
160416**	97-18	39.6 - 41.6	2	2A	siltstone	3	0	0	

ABA Logging Summary - Diamond Drillholes

Sample #	Drillhole	Depth Interval	Thickn.(m)	Strat.Unit	ABA Rock	% Sulph.	bm/bm+py	% Carb.	Notes
160417	97-18	41.6 - 45.25	3.65	D-ZONE	hi sulphide	25	10	12	mostly Fe-carbonate
160418	97-18	45.25 - 46.75	1.5	D-ZONE	exhalite	5	0	7	mostly Fe-carbonate
160419	97-18	46.75 - 48.4	1.65	2A	siltstone	4	5	2	
160420	97-18	48.4 - 49.2	0.8	D-ZONE	exhalite	20	0	0	
160421**	97-18	49.2 - 53.7	4.5	2AA	siltstone	7	0	0	
160422	97-18	53.7 - 60.5	6.8	1B	sandstone	2	0	0	
160423	97-18	60.5 - 67.15	6.65	1B	sandstone	1.5	0	0	fault zone, gouge
160424	97-18	67.15 - 72.85	5.7	1B	sandstone	2	0	3	
160425	97-18	72.85 - 76.3	3.45	1B	sandstone	1.5	0	1	
160426**	97-18	76.3 - 82.0	5.7	1B	siltstone	2	0	1	
160427	97-18	82.0 - 86.0	4	1B	sandstone	1	0	0.5	
160428	97-18	86.0 - 91.2	5.2	1B	sandstone	2	0	0.5	
160429	97-18	91.2 - 94.5	3.3	1B	sandstone	3	0	1	
160430	97-18	94.5 - 97.1	2.6	1B	sandstone	2	0	2	3% of sulphides = pyrrhotite
160431**	97-18	97.1 - 101.65	4.55	1B	sandstone	3.5	1	1	
160432	97-18	101.65 - 105.6	3.95	1B	sandstone	2	0	0	
160433	97-18	105.6 - 111.0	5.4	1B	sandstone	2	2	2	
160434	97-18	111.0 - 118.8	7.8	1B	sandstone	1	tr	1	
160435	97-18	118.8 - 120.7	1.9	1B	siltstone	2	2	1	
160436**	97-18	120.7 - 122.9	2.2	1B	siltstone	5	2	1	
160437	97-18	122.9 - 128.15	5.25	1B	siltstone	1	tr	5	
160438	97-18	128.15 - 132.5	4.35	1B	siltstone	2.5	0	5	
160439	97-18	132.5 - 137.0	4.5	1B	siltstone	1.5	0	5	
160440	97-18	137.0 - 141.5	4.5	1BA	siltstone	1.5	0	5	
160441**	97-18	141.5 - 144.75	3.25	1BA	siltstone	2	0	5	
160442	97-18	144.75 - 148.1	3.35	1AA	slate	2	0	5	
160443	97-18	148.1 - 155.5	7.4	1AA	slate	1	0	1	
160444	97-18	155.5 - 159.9	4.4	1AA	slate	1	0	2	
160445	97-18	159.9 - 166.7	6.8	MLS	limestone	3	0	92	
160446**	97-18	166.7 - 169.7	3	MLS	dol. lmst.	2	0	98	dolomitized lmst. (75% dolomite)
160447	97-18	169.7 - 176.78	7.08	MLS	limestone	1.5	0	98.5	
160451	84-95	5.2 - 13.5	8.3	2AP	sand/siltst.	1	0	0	sulphides partly oxidized
160452	84-95	13.5 - 22.4	8.9	2AP	silt/sandst.	1	0	tr	trace Fe-carbonate
160453	84-95	22.4 - 26.6	4.2	2AP	siltstone	1.5	0	tr	

ABA Logging Summary - Diamond Drillholes

Sample #	Drillhole	Depth Interval	Thickn.(m)	Strat.Unit	ABA Rock	% Sulph.	bm/bm+py	% Carb.	Notes
160454**	84-95	26.6 - 32.5	5.9	2AP	silt/sandst.	1	0	tr	
160455	84-95	32.5 - 39.1	6.6	2AP	sand/siltst.	1	0	tr	
160456	84-95	39.1 - 42.9	3.8	2AP	slate/siltst.	1	0	0	
160457	84-95	42.9 - 52.7	9.8	2AP	sand/siltst.	2	5	tr	
160458	84-95	52.7 - 62.7	10	2AP	siltstone	1.5	0	tr	
160459**	84-95	62.7 - 69.1	6.4	2AP	slate/siltst.	1	0	0	
160460	84-95	69.1 - 75.5	6.4	2AP	sandstone	3.5	2	1	
160461	84-95	75.5 - 81.3	5.8	2AP	sand/siltst.	1.5	tr	1	
160462	84-95	81.3 - 83.9	2.6	2AP	sand/slate	4	0	1	
160463	84-95	83.9 - 86.75	2.85	2AS	siltstone	1	15	tr	
160464**	84-95	86.75 - 89.9	3.15	2AS	siltstone	1.5	5	1	cherty
160465	84-95	89.9 - 91.4	1.5	O-ZONE	exhalite	1	3	0	
160466	84-95	91.4 - 93.8	2.4	2AS	siltstone	1.5	5	1	siliceous
160467	84-95	93.8 - 96.1	2.3	2AS	siltstone	1	8	1	
160468	84-95	96.1 - 96.8	0.7	2AS	siltst./lmst	1	0	40	coarse, dark, crystalline lmst.
160469**	84-95	96.8 - 99.6	2.8	2AS	siltstone	1.5	5	tr	
160470	84-95	99.6 - 100.1	0.5	O-ZONE	exhalite	1	5	0	
160471	84-95	100.1 - 102.6	2.5	2AS	siltstone	1	0	3	
160472	84-95	102.6 - 105.5	2.9	I-ZONE	exhalite	1.5	5	5	+ siliceous siltstone
160473**	84-95	105.5 - 108.0	2.5	2AS	siltstone	1	25	1	
160474	84-95	108.0 - 108.75	0.75	2AS	limestone	0.5	10	84.5	
160475	84-95	108.75 - 115.0	6.25	2AS	siltstone	1	1	1	
160476	84-95	115.0 - 121.1	6.1	2AS	slate/siltst.	1	tr	tr	
160477	84-95	121.1 - 126.3	5.2	2AC	siltstone	1	0	35	
160478**	84-95	126.3 - 132.3	6	U-ZONE	ex/hi sulph	7	10	13	carbonate mostly Fe-carbonate
160479	84-95	132.3 - 133.9	1.6	YBR	quartz vein	2	10	1.5	
160480	84-95	133.9 - 137.5	3.6	YBR	exh/qz vei	6	10	tr	
160481	84-95	137.5 - 141.9	4.4	D-ZONE	hi sulphide	40	3	5?	mineralogy tentative
160482	84-95	141.9 - 145.5	3.6	D-ZONE	exhalite	12	15	2	mineralogy tentative
160483**	84-95	145.5 - 150.3	4.8	2AA	slate/mdst	2.5	1	tr	
160484	84-95	150.3 - 154.9	4.6	2AA	slate/mdst	1	1	1	
160485	84-95	154.9 - 160.0	5.1	1B	sandstone	1	0	0	
160486	84-95	160.0 - 165.4	5.4	1B	sandstone	2	0	1	

ABA Logging Summary - Diamond Drillholes

Sample #	Drillhole	Depth Interval	Thickn.(m)	Strat.Unit	ABA Rock	% Sulph.	bm/bm+py	% Carb.	Notes
Camp Creek Fault samples									
160351	97-22	98.35 - 104.0	5.65	MLS	limestone	tr	0	98	
160352**	97-22	104.0 - 105.2	1.2	MLS	limestone	2	0	93	gouge
160353	97-22	105.2 - 109.73	4.53	MLS	limestone	1	0	96	
160354	97-23	93.0 - 96.0	3	MLS	lmst/mudst	1	6	87	breccia
160355	97-23	96.0 - 104.85	8.85	MLS	limestone	2	0	98	gouge, rubble
160356	97-23	104.85 - 109.5	4.65	MLS	limestone	tr	0	99	
160357	97-30	89.15 - 91.44	2.29	MLS	limestone	1	tr	99	
160358**	97-30	91.44 - 94.49	3.05	MLS	limestone	2	0	96	
160359	97-31	103.75-106.55	2.8	MLS	limestone	2	0	98	
160360	97-31	106.55-109.73	3.18	MLS	limestone	tr	0	99	
160361**	97-14	100.58-106.68	6.1	YBR	alter'd dike	12	0	2	YBR rock
160362	97-45	120.0 - 123.44	3.44	MLS	limestone	1	0	96	
160363	97-45	123.44-126.49	3.05	MLS	limestone	2	0	93	
160364	97-49	111.65-116.43	4.78	MLS	limestone	1.5	0	98.5	
160365	97-54	64.85 - 68.8	3.95	MLS	limestone	2	0	97	fault zone
160366**	97-54	68.8 - 72.8	4	MLS	limestone	0.5	0	99.5	footwall
160367	84-101	101.4 - 105.65	4.25	MLS	lmst+dike?	8	0	67	sulphides slightly oxidzed
160368	84-101	105.65 - 109.4	3.75	MLS	dol. lmst.	tr	0	75	75% of carbonate = dolomite

ABA Logging Summary - Soils

Sample #	Location	Depth	Strat.unit	Soil	Easting	Northing
160601	open pit	50 - 60 cm	OB	Soil	25000E	43300N
160602	open pit	50 - 60 cm	OB	Soil	25100E	43300N
160603	open pit	50 - 60 cm	OB	Soil	24800E	43400N
160604	open pit	50 cm	OB	Soil	24900E	43400N
160605**	open pit	60 cm	OB	Soil	25000E	43400N
160606	open pit	50 cm	OB	Soil	25100E	43400N
160607	open pit	50 cm	OB	Soil	25200E	43400N
160608	open pit	50 - 60 cm	OB	Soil	24700E	43500N
160609	open pit	45 cm	OB	Soil	24800E	43500N
160610**	open pit	45 - 50 cm	OB	Soil	24900E	43500N
160611	open pit	50 cm	OB	Soil	25000E	43500N
160612	open pit	50 cm	OB	Soil	25100E	43500N
160613	open pit	45 - 50 cm	OB	Soil	25200E	43500N
160614	open pit	50 - 55 cm	OB	Soil	24700E	43600N
160615**	open pit	55 - 60 cm	OB	Soil	24800E	43600N
160616	open pit	50 cm	OB	Soil	24900E	43600N
160617	open pit	50 - 60 cm	OB	Soil	25000E	43600N
160618	open pit	45 cm	OB	Soil	25100E	43600N
160619	open pit	50 cm	OB	Soil	24700E	43700N
160620**	open pit	50 - 55 cm	OB	Soil	24800E	43700N
160621	open pit	45 - 50 cm	OB	Soil	24900E	43700N
160622	open pit	50 cm	OB	Soil	25000E	43700N
160623	open pit	45 - 50 cm	OB	Soil	25100E	43700N
160624**	open pit	45 - 50 cm	OB	Soil	24700E	43800N

APPENDIX B

ACID ROCK DRAINAGE STUDIES
WASTE CHARACTERIZATION

SILVERTIP MINING CORPORATION

1CS010.00

1998 ACID ROCK DRAINAGE STUDIES
WASTE CHARACTERIZATION – PHASE 2

1CS010.00

1998 ACID ROCK DRAINAGE STUDIES
WASTE CHARACTERIZATION – PHASE 2

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DECEMBER, 1998

1CS010.00

1998 ACID ROCK DRAINAGE STUDIES
WASTE CHARACTERIZATION – PHASE 2

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ACID ROCK DRAINAGE STUDIES
WASTE CHARACTERIZATION – PHASE 2

1.0 INTRODUCTION

1.1 Project Background

The initial stages of mining of the Silvertip lead-zinc-silver deposit will involve a pit in the north flank of Silvertip Peak between Camp, Silver and Ferri creeks to remove shale, siltstone and sandstone overlying the orebodies primarily hosted in limestone. The bulk of this rock will be Earn Group, a predominantly weakly pyritic calcareous turbiditic sequence containing four thin sulphidic exhalite horizons.

1.2 GEOLOGY TERMINOLGY

The ore is contained in the McDame Limestone (MLS) (Figure 1-1). The ore is referred to as the Lower Zone (L Zone or LZ). The McDame Limestone is underlain by a dolomitic sandstone (Tapioca Sandstone).

The Earn Group rests unconformably on the McDame Limestone, indicating a period of erosion between deposition of the two units.

The Earn Group in the project area is divided into Units 1 and 2 (Figure 1-1). Both units are further sub-divided using letter descriptors to represent stratigraphic and lithological variations. Unit 1 overlies the McDame Limestone (MLS) and is divided into 1AA, 1AC, 1B and 1BA sub-units. 1A is the basal unit, followed by 1B. Unit 1B is dominantly sandstone and siltstone. Unit 2 is finer than Unit 1. The basal part of Unit 2 contains four "exhalite" horizons. These are believed to be formed by the discharge of dense metal-rich brines onto the sea floor environment. Reductive conditions resulted in precipitation of metal sulphides. The horizons are referred to as "zones". The lowest is the relatively thick Discovery Zone (DZ), followed by the U, F and O Zones. These zones are not laterally continuous as implied by Figure 1-1. Their position in the stratigraphy can be predicted but they vary in thickness. Minor silica-pyrite exhalite horizons are found above OZ in sub-unit 2AP.

Table 1-1 summarizes estimated volumes and rock composition of each sub-unit. As indicated, the largest sub-unit is 1b.

Silvertip (1997) is a detailed geological report for the project.

1.3 Chronology of ARD/ML Studies

Phase 1

In 1997, Silvertip Mining Corporation (SMC) completed a preliminary acid-base accounting study as part of ongoing property development (Mine Drainage Assessment Group (MDAG)) (1998). The study involved collection of 77 discrete samples of Earn Group and McDame Group from drill core and lead-zinc-silver ore from a stockpile extracted from the underground workings in 1986. The core samples were collected from a variety of locations and were not continuous.

Phase 2

In 1998, following development of a preliminary mine plan, further studies were initiated, with consultation by this Author, to address waste management issues arising from the mine plan and the preliminary ABA study. These studies including detailed stratigraphic sampling of the Earn Group within the proposed open pit area to characterize variability of acid generation and metal leaching potential, construction of field test pads, examination of a 12-year old ore stockpile, sampling of soils in the open pit footprint, and sampling of surface and groundwater in the vicinity of the open pit.

1.4 Structure of the Report

This report describes results of all studies completed to data.

Section 2 describes the results of the 1997 acid-base accounting program (referred to here as Phase 1.

Section 3 the design, methods and results of the subsequent phase of waste characterization.

Section 4 provides an initial geochemical interpretation of the results obtained to date.

Section 5 gives conclusions of the study.

1.5 Acknowledgements

Phase 2 of this study was conducted with input of the following personnel at SMC:

- Steve Robertson, Project Manager – Silvertip Project
- Peter Campbell, Manager, Environmental Affairs, Imperial Metals Corporation
- Chris Rees, Project Geologist – Silvertip Project.

Bondar Clegg, North Vancouver, BC, completed most analytical work for the project. Chemex performed quality control checking.

2.0 INITIAL (PHASE 1) ACID-BASE ACCOUNTING STUDY

2.1 Methods and Results

An initial acid-base accounting study was conducted by Silvertip using samples collected in the summer of 1997. The results were reported by MDAG (1998). The samples were collected from a variety of sources including rock core, and the ore stockpile and waste dump located near the main portal (Table 2-1). The samples were not collected to specifically represent waste rock that would be included in the current proposed open pit plan, but were intended to provide an initial indication of the characteristics of all rock types at the project. Detailed conclusions from that study are provided in the above report.

Summary statistics for the acid-base accounting and metal analysis portions of the study are shown in Tables 2-2 and 2-3, and results classified according to rock type are plotted in Figures 2-1 and 2-2. Raw data are provided in Appendix A.

Comparison of total sulphur and sulphur as sulphide concentrations (Figure 2-1) indicated that most sulphur was in the form of sulphide. HCl-soluble sulphate (ie gypsum and sulphide weathering products) had a median value of 0.02%, which appeared to be typical of the bulk of the unweathered rock types. Unaccounted for sulphur (ΔS) was calculated using:

ΔS, % = Total S – Sulphide-S – Sulphate-S

The median value of ΔS was 0.05%, which may be accounted for by sulphur as resistate sulphates such as barite and anglesite. Total barium was not determined so the presence of barite could not be confirmed.

Comparison of neutralization potential (using the Sobek et al. 1978 method) and total inorganic carbon re-calculated as calcium carbonate equivalents (Figure 2-1) indicated in general that the two values were very similar. The exception was unit 1B in the Earn Group, which indicated TIC significantly greater than NP. This was most likely due to the presence of iron-based carbonates, which could include siderite, ankerite, and ferroan calcite and dolomite.

Comparison of NP and AP (calculated from S-sulphide + ΔS) (Figure 2-2) using conventional classification regions of 1<NP/AP<2 (uncertain net acid generation potential) and NP/AP<1 (probable acid generators) showed that the majority of rock types in the Earn Group were classified as "uncertain" or "probable acid producers" though all values were very close to the NP/AP=1 boundary. Samples of exhalite (D- and O-Zone) indicated potential for acid generation. McDame Limestone samples are indicated to be acid consuming due to low sulphur concentrations and NP near 1000 kg $CaCO_3$/t (pure calcite). Ore samples (L-Zone) indicated high AP and NP, but with NP/AP<1 except for one sample. Samples indicated as "surface" in the plot legend are largely composed of McDame Limestone type materials.

The statistical summaries presented in Table 2-2 quantify these conclusions. The two well represented sub-units of the Earn Group (1AA and 1B) had median total S concentrations of 2.5 and 1.6%, respectively. Neutralization potentials were very similar (approximately 50 kg $CaCO_3$/t) hence 1AA had a median NP/AP of 0.9 compared to 1.4 for 1B. 1B will be the main unit excavated during open pit development. The main exhalite zone (D) contained a wider range of acid sulphur concentrations than the rest of the Earn Group and comparable neutralization potential. Median NP/AP was low and indicated potential for acid generation.

Statistics for selected metal analyses are shown in Table 2-3. Metal concentrations are variable in the Earn Group. MDAG(1998) noted that concentrations of antimony, arsenic, cadmium, copper, lead, silver and zinc were elevated above typical crustal values. Metal concentrations are variable in the Earn Group and include median values of zinc, lead and arsenic above typical crustal values. Copper concentrations were low and fairly typical of crustal values. The exhalite zones and ore-type materials contained elevated concentrations of all these elements.

The McDame Limestone generally had low concentrations of metals on average, but a wide range in metal concentrations indicating variable base metal mineralization throughout the unit.

2.2 Conclusions

The principle conclusions of the Phase 1 study were as follows:

- The Earn Group, of which unit 1B will form the majority of waste rock from the open pit, has variable sulphur content due to the presence of disseminated fine-grained pyrite. This unit is predicted to be of uncertain acid generation potential (1<NP/AP<2) though NP/AP is rarely less than 1. It contains variable but elevated concentrations of As, Pb and Zn. Due to the nature of the study, it is not known whether acid generation potential and heavy element content occurs randomly or as correlatable zones.

- The lower parts of unit 2A contain sulphide-rich exhalite horizons. These units have elevated sulphur concentrations and are predicted to be acid generating.

- The ore-host McDame limestone has low sulphur concentrations (<0.5%, with some exceptions) but contains locally elevated As, Pb and Zn concentrations.

- The ore has variable elevated sulphur content, including massive, and also has variable carbonate content.

- Massive sulphide ore stored on surface for over a decade has not become acidic despite having relatively low carbonate content (1%).

3.0 FOLLOW-UP ARD/ML STUDY

3.1 Study Design

3.1.1 Introduction

Based on the acid generation/metal leaching database developed in 1997, and the project proposal, several issues relating to design for management of potential sources of poor quality water sources at Silvertip were identified:

- **Construction material will be required for the impoundment and other structures.** Waste rock used for this purpose will need to be non-acid generating and not significantly metal leaching with a very high degree of certainty. Construction material will originate from Earn Group waste rock stripped from the open pit. The Earn Group appears to contain suitable material but it is not known if this material occurs in contiguous mineable zones.

- **Units 1A and 1B of the Earn Group may be non-acid generating on-balance but there is a potential for localized acid generation and leaching of zinc, arsenic and cadmium resulting in elevated concentrations of these elements in non-acidic drainage.** The degree to which this occurs and results in unacceptable drainage quality needs to be quantified, as this will dictate the requirements for special handling of the entire unit or selected stratigraphic sections.

- **The final exposed pit highwall will be composed principally of Unit 1 of the Earn Group, however, exhalite horizons in Unit 2A will be exposed at the very top of the wall.** Primarily the weathering of the exhalite horizons would control the chemistry of runoff. Since these walls can not be flooded at final closure, the effect of these exposures will control any requirement for long term chemical treatment of water from the closed mine.

In order to focus subsequent waste characterization studies, Table 3-1 outlines potential waste management options for each facility, suggested studies and test methods to further develop the options. A detailed ARD/ML program will be formulated as mine planning progresses. The rationale for the various types of studies are summarized in the following sections.

3.1.2 Mineralogical Description

Since much of the rock is weakly mineralized, and some rock is marginally acid generating, understanding the type and occurrence of the various mineral species will be critical to developing site specific criteria for management of waste rock. This includes determining the mineralogical form of sulphur (ferrous and non-ferrous reduced vs. oxidized), mineralogical form of acid neutralizers (calcium, magnesium and iron carbonate, and non-carbonate) and the mineralogical occurrence of the minerals (eg. disseminated, massive, fracture filling, degree of crystallinity, particle size).

3.1.3 Static Testing

The Phase 1 study indicated that the Earn Group varies in its acid generation and metal leaching potential. The chemistry of leachate from the waste rock and mine highwall will largely be controlled by the spatial variation of sulphide and carbonate content. The static test program was designed to evaluate the detailed stratigraphic variation of mineralogy within the Earn Group.

Since the mineralogy at Silvertip possibly includes several minerals that may interfere with conventional acid-base accounting methods, additional testing is needed to understand how the tests respond to the mineralogy. Specific interferences designed to be addressed in Phase 2 included:

- Non-ferrous sulphides (principally sphalerite and galena) report to acid potential when determined by sulphide-sulphur but do not generate acid (though are a source of metals).
- Barite may be present and needs to be quantified to avoid including it in the sulphur as sulphide quantity.
- Iron carbonates are common at Silvertip. Evaluation of the types of carbonates reported as "neutralization potential" is needed. Iron carbonates do not consume acid under aerobic conditions.
- Effect of silicates on neutralization potential detminations.

3.1.4 Laboratory Kinetic Tests

A program of kinetic test work will be initiated based on the interpretation of Phase 2 results and consultation with regulatory agencies through stage 1 of the BC EAA.

Laboratory kinetic tests will be used to develop site specific criteria for:

- Lag time to onset of acid generation in potentially acid generating rock (PAG); and
- Definition and possibly segregation of PAG rock.

Results from the MDAG (1998) study indicated that elevated concentrations of silver, antimony, arsenic, cadmium, lead, zinc and locally copper occur throughout the stratigraphy. Since zinc, arsenic and antimony can both be leached under non-acidic conditions and can persist in acidic waters neutralized by carbonate, kinetic tests will also indicate the degree to which these elements are released under non-acidic and acidic conditions.

No bench scale kinetic tests have been initiated.

3.1.5 On-site Kinetic Tests

Primarily due to the potential for leaching of heavy elements under non-acidic condition, field kinetic tests are needed to determine release of these elements under natural conditions, for comparison with laboratory tests.

3.1.6 Excavation of Ore Pile

Approximately 9000 t of ore-type material excavated from the underground workings in 1987 is located in a stockpile, north of the portal in a large laydown area constructed from McDame Limestone. The pile provides an opportunity to evaluate long-term weathering under site conditions, primarily to assess on-set of acid generation and liberation of heavy metals under non-acidic conditions. The pile was placed on coarse crushed limestone, hence no seepage has been observed.

3.1.7 Natural Surface and Groundwater

Monitoring of natural water chemistry provides indications of natural weathering controls and mechanisms likely to control long term water chemistry, particularly in open pit walls.

3.1.8 Open Pit Area Soils

Soils will be stripped from the open pit area prior to mining rock. Soils are potentially a source of dissolved metals since they represent oxidized equivalents of the bed rock lithologies.

3.2 Methods

3.2.1 Static Testing

3.2.1.1 Sample Selection

Four diamond drill holes within the open pit were selected to provide relatively complete cross-sections through the entire hangingwall stratigraphy (Figure 3-1). Sample selection was also guided by a need to sample several of the exhalite zones. Age and condition of core was also considered. The older core has been stored in wall-less but covered core racks. Much of the older core had been weathered and was not suitable for testing. More recent drilling had focussed on the McDame ore and did not intersect the whole Earn Group stratigraphy. Core selection was as a result constrained by several variables. The total number of samples was 116.

An additional nine samples were collected from drill holes piercing the Camp Creek Fault. The fault will form the west wall of the open pit.

Twenty-four samples were also collected from shallow hand-dug pits within the proposed open pit footprint, primarily to evaluate the presence of leachable metals in near surface weathered material which would be stripped prior to mining.

3.2.1.2 Mineralogical Description

Each core interval sampled was described by project geologist Chris Rees using a template to characterize the minerals that typically control leachate chemistry.

3.2.1.3 Acid-Base Accounting

Acid-base accounting was performed using the conventional Sobek et al. (1978) procedure to ensure consistency with the first round of sampling. The laboratory reported total sulphur, neutralization potential (NP), fizz rating, quantity and strength of acid used in the NP determination and paste pH.

3.2.1.4 Carbonate and Sulphur Speciation

Carbonate speciation was evaluated directly on every 5th sample by determining total inorganic carbon (TIC) which is converted to equivalent units of neutralization potential (NP) using:

- TIC_{NP} (kg $CaCO_3$/t) = TIC(%)*(100/12)*10

Sulphur speciation was evaluated by determining total barium (by x-ray fluorescence) as a surrogate for sulphur associated with barite. Total sulphur as sulphide was determined by leaching the samples with hot sodium carbonate to remove all sulphates (includes both weak acid soluble and resistate phases) and then analyzing the residue for total sulphur (by Leco Furnace in most cases, or gravimetrically for sulphur greater than 10%). Barium was determined on every 5th sample. Sulphate present in water or weak-acid soluble forms was determined by subtracting S as $BaSO_4$ from total S as sulphate. The following data conversions were used:

- Maximum Potential Acidity, MPA (kg $CaCO_3$/t) = Total S(%) x 31.25.
- Sulphur as barite, S_{Ba}(%) = Total Ba(%)*(32/137.3)
- Sulphur as zinc sulphide, S_{Zn}(%) = "Total" Zn(%)*(32/65.3)
- Sulphide as lead sulphide, S_{Pb} (%) = "Total" Pb(%)*(32/207.2)
- Acid Potential, AP = (S as Sulphide(%), $S_{S2} - S_{Zn} - S_{Pb}$) x 31.25
- Other forms(%) = Total S – $S_{Ba} - S_{S2}$

The last step forms a check to determine the amount of sulphur unaccounted for by the other determinations. For this project, the amount was expected to be low because there are no other significant forms of sulphur. Sulphur as weak-acid soluble sulphate was not determined directly as these were found to be negligible in the Phase 1 study.

3.2.1.5 Total Elemental Concentrations

All samples were analyzed for "total" element concentrations following digestion by aqua regia. This acid digestion completely digests metal sulphides and oxides but does not completely digest silicates. Hence concentrations for light elements primarily associated with silicates are not total. Barite is not completely digested by aqua regia, therefore, barium concentrations are also not total if barite is present. Barium was determined separately by XRF on a pressed pellet. Selenium was also determined by XRF.

3.2.1.6 Water and Weak-Acid Leachable Element Concentrations

Water leachable element concentrations were determined using the procedure preferred by BC Ministry of Energy and Mines (Price 1997). The samples were leached for 24 hours in de-ionized water (3 parts water to one part solid, by weight). The leachate was analyzed for the same elements as the total element scan (above).

Weak-acid leachable elements were determined primarily to evaluate the minerals possibly contributing to neutralization potential. The hydrochloric acid leachate volume and strength was the same as that used to determine neutralization potential (ie determined based on the fizz rating). The leachate was analyzed as above. Specifically, calcium and magnesium concentrations were converted to equivalent units of NP using:

$$(Ca+Mg)_{NP} = (Ca(\%)/40 + Mg(\%)/24)*100*10$$

3.2.2 On-Site Kinetic Tests

3.2.2.1 Sample Selection

Three samples were selected for construction of small test piles at the site:

- **Sample designated OP** was obtained from a road cut in the Earn Group (Figure 3-1). This sample is intended to indicate leaching rates for typical waste from the Earn Group rock.

- **Sample DZ** was obtained from a trench in the Discovery Zone exhalite in the Earn Group. The trench had been exposed for several years and the exposure was deeply weathered.

- **Sample HG** was obtained from the ore stockpile removed from the underground mine in 1984.

Samples of the pile materials were submitted for analysis. The samples were sieved to three fractions using 10 mm and 2 mm screens. The coarse and fine fraction were analyzed for acid-base account and total metals. The fine fraction was also analyzed for water soluble element content using a shake flask.

3.2.2.2 Construction

The pads were constructed over the period of July 24-26, 1998 using the design in MEND Report 1.19.1 (1994). The main adaptation of this design was that the large collection pipe was replaced with two smaller diameter pipes. Details of the construction are shown in Table 3-2.

Figure 3-2 shows the pads after construction. SMC constructed plywood barriers between the plots to further isolate pads from one another.

3.2.2.3 Monitoring

The following guidelines are being used for monitoring

1. Record daily precipitation at site.
2. At least once a week and following heavy rainfall, remove the lid and check the bucket for water. Using pH paper (or clean meter) and clean electrical conductivity (EC) meter record pH and EC. Record the colour of the water and note presence or absence of suspended matter. Note any coatings on the inside of the collection bucket. Make the measurements from Earn (OP), then Ore (HG) and finally Discovery Zone (DZ). Do not empty the pails. Replace the lid.
3. Once a month (if sufficient water in pails), collect water samples. Collect one 500–mL sample for general parameters (pH, EC, sulphate, alkalinity, acidity) and one sample for element scan (ICP-MS). The latter sample is to be shipped immediately in a cold cooler unfiltered and unpreserved. Decant water. Replace the lid.

Three sets of leachate samples were collected in September 1998 before the site was decommissioned for the winter.

3.2.3 Excavation of Ore Pile

On June 6, 1998, excavation of "box-cut" trenches was started in the ore pile. The backhoe broke down shortly after the first trench was started. Excavation was resumed on July 25, 1998. Three trenches were excavated.

The pile is elongate running approximately east to west and is accessible along the north side. The "East" trench was located at the far eastern end of the pile. The "North" trench was located in the middle of the north side, and the "Northeast" trench was located approximately midway between these two trenches. The test pad sample "HG" (See section 3.2.2.1) was collected from the west-end of the pile.

The highwall profile in each trench was described according to grain size, rock type, colour, moisture content, reaction with hydrochloric acid and rinse pH. Samples were collected from distinct horizons. The North trench showed several distinct zones identified by colour and pH and was described in more detail than the other trenches.

Samples were sieved into size fractions using sieves at 10 mm and 2 mm. The fractions were weighed, and the coarsest (+10 mm) and finest (-2 mm) fractions were analyzed for acid-base account, total Ba, and aqua regia digestible elements. The finest fraction was also leached using deionized water (3 parts water to 1 part sample, by weight), and the leachate scanned for dissolved metals.

3.2.4 Natural Groundwater and Runoff Sampling

SMC is sampling water in cased diamond drill holes and surface streams as part of ongoing baseline studies for the project. Locations of particular relevance to understanding natural weathering conditions include (Figure 3-1):

- Hydrology wells drilled in 1984 TH-1 and TH-3.
- Cased 1981 diamond drill holes 81-05 and 81-06
- Silver Creek at monitoring location W-5 and two additional on Silver Creek (See Figure 3-1).

Silver Creek flows primarily over Earn Group stratigraphy including head water exposures of exhalite zones.

3.2.5 Soils

Soils were collected from the locations shown in Figure 3-1 and tested using the same methods used for rocks including water-leachable metal concentrations (see Section 3.2.1).

3.3 Results

3.3.1 Static Tests – Rock Core

Raw data listed by drill hole and analysis type are provided in Appendix B.

3.3.1.1 Mineralogical Descriptions

Mineralogical descriptions for all core intervals are sampled are provided in a separate report (Silvertip Mining Corporation, 1998). Overall mineralogical characteristics of the major rock groups are provided in Table 3-3.

In the arenaceous and argillaceous waste rock types, the dominant minerals are silicates of which the main minerals are quartz, sericite and albite. These occur as rock-forming clasts. Quartz occasionally occurs as veinlets.

The main sulphide mineral is pyrite which occurs primarily in disseminated fine (<0.3 mm) grains. In the finer rock types (siltstone and mudstone/slate), pyrite also occurs as laminae, veinlets, fracture fillings and porphyroblasts. In the slate and mudstones, 30% of pyrite occurs in non-disseminated form. Both pyrrhotite and base metal sulphides (galena and sphalerite) occur in trace quantities in disseminated, fracture filling and porphyroblastic forms.

Both calcite and iron-bearing carbonates have been identified. The latter constitute less than 2% of the rock mass by volume and generally occur as veinlets and fracture fillings. Calcite occurs primarily as laminae. Manganese carbonates have not been identified but manganese might be expected to be associated with iron carbonates.

In limestone, the matrix is dominated by calcite with minor dolomite and trace iron carbonate. Pyrite is the main sulphide with minor base metal sulphides. The sulphide minerals occur dominantly as veinlets and fracture fillings.

In exhalite horizons ("high sulphide"), sulphide minerals constitute on average 30% by volume. Pyrite is the main sulphide (90%) but base metal sulphides are also abundant (10%) occurring in a wide variety of forms (Table 3-3). Iron carbonates are also relatively abundant compared to other rock types, probably representing a third of carbonate content. Quartz is the dominant silicate.

In the ore, the Silvertip Deposit is characterized by wide range of minerals (Silvertip 1997), many occurring in trace quantities, but potentially a source of leachable heavy elements. These trace mineral groups; minerals; and associated elements include:

- Iron sulphides – pyrrhotite (Fe, Co, Ni), marcasite (Fe, Co, Ni);
- Other sulphides – chalcopyrite (Cu), arsenopyrite (As), argentite (Ag), bismuthinite (Bi), stibnite (Sb), stannite (Cu, Sn).
- Sulphosalts – pyargyrite-proustite (Ag, As), boulangerite-jamesonite (Pb, Sb), tetrahedrite-tenantite (Cu, Sb, As), geocronite (Pb, As, Sb), franckeite (Pb, Sn, Sb).
- Native elements – Silver (Ag), Bismuth (Bi)
- Oxides – Cassiterite (Sn).

3.3.1.2 Sulphur Speciation

Comparison of total sulphur and sulphur as sulphide indicates a strong correlation with a relatively constant fixed bias of 0.2%, varying to higher values of 0.5% (Figure 3-3). The bias does not appear to be related to total sulphur content, hence in relative terms it is lower at higher sulphur concentrations than at lower concentrations. The difference corresponds to HCl-soluble sulphate+ΔS determined in Phase 1. In Phase 1, this bias was also uncorrelated with total sulphur content and averaged 0.2%, ranging up to 0.7% for oxidized rock types. The two databases appear equivalent for sulphur content and speciation.

Total barium analyses were greater than barium determined by aqua regia indicating that barite is present. Typical total barium concentrations are between 0.1 and 0.5% compared to between 0.01 and 0.05% by aqua regia (Figure 3-4). Calculated sulphur as barite concentrations are typically less than 0.1% and are weakly correlated with total sulphur concentrations (Figure 3-4). This amount of sulphur as barite does not contribute significantly to total sulphur though led to slight overestimation of AP in Phase 1.

Sulphur concentrations associated with zinc sulphide are low (typically much less than 0.1%) except at higher sulphur concentrations where higher sulphur as zinc sulphide concentrations are associated with higher total sulphur concentrations and the two concentrations are strongly correlated (Figure 3-5). Sulphur concentrations associated with lead sulphide are very low (<0.01%) (Figure 3-5) but correlated with total sulphur concentrations.

3.3.1.3 Carbonate Speciation

Neutralization potential is positively correlated with TIC (Figure 3-6) but TIC is generally greater than NP. This observation is consistent with the observation of iron carbonate in the core. Generally, qualitative observation of iron carbonate amount does not correlate well with the difference between NP and TIC. This is probably due to variable solid solution of iron carbonate in calcite, which would not always be readily identifiable in core. As found in Phase 1, Unit 1B generally had more TIC than NP. 1AA was not sampled in Phase 1, but it also appears to contain iron carbonate.

Comparison of NP with calcium and magnesium in HCl leachates also indicates a positive correlation (Figure 3-6). For the large Unit 1B, the two measures are comparable suggesting that neutralization potential as reported reported reflects calcium and magnesium carbonates. Two samples of Unit 1AA yielded higher concentrations of Ca and Mg than expected. No explanation is readily apparent.

Aluminum in NP leachates implies some dissolution of silicates during the procedure. These are most likely micas and clays. Comparison of paste pH and NP (Figure 3-7) shows that even at low NP (<10 kg $CaCO_3$/t), paste pH remains above 6, implying that most measurable NP is in carbonate form. The mineralogy of the rock and origin of the mineralization indicates a lack of alteration minerals that commonly contribute to non-carbonate NP (eg. chlorite, epidote, Ca-plagioclase, etc.).

A similar comparison for TIC with Ca and Mg in HCl leachate (Figure 3-7) indicated that TIC is greater than equivalent Ca+Mg, again indicating that TIC reflects iron carbonate as well as dolomite and calcite.

Comparison of NP with Ca+Mg from aqua regia digestion indicated a strong near 1:1 correlation for Units 1AA, 1BA and 1B (Figure 3-8). The correlation was very poor for unit 2AP and at low NP. The correlation appears to be poor for MLS (McDame Limestone) but this is due to reporting limits on calcium concentrations. These results imply that the strong acid digestion is primarily leaching carbonates in Unit 1 and that calcium and magnesium-containing silicates are generally not contributing significantly to measured calcium and magnesium concentrations. Calcium and magnesium determined by acid digestion may be useful surrogates for carbonate determinations.

Manganese concentrations determined by aqua regia digestion and determined in the NP leachates were identical, which implies that Mn is in a relatively soluble form (possibly carbonates). Manganese concentrations are however very low and in $CaCO_3$ equivalents for $MnCO_3$ represent less than 1 kg $CaCO_3$/t.

3.3.1.4 Water-Soluble Metals Content

Water-soluble metals concentrations were generally undetectable (Appendix B). Heavy elements showing detectable concentrations were zinc, cadmium, antimony, manganese and barium. Elevated water soluble metals concentrations were associated with elevated total metal concentrations and elevated sulphur concentrations. These samples are in some cases exhalites, and in all cases either immediately in contact with exhalite horizons or within a few metres of an exhalite. No correlation with NP/AP was noted.

3.3.1.5 Results by Rock Type

Statistical summaries of ABA parameters and selected heavy elements are shown in Tables 3-4 and 3-5. Figure 3-9 compares NP and AP on a rock type basis.

The statistics for ABA (Table 3-4) illustrate the following:

- On average, and considering the range of variation, there is little statistical difference between the main units in the Earn Group.
- The exceptions are units 2A and 2AS which host the exhalite zones. These tend to have higher total S and AP than the other units.
- Unit 2AP which is above the exhalite zones may have lower total S and NP, though as noted below this may be due to surface weathering.
- Samples of the ore and exhalites indicated high sulphur content and NP/AP<1.

The statistics for metal content show elevated zinc and arsenic concentrations throughout the stratigraphy, and particularly the ore and exhalite horizons. The exception is the O-Zone exhalite which appears to have lower arsenic content than the D-Zone exhalite. The statistics for lead show that lead concentrations are elevated in Unit 1AA relative to the other unmineralized Earn Group units.

Selenium was analyzed every fifth sample since it is not included in the scan. It was generally not detected (<2 ppm) except in the vicinity of the exhalite zones where concentrations up to 25 ppm were noted (2AA immediately below the D-Zone).

The dolomitic Tapioca Sandstone is not in the open pit but one grab sample was collected from an outcrop in the valley of Silvertip Creek. Acid-base accounting results indicate very low sulphur concentration and high purity (Table 3-6).

TABLE 3-6
Acid Base Accounting for Tapioca Sandstone

Sample ID	Fizz Rating	Paste pH	S %	MPA kg/t	NP kg/t	NP/MPA	NNP kg/t
40232SD006	3	9.1	<0.02	0.6	976.8	1563	976

3.3.1.6 Continuous Downhole Sampling

Continuous downhole sampling was completed to assess the variability in acid generation potential and heavy elements over narrow distances thereby providing an indication of the potential for narrow zones of reactive materials in waste rock and pit walls to influence leachate quality. Results are illustrated schematically in Figures 3-10 to 3-14. Stratigraphic units are shown using symbols.

Profiles for NP/AP (Figure 3-10) show that variations in overall acid generation potential are generally smooth and can be related to the presence of exhalite zones. Also, the L zone ore (DDH 95-15) noticeably depresses NP/AP below 1 in the surrounding unit 1AA due to increase in sulphur content (Figure 3-11). The L zone is also present in DDH 97-46 but is described as oxidized. AP and NP (Figure 3-12) are very high in the vicinity of the zone.

DDH 84-65 contained no logged exhalite. AP is greatest just above Unit 1AA (Figure 3-11), possibly suggesting an effect from the L zone. Smooth variation in AP is observed in this hole with no sharp increases or decrease. NP/AP is always greater than 1, and two "zones" of greater NP/AP (near 10) are apparent between 40 and 60 m and between 120 and 140 m. The upper of these two zones is due to lower AP, while the lower is due to NP almost double the average. Sulphur and NP both decrease toward the upper part of the hole, possibly due to the effect of surface weathering.

NP/AP increases at the same time implying the rock is naturally tending towards non-acid generation.

DDH 97-18 intersects the same stratigraphy as DDH 84-65 but the D-Zone Exhalite is intersected in the upper part of the hole. NP/AP rarely falls below 1 in Unit 1B though NP/AP is generally lower than DDH 84-65. AP is generally greater and NP is comparable. NP shows the same general variations in both holes and these occur in stratigraphically the same locations. The main feature is elevated NP in the lower part of both holes.

Rock immediately below (within 10 m) of the D-Zone exhalite contains elevated sulphur concentrations which depresses NP/AP. Units 2A and 2AA between the exhalite layers is potentially acid generating and contains low NP.

DDH 84-95 covers stratigraphy in Unit 2 above the exhalite layers. For about 20 m above the exhalite, the rock has NP/AP<1 and elevated AP and NP. Both AP and NP decrease above the exhalite though NP/AP remains relatively constant above 1. This trend may be due to the effect of weathering.

Zinc and arsenic concentrations (Figures 3-13 and 3-14, respectively) tend to follow the same general trend as AP, except that concentrations typically increase by one or two orders of magnitude near the exhalite layers. The exception is the O Zone exhalite in DDH 84-95 which contains lower arsenic concentrations than other unmineralized parts of the Earn group and unit 2AP immediately above it.

3.3.1.6 Camp Creek Fault

Rock along the Camp Creek Fault which may form some or all of the West Wall of the open pit was sampled separately. Nine samples were collected from a variety of holes intercepting the trace of the wall. Results are provided in Appendix C. The samples were all dominantly carbonate. Neutralization potentials were high (median value of 770 kg $CaCO_3$/t). Total sulphur concentrations were variable, from 0.11 to 12% and comparable to sulphide-sulphur concentrations. Metal concentrations, except for iron were very low and resemble background values. Molar ratios of sulphur to iron were very close to 2, indicating that pyrite is the dominant sulphide. Base metal sulphides were absent.

3.3.2 Waste Rock Pads

3.3.2.1 Description of Sample Sites

The OP sample was obtained from one of the few exposures of Earn Group in the proposed open pit footprint. The exposure is a road cut. Small bedrock outcrops were exposed using an excavator. The exposed siltstone was non-calcareous and non-pyritic. The rock is heavily fractured and iron stained. The overlying soil horizon contains a thin Bm horizon transitional to C and R horizons over about 0.5 m.

The exposure of the Discovery Zone is very strongly oxidized to a depth of at least one metre (Figure 3-15). The unoxidized exhalite zone is grey, friable and contains abundant fine-grained pyrite. No carbonate is present and both the oxidized and unoxidized rock had rinse pHs of less than 4. The sample for the pad was collected from the unoxidized part of the profile, as practical (Figure 3-15) though inevitably some oxidized rock was incorporated into the sample.

The HG sample was collected from the North-West End of the ore pile. The sample site is shown in Figure 3-16. Discussion of the characteristics of the pile is provided in Section 3.3.3.

3.3.2.2 Chemical Results for Test Samples

Results for analysis of the rocks placed in the pads are summarized in Appendix D.

The Earn Group sample from the open pit area had lower sulphur concentrations which increased slightly in the finer fractions. NP, TIC and metal concentrations were substantially greater in the finer fraction. This sample contained less NP and significantly less sulphur than typical values for the Earn Group (see also Table 3-4) statistics). Metal concentrations were near typical or slightly lower than average. Water-leachable Zn, Fe, Mn and K were detected.

The DZ sample contained sulphur concentrations comparable to average for core samples (compare Table 3-4 and Table 2-2), and indicated the strong partitioning of sulphur into the fine fraction (Appendix D). The sample was acidic with the greatest acidity in the fines. Metal concentrations were much lower than measured in drill core, possibly indicating leaching of the outcrop. The exception was arsenic which was relatively stable in the fine fraction. Elevated water leachable concentrations of silver, copper, lead, zinc, arsenic, iron, manganese, aluminum, calcium and potassium were detected (Appendix D).

Sample HG contained elevated sulphur and neutralization potential typical of the ore. This was accompanied by elevated concentrations of silver, copper, lead, zinc, cadmium, arsenic, antimony and tin. The sample was non-acidic but contained elevated water leachable concentrations of zinc (Appendix D).

3.3.2.3 Chemical Results for First Leachate Samples

Following construction of the pads in late July, no precipitation occured until late August, and the first leachate samples were obtained in early to mid-September. Certificates of analysis for samples collected on September 4, 10 and 13 are in Appendix E. Selected extracted results are provided in Table 3-7.

These results indicate the initial flush produced by the first precipitation event. The samples were not filtered hence interference of suspended matter can be expected. The OP samples indicated approximately pH neutral leachate with high suspended solids and aluminum concentrations produced by release of fines capable of passing through the geosock. The resulting concentrations for arsenic, copper, lead and zinc more likely reflect suspended matter rather than dissolved ions. The observed dissolved concentrations of aluminum and copper cannot be present at the indicated pHs.

The initial leachates from the DZ sample were extremely acidic (pH<2). The leachates were red-brown indicating high concentrations of dissolved ferric iron and contained elevated concentrations of several heavy elements (primarily zinc) which persisted after suspended matter stopped being produced. These results reflect leaching of weathering products accumulated in the outcrop and during storage prior to construction.

The HG sample produced pH neutral leachate with calcium and sulphate concentrations indicating control by gypsum. Zinc and cadmium concentrations were elevated due to leaching of sulphates primarily accumulated in the ore pile.

3.3.3 Excavation of Ore Pile

3.3.3.1 Description of Pile

The pile contains approximately 9000 tonnes of ore-type material. The pile is approximately 5 m high, at angle of repose with no significant crest. Observed rock type on the surface include limestone, massive pyrite and sphalerite (with included galena and tetrahedrite and chalcopyrite) and massive calcite. Large boulders located on surface were visibly oxidized. During the summer, white crusts were observed on the underside of the boulders. The crusts were readily soluble, and nearby fines had rinse pHs of 2. However, most surface material contained abundant calcite and is non-acidic (pH>6).

The overall stratigraphy of the pile is illustrated by the East Trench (Table 3-8, Figure 3-17). The outer 30 cm was often brown and suggesting oxidation. The interior of the pile was typically composed of grey sandy gravel containing abundant fine-grained pyrite and calcite with larger clasts of massive sulphide. The pile overlies crushed cemented limestone gravel containing very little sand. This in turn rests on an olive brown loam layer that is presumably cleared native soil. The loam layer was not visible further west presumably because the cemented limestone fill thickens.

The North Trench shows some significant variations from the above stratigraphy (Figure 3-18). Below grade and near the margins of the pile, the entire profile was red-brown, moderately acidic (pH 5) and contained little field detectable carbonate. The contact between the grey and brown layers was sharp and slopes upwards into the pile. Occasional grey pyritic layers were noted within the brown material. Further back into the pile, the brown colouration graded into similar but non-acidic (pH 6.5) brown mottled grey/green material with no detectable carbonate.

The contact between the grey and brown layers also appeared to be marked on surface by a break in slope and the presence of efflorescent salts (Figure 3-18).

3.3.3.2 Analytical Results

The acid-base accounting results (Table 3-9) indicate, as expected, that sulphur concentrations in the ore are very high (typically greater than 50% pyrite volume equivalent) but carbonate is generally present. As a result laboratory crushed pH's were generally slightly alkaline. In general, sulphur and metal concentrations (Table

3-10) are greater in the fine fraction than in the coarse fraction, but carbonate concentrations were greater in the coarse fractions.

The ore noted to be moderately acidic in the North Trench was also moderately acidic in the fine fraction (Table 3-9, Sample 105). This rock contained much less neutralization potential than the ore above it, or in the East Trench. However, nearby sample 107, also had low neutralization potential and low TIC. The fine fraction contained more carbonate than 105.

The underlying crushed limestone contained much lower total sulphur concentrations than the ore in the East Trench, but the fine fraction of the limestone contained comparable sulphate concentrations to the ore. The limestone sample from the North Trench showed similar characteristics for the coarse fraction but the fine fraction contained elevated total sulphur concentrations. Concentrations of most elements were lower in the limestone than in the ore but were significantly greater in the fine fraction. Total and aqua regia digestible barium concentrations were much greater in the limestone than in the ore (Table 3-10) in the East Trench. Barium concentrations were also elevated in the North Trench limestone compared to ore but the effect was less pronounced.

The loam sample beneath the limestone in the East Trench contained lower sulphur concentrations than the limestone or ore and low concentrations of sulphur in the form of sulphate. Carbonate concentrations were lower than in the ore and limestone but were significant. The coarser fraction of the loam contained much more carbonate than the fines. Elevated metal concentrations continued into the loam, including barium, lead and zinc.

Metals occurring in significant detectable water-leachable concentrations include silver, copper, lead, zinc, cadmium, manganese and calcium. Other detected metals are listed in Table 3-11. Within the ore, under non-acidic conditions, zinc, lead, and manganese appear to be mobile. In the two moderately acidic samples (105 and 107) from the North Trench, these elements become more mobile, with the addition of silver, copper and cadmium. Despite the elevated concentrations of the above elements, arsenic and antimony were not detected in the leachates. The main difference between the limestone and ore is that leachable concentrations generally decreases, the main exception being silver which was found in elevated leachable concentrations in both the limestone and loam. These samples also contained moderately elevated silver concentrations.

3.3.3.3 Interpretation

The ore pile appears to contain a heterogeneous mixture of rock types including massive sulphide rock and host McDame Limestone. The variations observed in the North Trench also indicated that some ore-type materials contain lower concentrations of carbonate. If it is assumed that the coarser particles represent the original ore material and the fine particles are the effect of preferential mineral release and oxidation due to blasting and weathering, the material represented by samples 105 and 107 contained much less carbonate than other types of ore. Low NP (<10 kg $CaCO_3$/t) ore was sampled during Phase 1 (see Table 2-2 and Appendix A). This material was placed at the base of the pile. Since it is moderately acidic, it is apparent that low NP ore can become acidic in 12 years or less. The rock is not strongly acidic possibly due to residual carbonate. The lack of acidity toward the centre of the pile may reflect both lower oxygen concentrations further from the surface and downward leaching of alkalinity from the calcareous rock. At the margins, oxygen would be more available and the flow path through the overlying calcareous rock shorter. The pH levels imply buffering by iron carbonates rather than calcium and magnesium carbonates. Conditions were sufficiently acidic to allow accelerated oxidation of pyrite, and oxidation of sphalerite and galena. Water-leachable cadmium, zinc and lead concentrations were elevated in this material. Lead concentrations in the leachates were consistent with solubility control by secondary anglesite (lead sulphate). Copper concentrations were slightly elevated but pH conditions were not low enough to result in significant mobilization of copper.

Efflorescent salts along the toe of the pile where this rock is exposed are probably produced by evaporation of salt-rich waters during the summer.

The bulk of the ore-type material contains abundant though variable neutralization potential. It is apparent that NP has been available to maintain non-acidic conditions though localized oxidation of sulphides occurred resulting in production of soluble weathering products (for example, sample 101 contained elevated water-soluble zinc, cadmium and manganese concentrations). These conditions were shown in trenches by orange mottling.

The elevated metal concentrations in the McDame limestone beneath the ore pile may be partly due to the use of rock from underground workings to construct the pad. However, metal concentrations are particularly elevated in the fines which implies that ore fines were transported down into the large voids in the limestone during placement, and possible afterwards due to water movement and settling. The elevated total barium concentrations may not have been produced by the same mechanism because the ore material does not appear to have comparable barium concentrations. The elevated barium concentrations were probably not produced by downward movement of barium and precipitation in the limestone and loam. Some form of barite-rich rock may have been mixed with the limestone and loam.

3.3.4 Natural Groundwater and Runoff

Water chemistry for groundwater from four drill holes and surface water from Silver Creek is summarized in Table 3-12. These samples represent natural background water quality proximal to the open pit before the water has come into contact with Lower Zone mineralization. Concentrations are shown as "totals" so that a complete comparison is possible. Suspended solids are present as indicated by TSS, likely effecting measured concentrations of total metals. In cases where total and dissolved concentrations were measured, the concentrations were similar (ie within the same order-of-magnitude).

Hole 81-05 intersects the D-Zone exhalite. The water sample likely reflected groundwater in contact with the zone. The water was acidic with associated elevated concentrations of cadmium, zinc and copper. Sulphate concentrations were moderate and indicative of stable long term weathering and slow moving groundwater. Similar zinc and sulphate concentrations were observed in the other holes. Hole TH-1 showed similar acidity. Iron concentrations were elevated in all waters (including TH-3, 81-00). This indicates redox conditions allowing iron to remain in solution in ferrous form. It cannot be attributed directly to pyrite oxidation but could also be caused by rusting of drill casing.

The similarity of Zn chemistry in all four holes suggests that in situ weathering of the exhalite zones is probably an important control on groundwater chemistry.

Silver Creek water showed a similar effect. The water was acidic and contained elevated sulphate, cadmium, copper, iron, zinc and aluminum. These waters were probably fully oxidized but the pH was low enough to allow ferric iron to remain in solution. Sulphate and metal concentrations were greater than in groundwater probably due to the more aggressive weathering conditions on surface and lack of dilution in the headwaters of Silver Creek. Downstream, orange precipitates were observed indicating precipitation of iron hydroxide. Near the confluence of Camp Creek with Silvertip Creek, the streambed was coated with white precipitate indicating increase of pH above pH 4.5 and precipitation of aluminum hydroxide.

3.3.5 Soils

Soils in the open pit area are thin, formed on colluvium derived from weathering the Earn Group. Most soil profiles contain a thin brunisolic B-horizon. The sample was collected from below this horizon in weathered bedrock. This layer was typically 75 cm below surface.

Soil samples indicated fairly uniform chemical characteristics (Appendix F). Residual total sulphur concentrations had a median value of 0.18% and an isolated high value of 0.56%, whereas residual sulphide concentrations were near 0.01%. Barium concentrations were generally higher than the host rock reflecting stability of barite during weathering. The values correspond to baritic sulphur concentrations of between 0.05 and 0.1%. The balance of residual total sulphur (~0.1%) probably indicates the presence of soluble sulphates. Except for sample 160624, the samples had paste pHs less than 5.5 and corresponding negative NPs. For pHs between 4 and 5, it is likely that the soil is strongly weathered and had no buffering effect on the water. The pH of the water used in the test was 5.9. Two samples had paste pH less than 4, and one was associated with the highest total sulphur concentration, and significantly elevated concentrations of silver, lead, copper, arsenic and tin. This sample apparently represents bedrock associated with exhalite mineralization. Zinc and cadmium concentrations were uniformly low in all the samples reflecting its mobility in soils.

Deionized water leachates contained detectable lead, minor zinc, iron, manganese, aluminum, potassium and sodium. The relatively low pH of leachates increases the solubility of elements such as Fe, Mn, Al, K and Na associated with residual oxides and silicates.

4.0 GEOCHEMICAL INTERPRETATION

The bulk of the waste stratigraphy at Silvertip is composed of weakly sulphidic layered clastic sedimentary rocks classified as shale (or slate) to siltstone and sandstones. Sulphidic exhalite horizons are located in the upper part of the stratigraphy which would be mined.

The weakly mineralized rocks contain disseminated pyrite and carbonate (primarily calcite with some iron carbonate) in laminae. Minor disseminated sphalerite and galena contribute to elevated background concentrations of zinc and lead. A significant volume of the rock is likely to be classified as being of "uncertain" acid generation potential due to NP/AP between 1 and 2. NP/AP is mostly greater than 1 in the large Unit 1, which will dominate the waste rock produced in the open pit. NP and AP do not vary widely, for example, zones containing locally elevated sulphur concentrations were not found. Outcrops and soils formed from this rock are not naturally acidic. Due to the near balance of NP and AP, and the tendency for carbonates to be partitioned into the fines (thereby raising the NP/AP in the reactive component) this rock is not expected be acid producing.

Since concentrations of heavy elements (primarily zinc and lead) are elevated in the weakly mineralized rock, metal leaching under non-acidic conditions could occur. The natural soils formed on this rock are depleted in zinc due to the relatively high solubility of sulphates and basic carbonates of zinc. Lead is not depleted because it remains as lead sulphate and carbonate. The rate of zinc leaching from these rock types cannot be determined using the current data and will need to be estimated using kinetic tests.

The natural water chemistry in the vicinity of the proposed open pit appears to be dominated by weathering of the exhalite horizons. The horizons are sulphidic and predicted to be acid generating, but rock a few metres below the horizons also contains high sulphur concentrations, lower NP and elevated metal concentrations (including zinc, lead, cadmium and arsenic). Since the exhalite horizons are located high in the stratigraphy in Unit 2 of the Earn Group, surface and groundwater coming into contact with the exhalites becomes acidic and dissolves oxidation products containing copper, zinc and cadmium. Although these waters are subsequently neutralized by contact with the lower parts of the Earn and by mixing with alkaline groundwater, elevated concentrations of zinc remain in both surface water and groundwater masking the effect of weathering the weakly mineralized parts of the Earn Group. The exhalite horizons are strongly reactive and capable of generating very low pH drainage (<2) containing elevated concentrations of numerous heavy metals.

The ore-type material (referred to as L-Zone) is mostly potentially acid generating. Lower NP (<10 kg $CaCO_3$/t) rock appears to become acidic in less than 12 years. This is a fairly typical rate and consistent with the elevated sulphur content. Leach pad results indicate that this material leaches zinc and cadmium under non-acidic conditions.

5.0 CONCLUSIONS

The following are concluded from the studies completed to date:

- The bulk of Earn group (Unit 1 and lower Unit 2) is composed of weakly pyritic shales, siltstones and sandstones classified as non-acid generating to uncertain acid generation potential. Sulphur content and neutralization potential vary uniformly within the units with no sharp changes. Sulphur occurs primarily as pyrite. Neutralization potential is due to calcite. Iron carbonate is present but it does not contribute to measured neutralization potential. Manganese probably occurs as carbonate but in very low concentrations.

- Natural weathering features indicate that most of the Earn Group is not likely to be acid generating, possibly partly due to NP/AP near 1 and preferential liberation of carbonate during physical degradation. However, the presence of disseminated sphalerite indicates that leaching of zinc under pH neutral conditions may be expected due to direct oxidation of sphalerite or galvanic processes.

- Exhalite Zones are potentially acid generating and very reactive. Rock immediately below the exhalites is also potentially acid generating due mainly to increased sulphur content.

- The L-Zone ore is potentially acid generating. Most of the ore pile has not generated acid but low NP rock located beneath part of the pile is moderately acidic after 12 years of exposure.

- The Camp Creek fault which may form all or a portion of the west wall of the pit would be composed of variably pyritic non-acid generating limestone. This rock has low base metal concentrations suggesting that leaching under pH neutral conditions would not release metals at high rates.

- Thin brunisolic soils in the open pit footprint are uniformly leached with low residual sulphur concentrations representing residual barium, lead and other types of sulphates. The soils are weakly acidic but pH was only marginally less than the pH of the water used in the test.

This report, **1CS010.00 - Acid Rock Drainage Studies - Progress Report,** has been prepared by:

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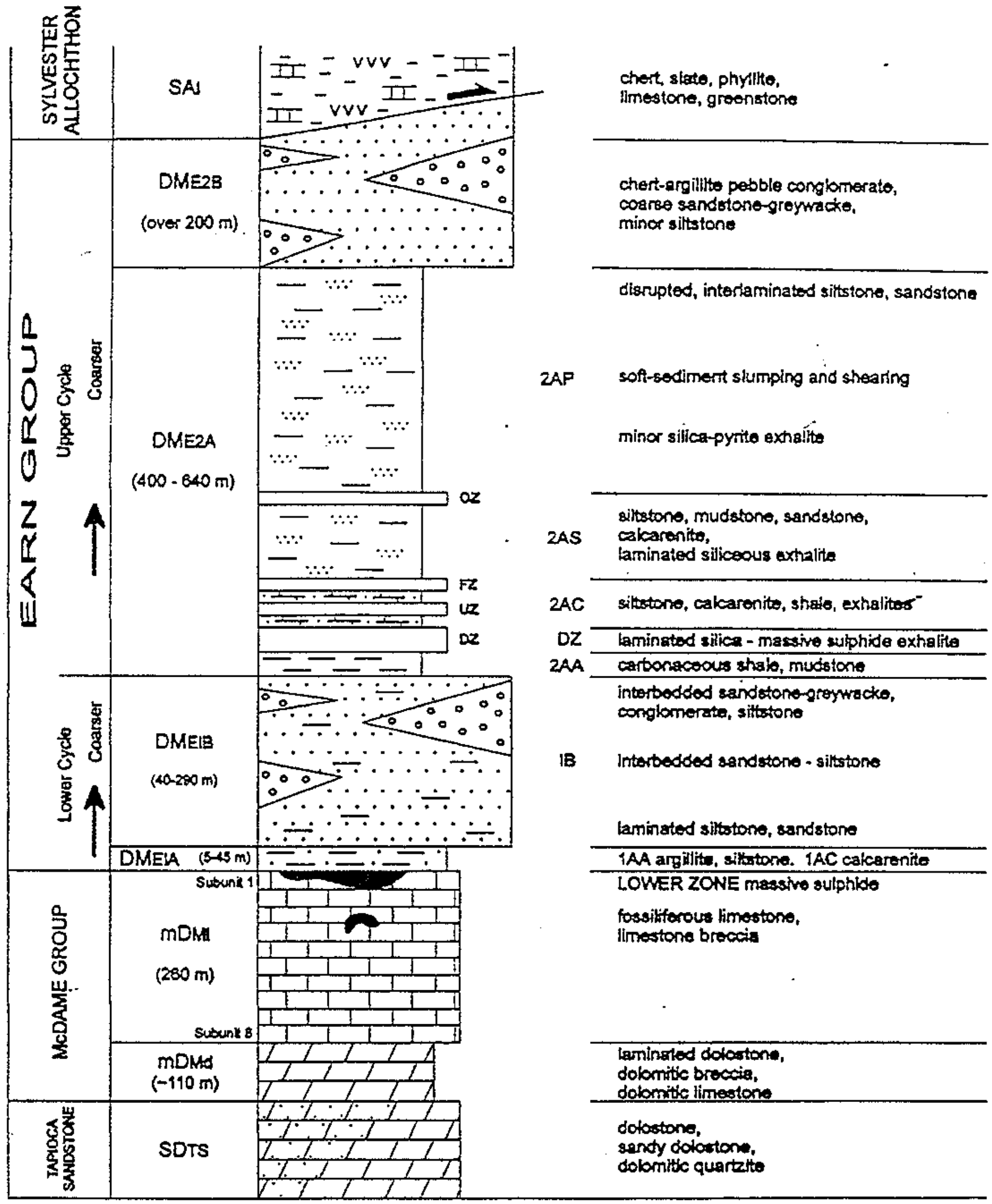
FIGURES



Adapted from Cordilleran Engineering (1985)

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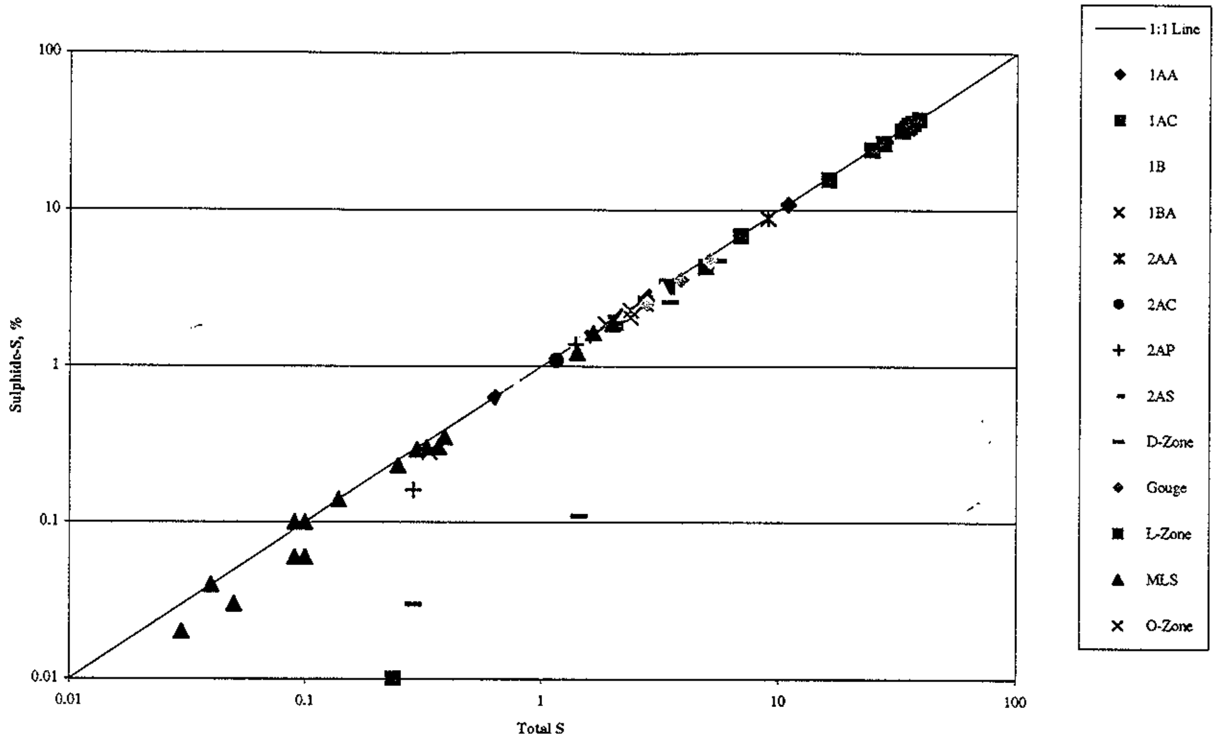
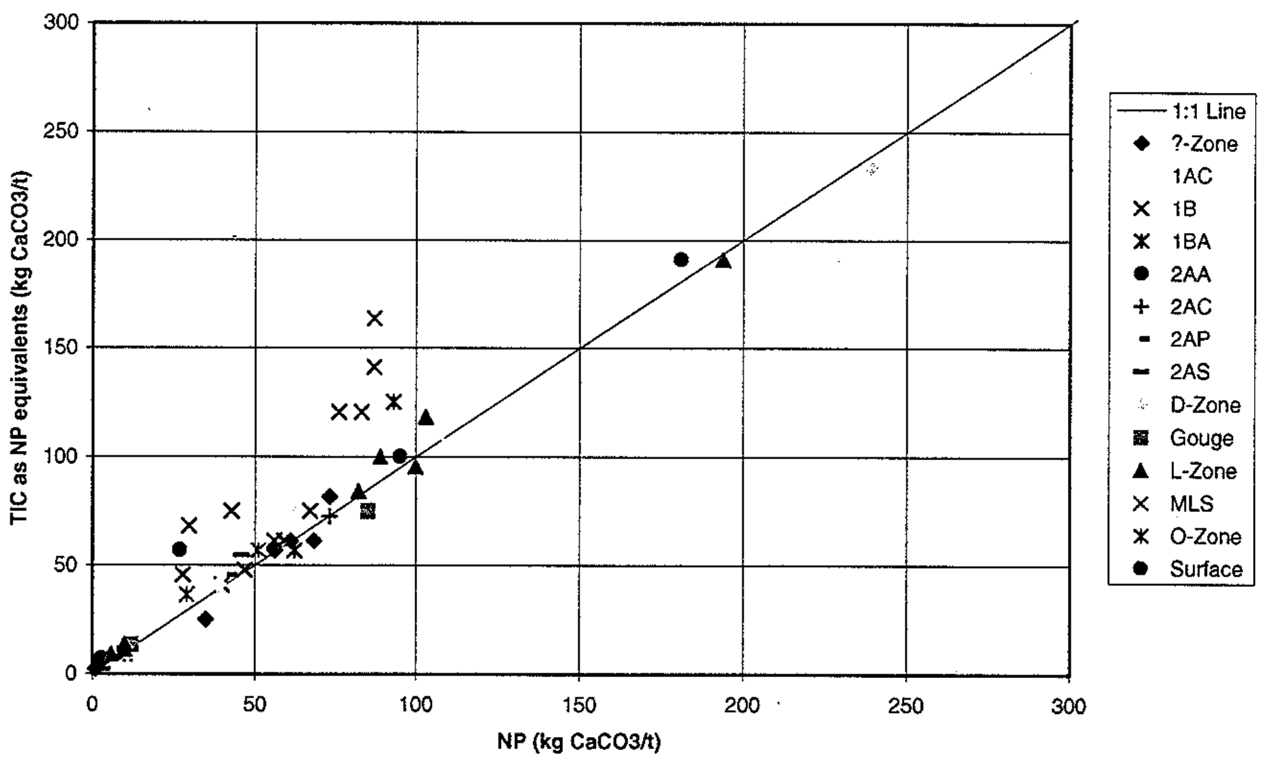
SILVERTIP MINING CORPORATION

ACID ROCK DRAINAGE STUDIES
SILVERTIP PROJECT

SITE STRATIGRAPHY

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	1-1





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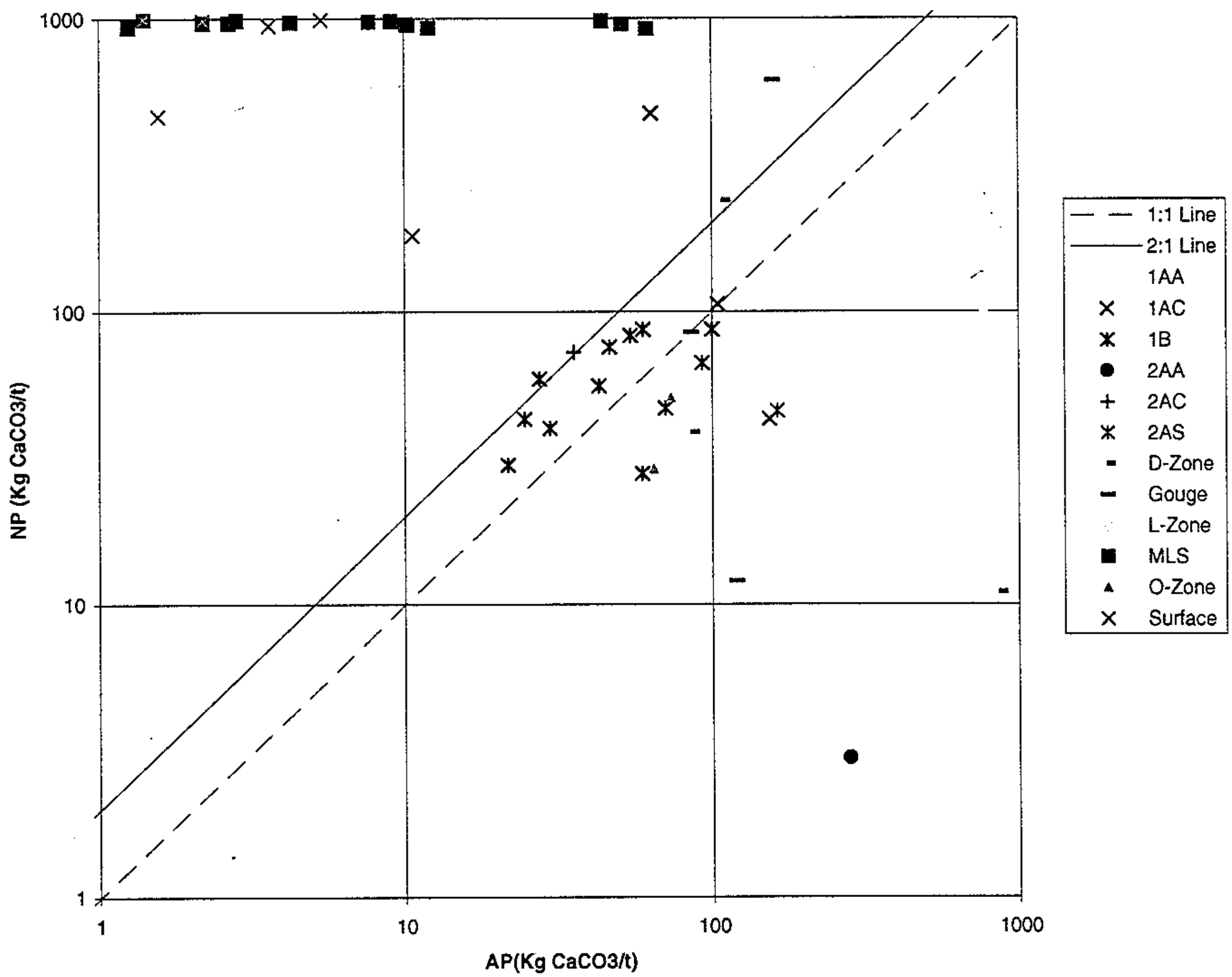
SILVERTIP MINING CORPORATION	**Total S vs Sulphide S Phase 1 ABA Study**		
Project 1CS010.00	Date DEC 1998	Approved SJD	Figure 2-1

Silvertip Drillhole Database
NP vs. AP



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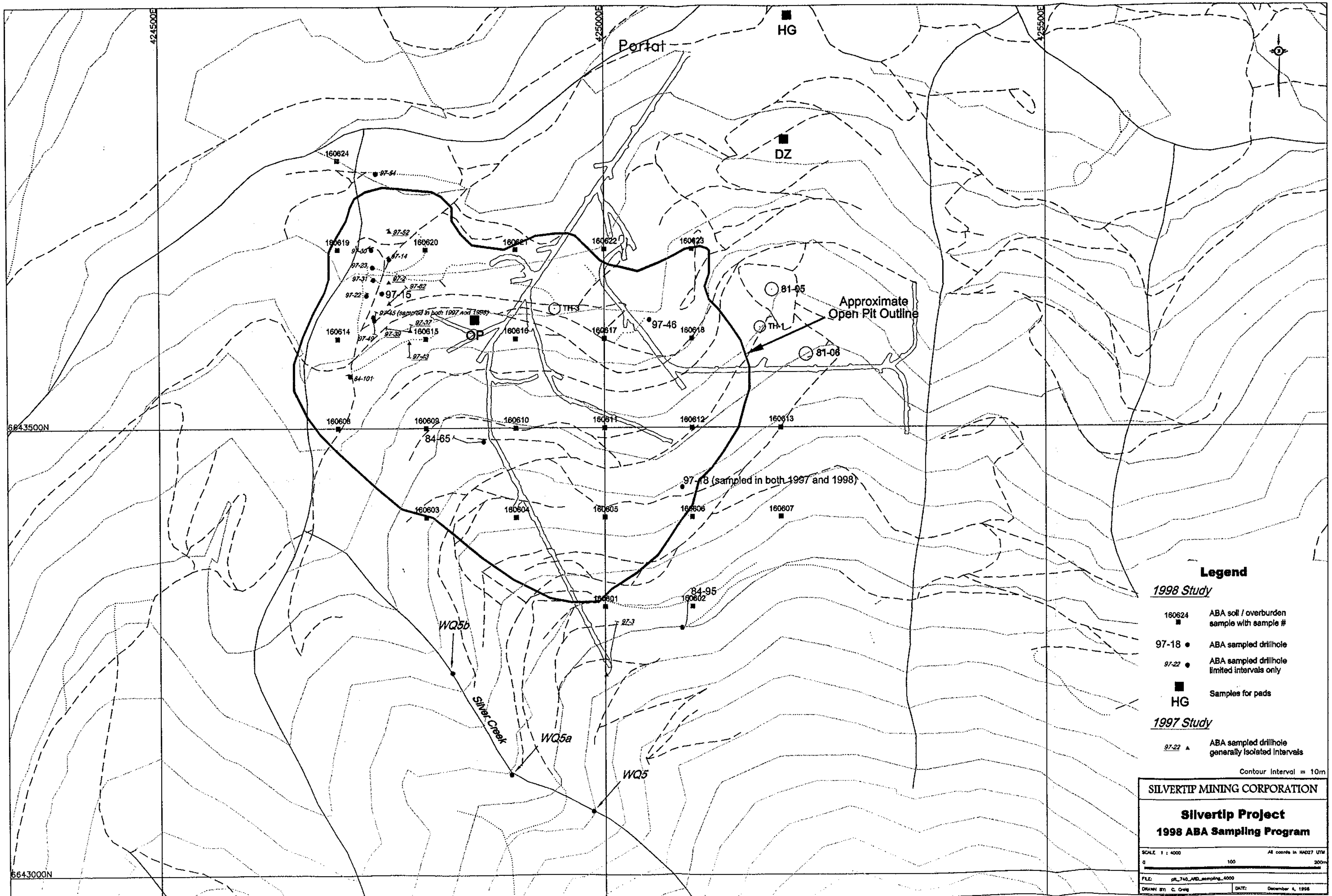
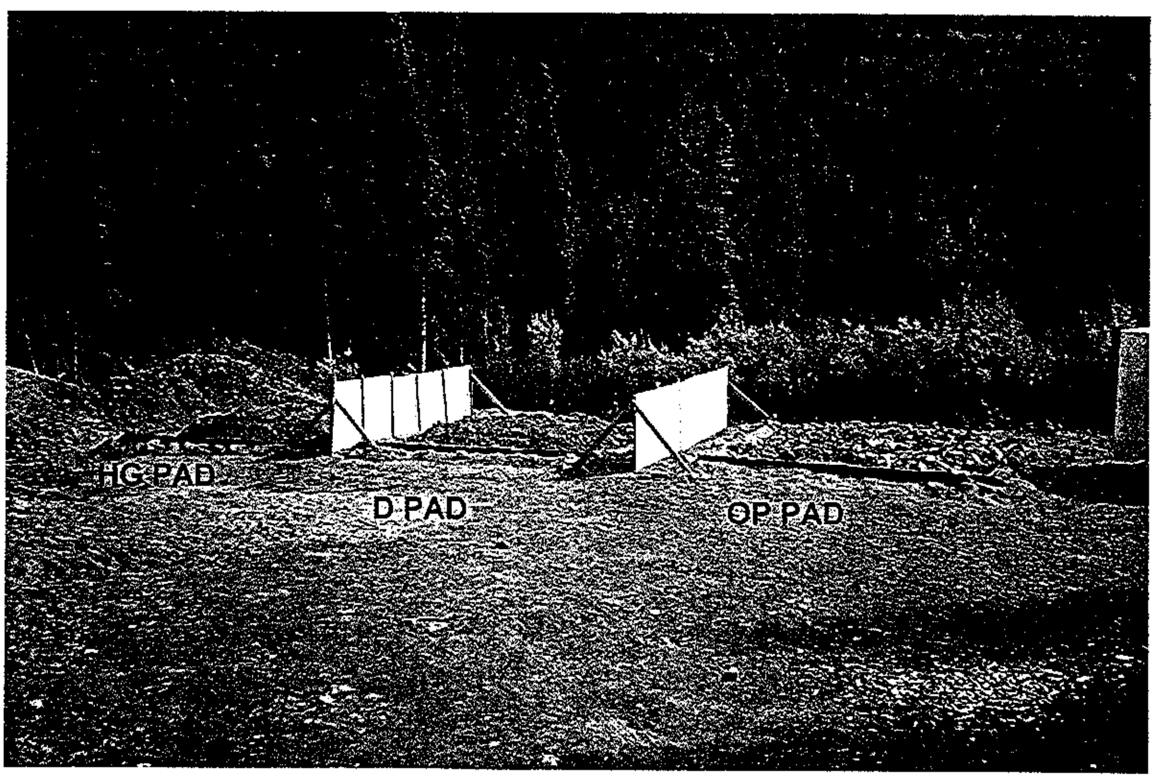
ACID ROCK DRAINAGE STUDIES
SILVERTIP PROJECT

NP vs AP
Phase 1 ABA Study

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	2-2



424500E
425000E
425500E
6643500N
6643000N
Portal
HG
DZ
OP
Approximate Open Pit Outline
97-18 (sampled in both 1997 and 1998)
97-45 (sampled in both 1997 and 1998)
97-46
97-15
84-65
84-95
81-05
81-06
TH-3
TH-1
160624
160619
160620
160621
160622
160623
160614
160615
160616
160617
160618
160608
160609
160610
160611
160612
160613
160603
160604
160605
160606
160607
160601
160602
WQ5b
WQ5a
WQ5
Silver Creek
Legend
1998 Study
ABA soil / overburden sample with sample #
ABA sampled drillhole
ABA sampled drillhole limited intervals only
Samples for pads
1997 Study
ABA sampled drillhole generally isolated intervals
Contour interval = 10m
SILVERTIP MINING CORPORATION
Silvertip Project
1998 ABA Sampling Program



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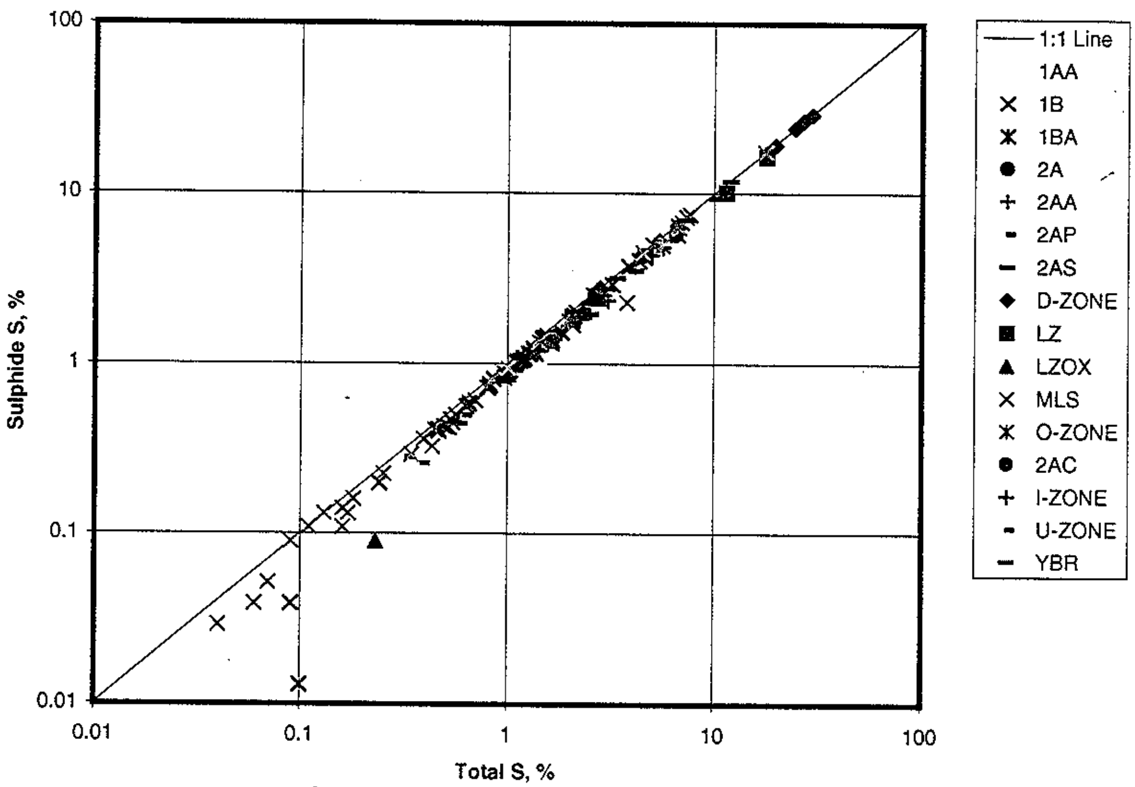
WASTE ROCK PADS

Project	Date	Approved	Figure
1CS010.00	NOV 1998	SJD	3-2



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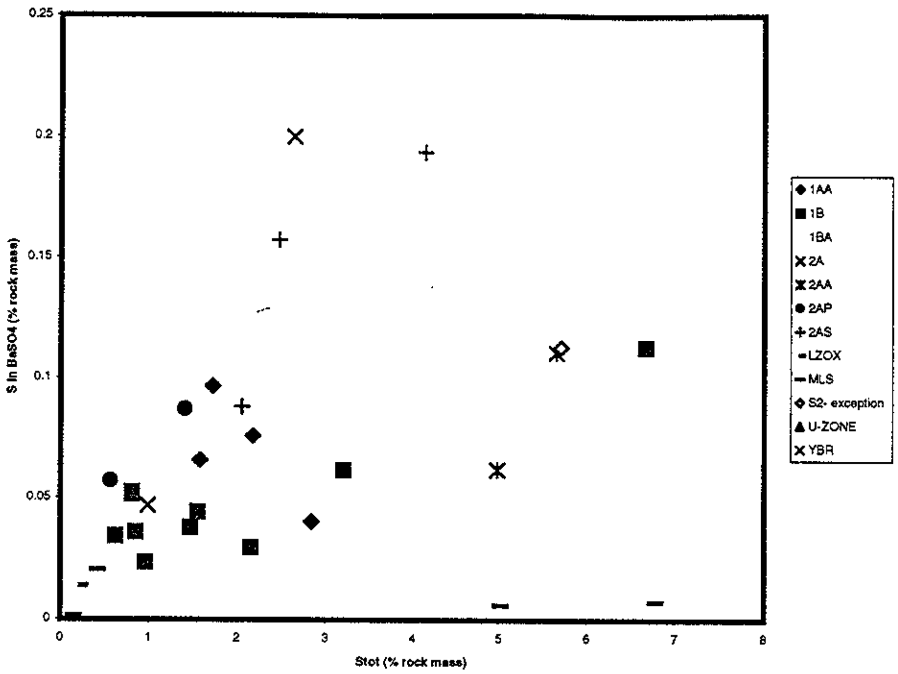
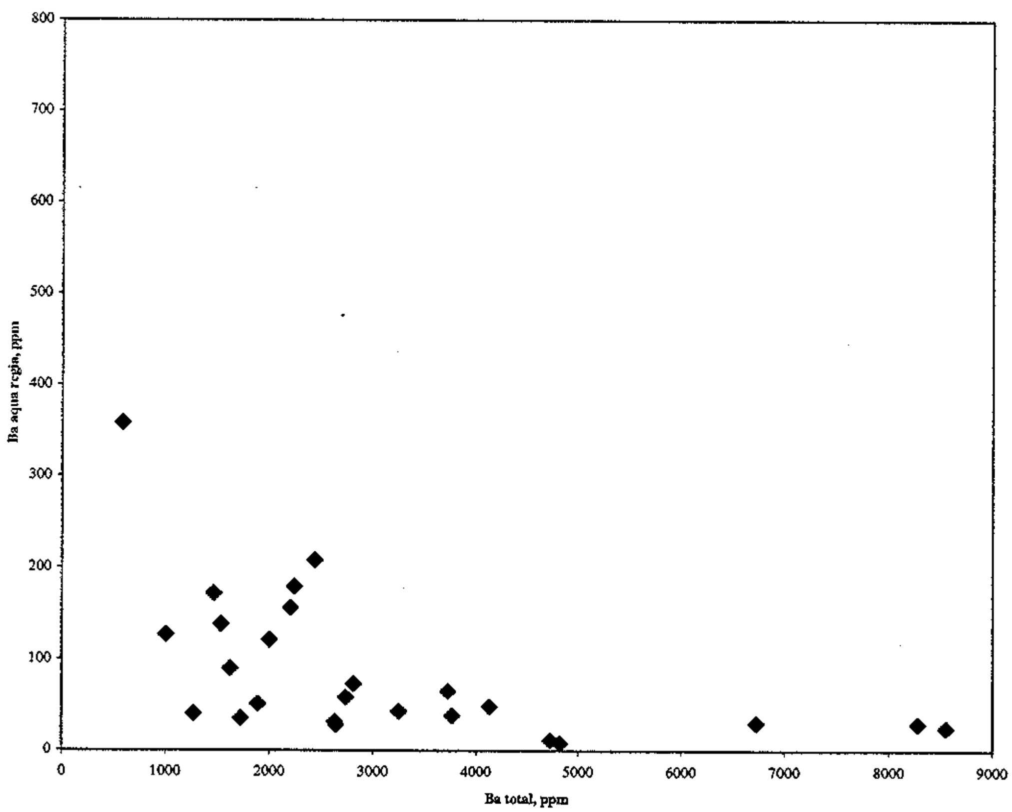
Total S vs Sulphide S
Rock Core

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-3





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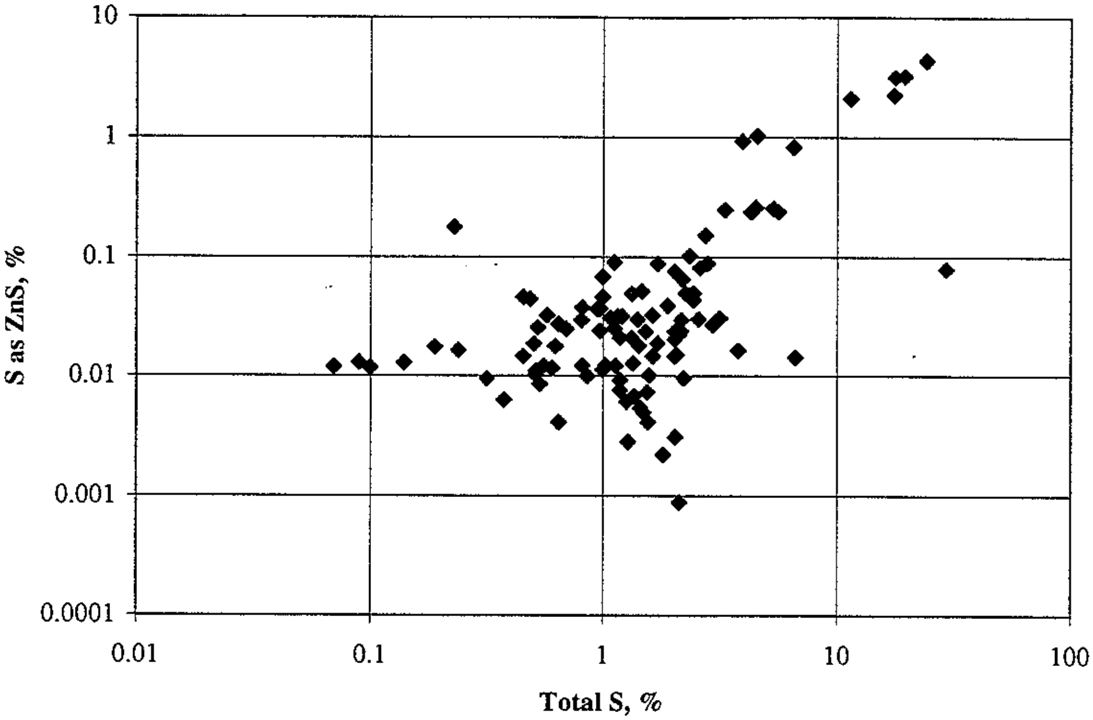
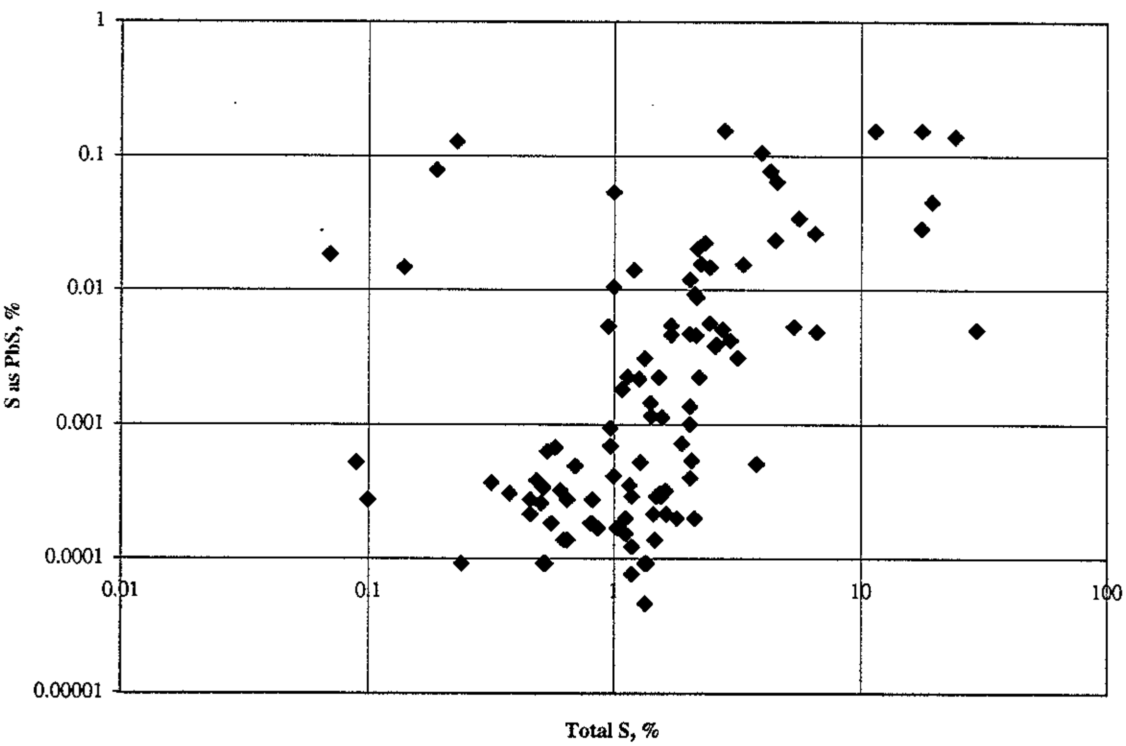
Barium vs Sulphur
Rock Core

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-4





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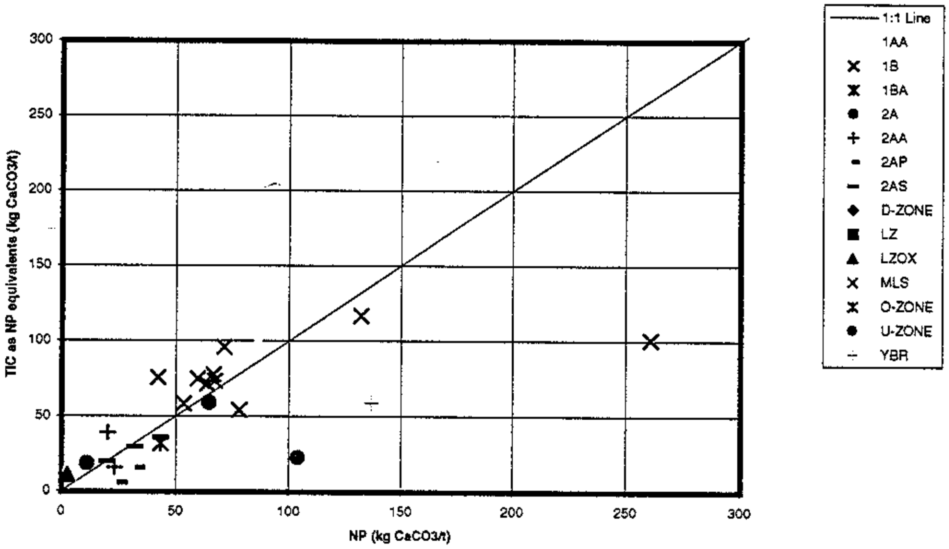
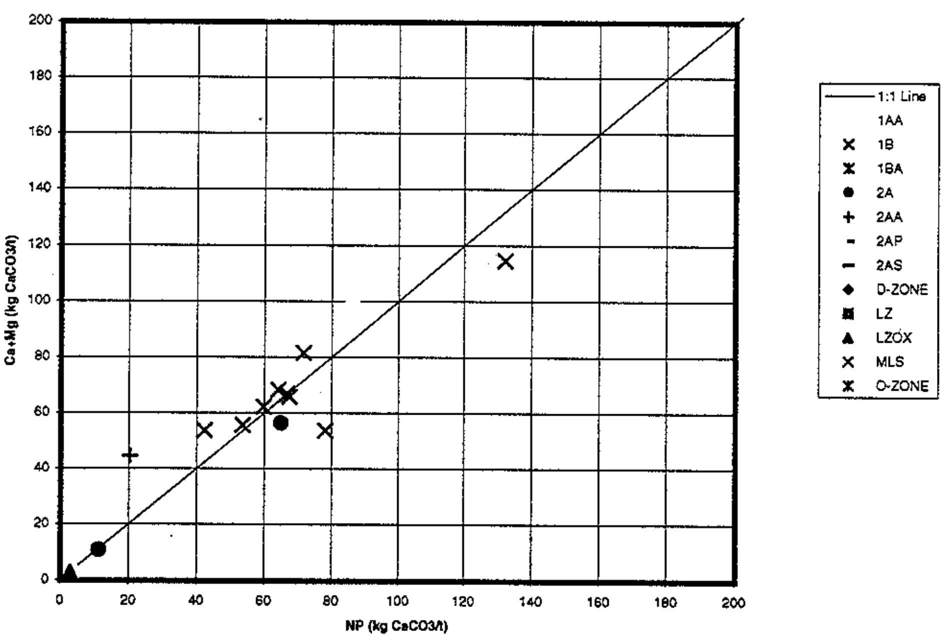
Zinc and Lead vs Sulphur

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-5





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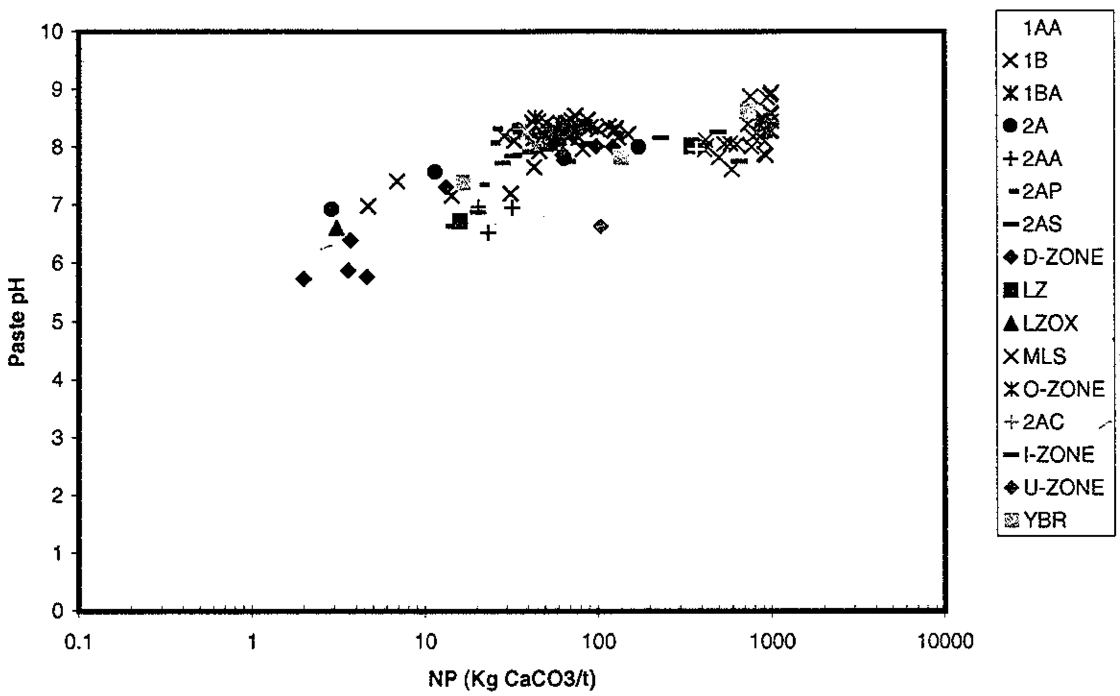
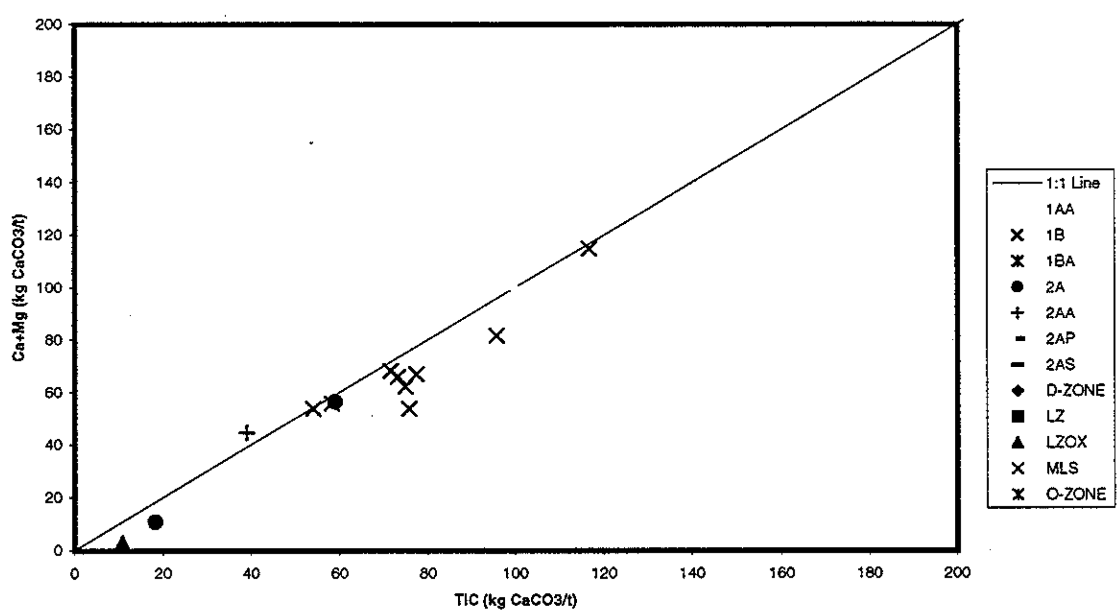
NP vs TIC, Ca+Mg in NP HCl leach

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-6

(A)



(B)



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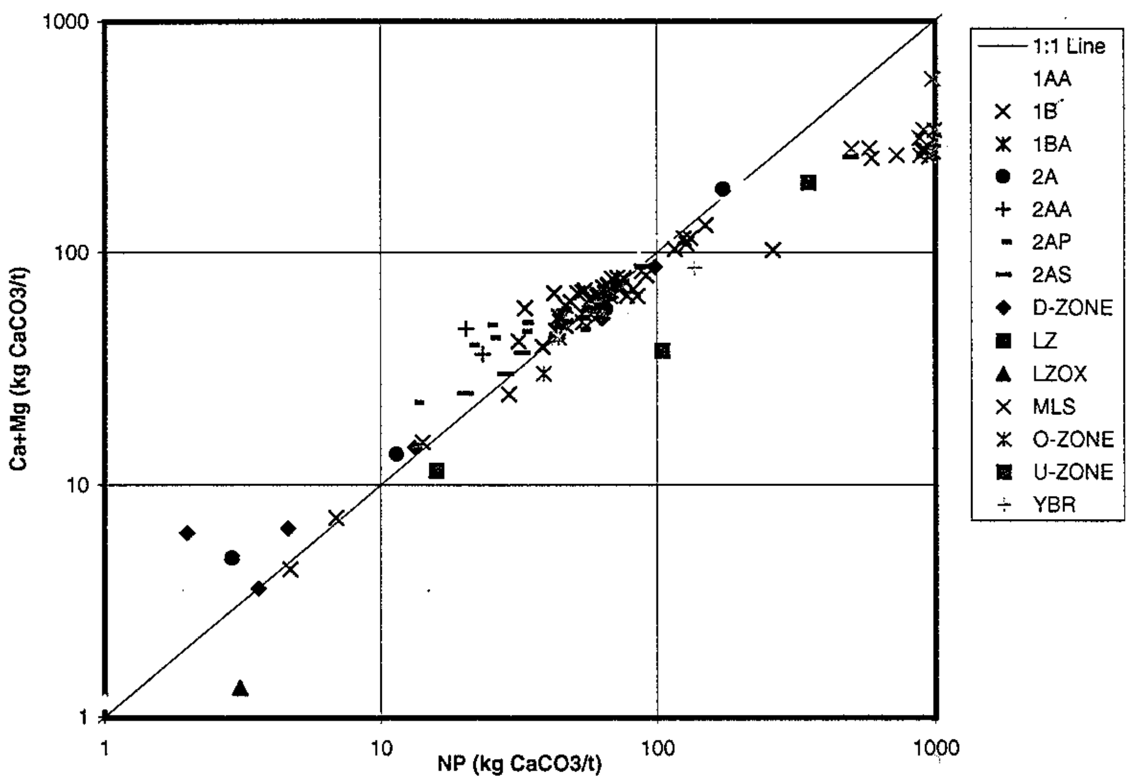
(a) NP vs paste pH
(b) TIC vs Ca+Mg in NP HCl leach

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-7



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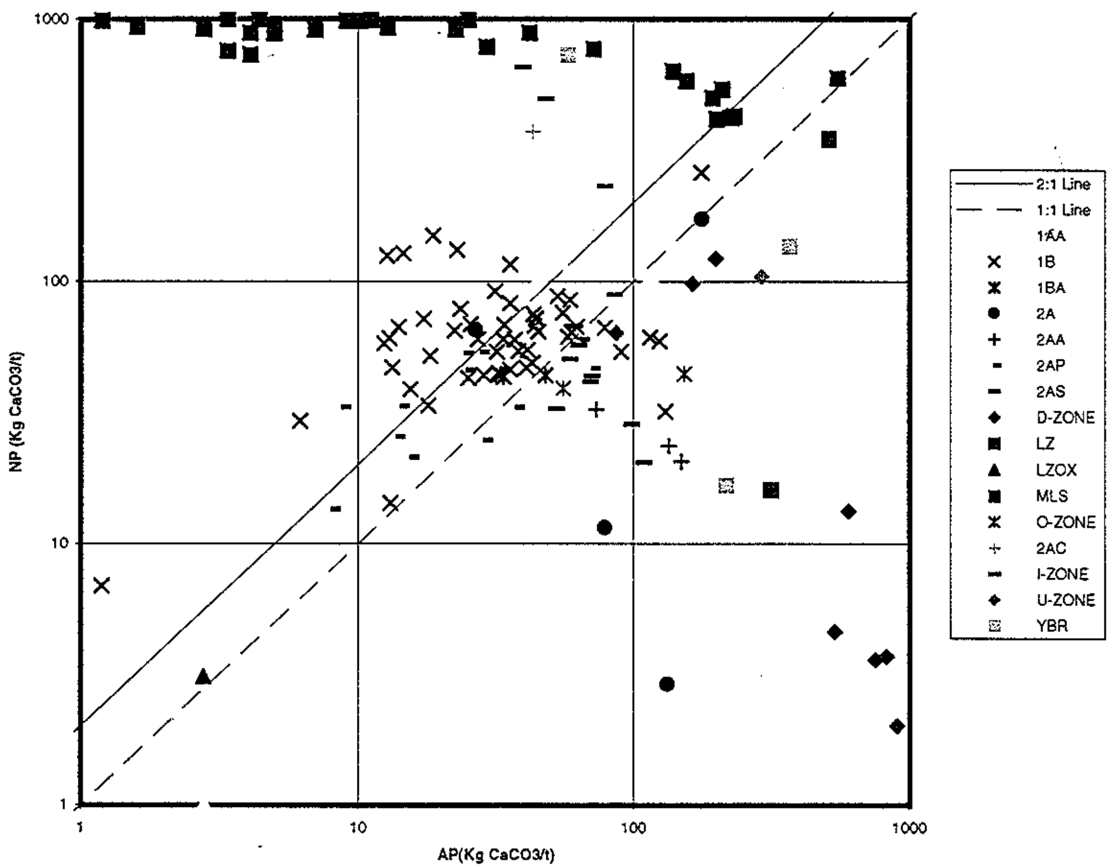
NP vs Ca+Mg by Aqua Regia

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-8



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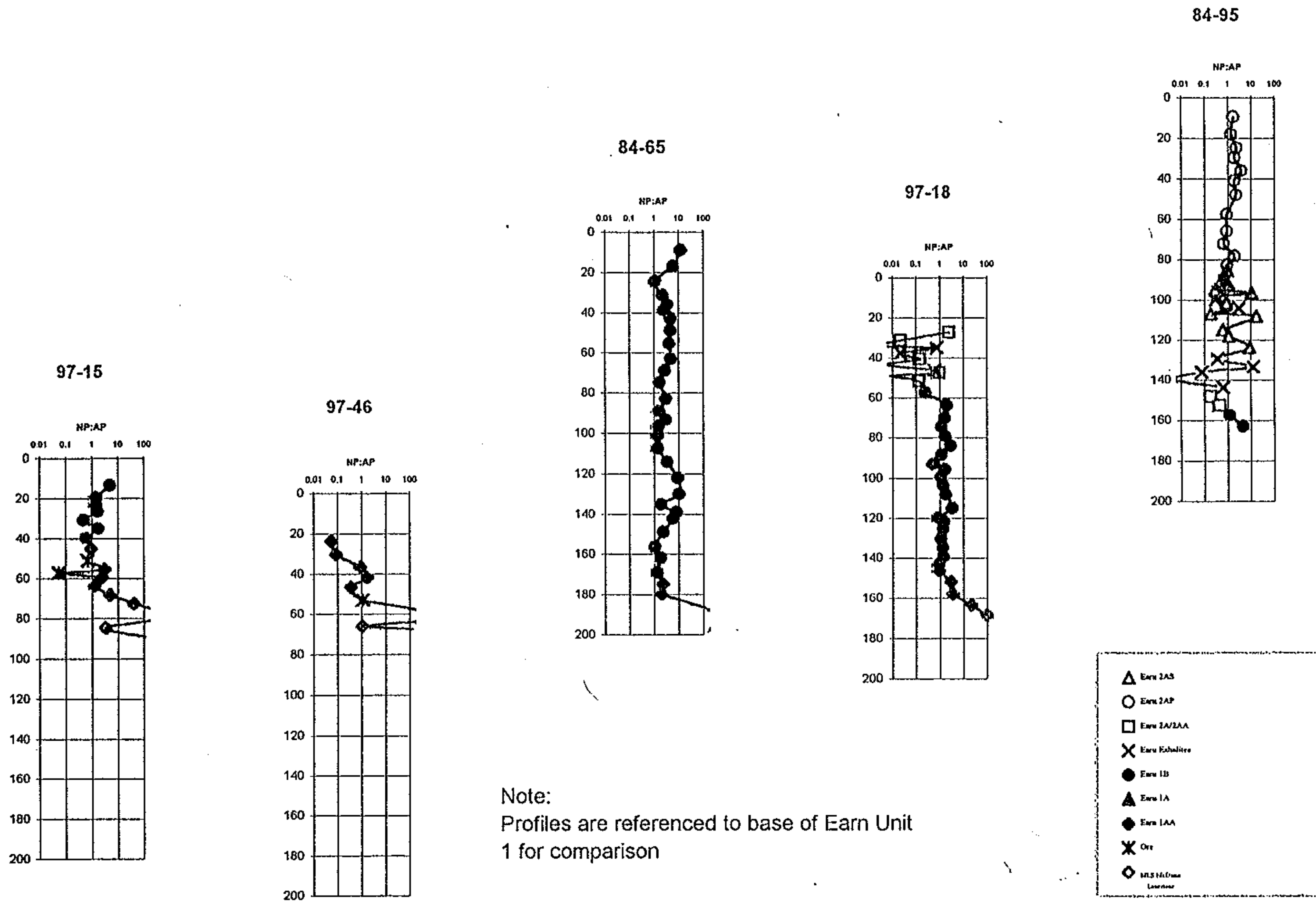
NP vs AP

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-9



Note:
Profiles are referenced to base of Earn Unit 1 for comparison

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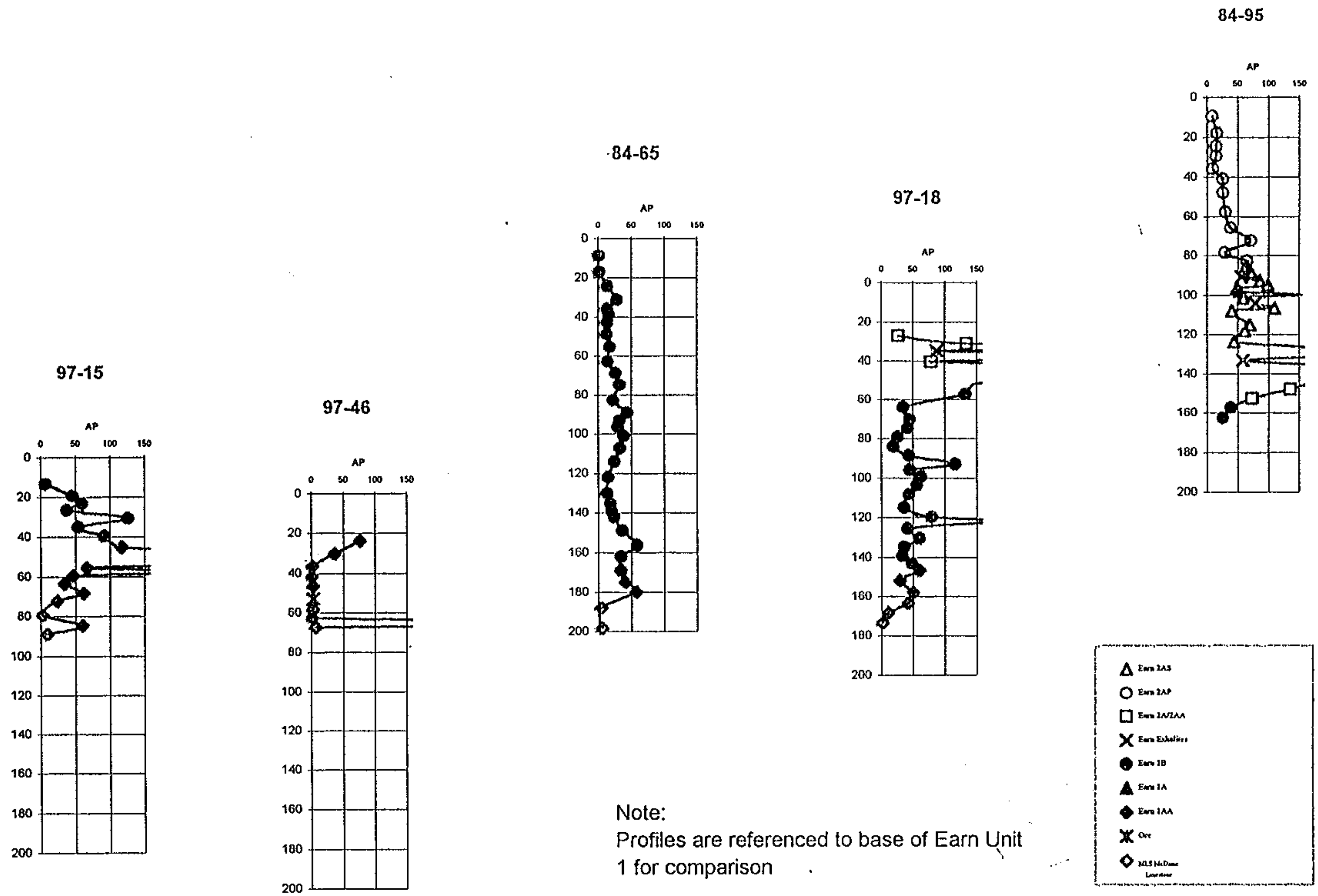
SILVERTIP PROJECT

DOWNHOLE PROFILES
NP/AP

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-10



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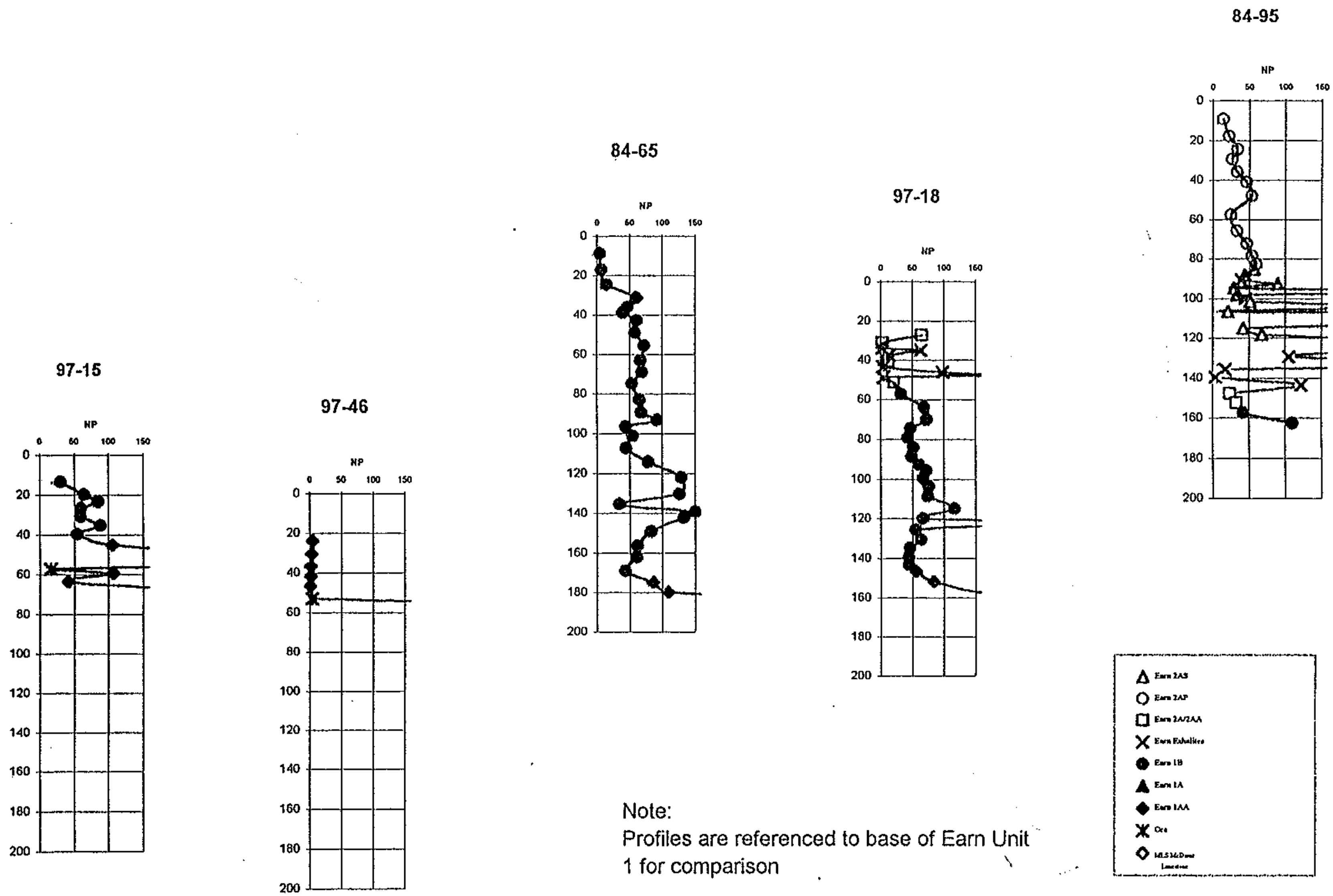
SILVERTIP PROJECT

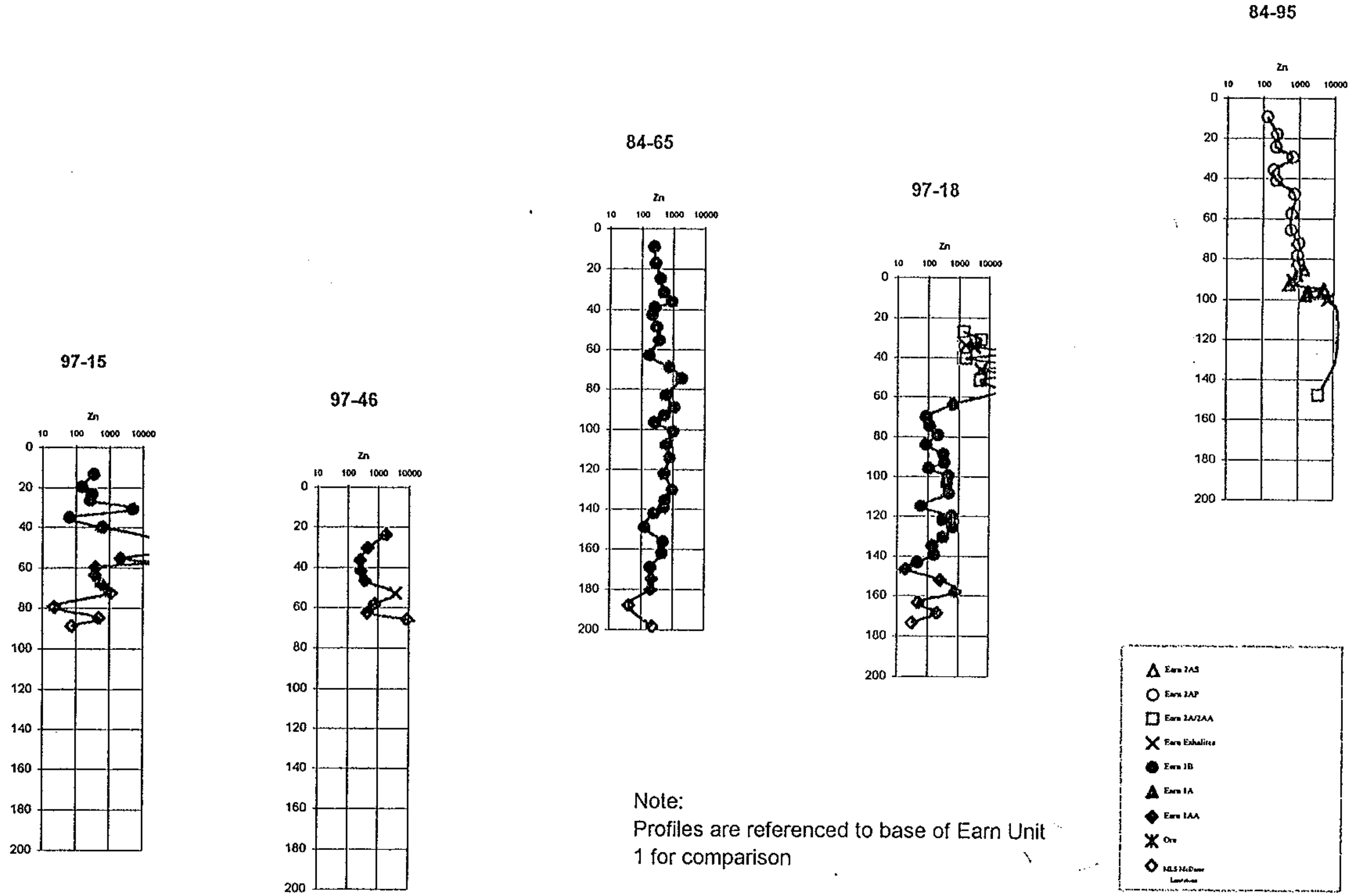
DOWNHOLE PROFILES
AP

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-11



Note:
Profiles are referenced to base of Earn Unit 1 for comparison

SRK Consulting — Engineers and Scientists	ACID ROCK DRAINAGE STUDIES SILVERTIP PROJECT			
	DOWNHOLE PROFILES NP			
SILVERTIP MINING CORPORATION	Project 1CS010.00	Date DEC 1998	Approved SJD	Figure 3-12



Note:
Profiles are referenced to base of Earn Unit 1 for comparison

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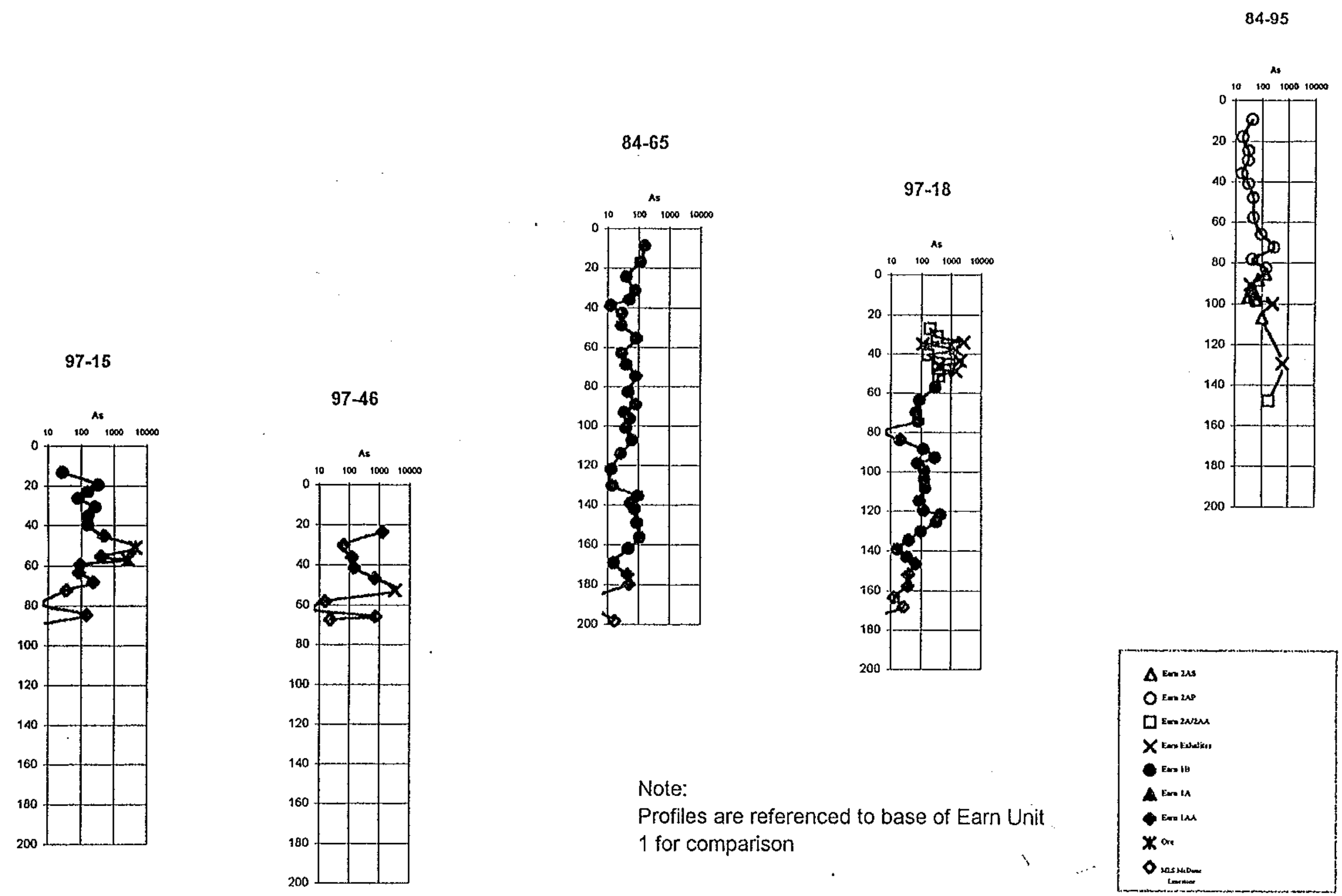
SILVERTIP PROJECT

DOWNHOLE PROFILES
Zn

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-13



Note:
Profiles are referenced to base of Earn Unit 1 for comparison

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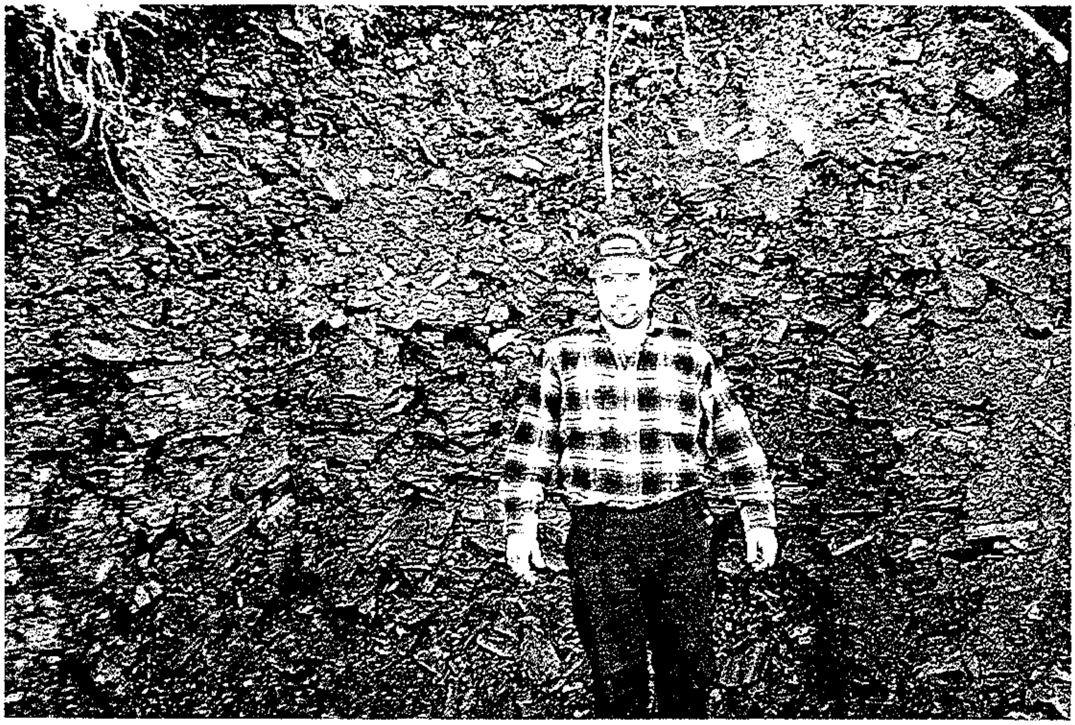
ACID ROCK DRAINAGE STUDIES
SILVERTIP PROJECT

DOWNHOLE PROFILES
As

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-14



(A) OP SAMPLE SITE

(B) D SAMPLE SITE

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SILVERTIP PROJECT

SAMPLE SITES FOR OP AND D PAD SAMPLES

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-15

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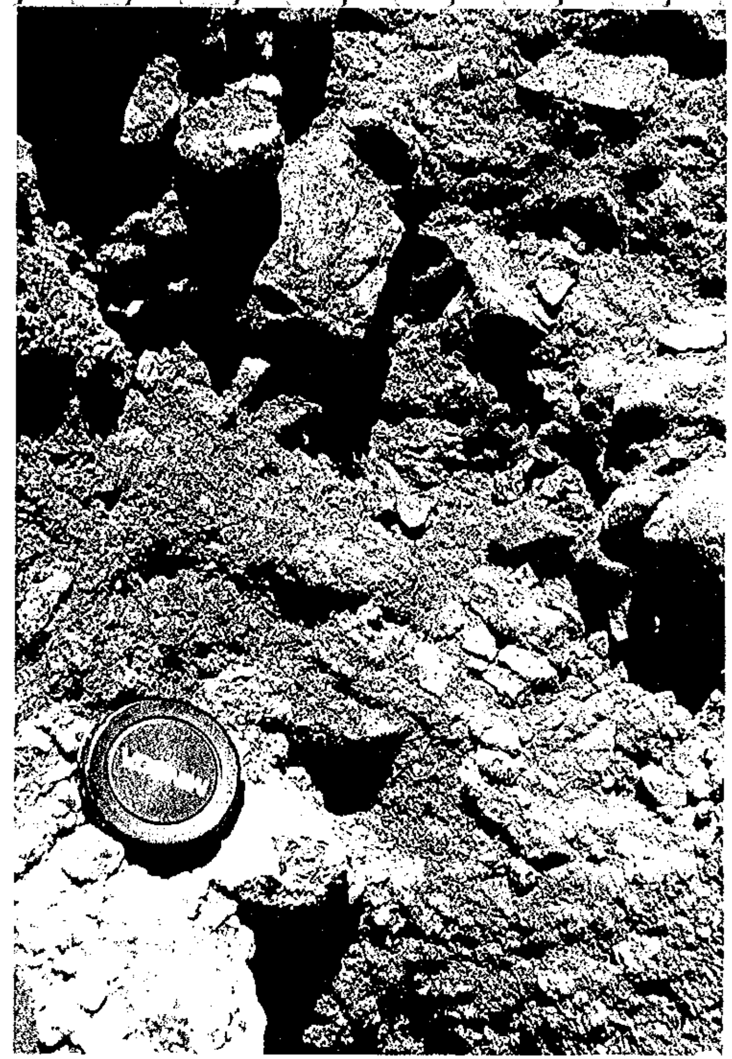
SILVERTIP PROJECT

SAMPLE SITES FOR HG PAD SAMPLE

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-16

(A) TRENCH VIEW



(B) CLOSE UP OF LOCALIZED OXIDATION

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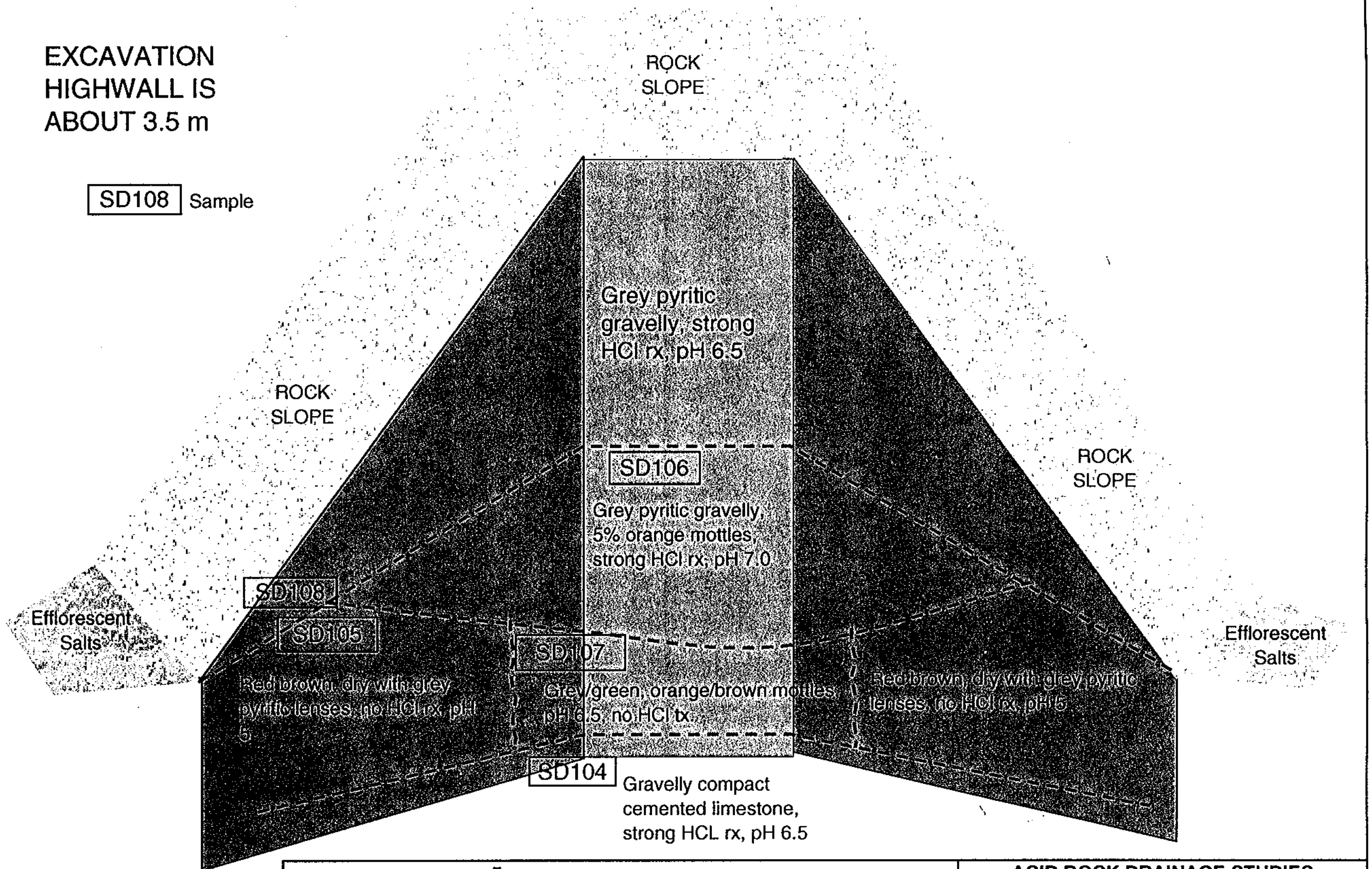
SILVERTIP PROJECT

EAST TRENCH - ORE PILE

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-17



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SILVERTIP PROJECT

PERSPECTIVE SCHEMATIC OF NORTH TRENCH - ORE PILE

Project	Date	Approved	Figure
1CS010.00	DEC 1998	SJD	3-18

TABLES

TABLE 1-1
Estimated Rock Volumes And Lithological Composition Of Sub-Units

Unit	Approx Vert. Thickness (m)	Approximate Volume (m^3)	Estimated Lithology
Total Pit	75	8,038,000	
Overburden	14	1,715,000	
Undiffer-entiated 2A	8	7,960	45% sltst, 15% ss, 35% shale, 5% calc
2AP	3	1,440	60% sltst, 25% ss, 15% shale
2AS	6	2,600	50% sltst, 20% ss, 20% shale, 10% calc
2AC	28	238,500	40% sltst, 15% ss, 30% shale, 15% calc.
2AA	8	12,840	30% sltst, 70% shale
UZP	4	1,720	Siliceous exhalite, py
OZP	1	280	Siliceous exhalite, py
FZP	3	2,000	Siliceous exhalite, py
DZP	5	23,720	Siliceous exhalite, py, gn, sp
1B	53	4,371,000	20% sltst, 65% ss, 5% shale, 10% congl
1BA	15	313,000	70% sltst, 15% ss, 15% shale
1AA	20	705,500	60% sltst, 5% ss, 35% shale
1AC	4	47,800	50% sltst, 50% calc
McDame (Assuming Meas+Ind)	19	435,000	95% limestone, 5% shale
McDame (Assuming Total Resource)	19	385,000	95% limestone, 5% shale
Lower Zone			Massive py, sp, gn, gangue
YBR	6	9,320	Altered rock

TABLE 2-1
Rock Units and ABA Samples 1997

Group	Unit	Number of ABA Samples
Earn Group	**Calcareous Rock**	**2**
	Clastic	27
	Massive-Sulphide Exhalite	10
	Fault Gouge/Zone	3
McDame Group[1]	Limestone	16
	Massive Sulphide	5
	Fault Gouge/Zone	1
	Oxidized Sludge	1
Mixed Rock	High Grade Stockpile	5
	Waste Dump	7
	TOTAL	77

Extracted from MDAG (1998)

TABLE 2-2
PHASE 1 ACID-BASE ACCOUNTING STUDY
ABA STATISTICS

Rock Type	Total S						NP						AP					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	6	1.10	2.48	3.50	6.92	3.77	6	46	65	178	423	292	6	35	78	110	217	118
1B	12	0.80	1.63	1.70	2.92	0.82	12	31	58	59	87	21	12	25	51	53	91	26
1BA	3	0.65	1.88	1.66	2.58	1.22	3	20	62	55	87	42	3	21	59	52	81	38
2AA	1	9.03	9.03	9.03	9.03	-	1	3	3	3	3	-	1	282	282	282	282	-
2AP	2	0.40	0.85	0.85	1.29	0.78	2	7	23	23	38	28	2	13	27	27	41	25
2AS	1	5.52	5.52	5.52	5.52	-	1	46	46	46	46	-	1	173	173	173	173	-
D-Zone	5	0.75	2.77	7.14	18.02	11.56	5	-2	11	57	159	103	5	23	87	223	563	361
L-Zone	11	6.93	33.00	26.25	36.50	12.99	11	6	89	158	447	220	11	217	1030	821	1140	406
MLS	16	0.05	0.20	0.46	1.54	0.63	16	933	969	968	994	26	16	2	6	14	48	20
O-Zone	2	2.38	2.39	2.39	2.39	0.01	2	31	40	40	49	16	2	74	75	75	75	1

Rock Type	NNP						NP:AP						Paste pH					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	6	-171	-11	68	386	357	6	0.37	0.90	-	20.34	15.71	6	7.60	8.20	8.07	8.40	0.45
1B	12	-26	11	6	29	23	12	0.67	1.37	-	1.74	0.50	12	8.21	8.55	8.55	8.80	0.24
1BA	3	-19	-1	3	27	29	3	0.78	0.97	-	1.47	0.44	3	7.96	8.60	8.40	8.76	0.53
2AA	1	-279	-279	-279	-279	-	1	0.01	0.01	-	0.01	-	1	7.50	7.50	7.50	7.50	-
2AP	2	-6	-4	-4	-2	3	2	0.47	0.69	-	0.91	0.39	2	6.78	7.50	7.50	8.22	1.27
2AS	1	-127	-127	-127	-127	-	1	0.28	0.28	-	0.28	-	1	7.60	7.60	7.60	7.60	-
D-Zone	5	-532	-48	-166	74	392	5	-0.63	0.01	-	1.50	1.16	5	4.94	7.50	6.84	8.44	1.77
L-Zone	11	-1143	-975	-663	2	557	11	0.00	0.09	-	3.22	3.22	11	7.00	7.40	7.41	8.40	0.81
MLS	16	911	963	953	993	39	16	20.34	178.82	-	728.84	406.04	16	8.35	8.60	8.56	8.75	0.20
O-Zone	2	-44	-35	-35	-25	16	2	0.47	0.57	-	0.67	0.17	2	7.97	8.25	8.25	8.53	0.49

Note
Mean NP/AP cannot be calculated by arithmetic averaging.

TABLE 2-3
PHASE 1 ACID-BASE ACCOUNTING STUDY
METAL CONCENTRATION STATISTICS

Rock Type	Zn						Pb					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	6	76	640	2390	6455	3884	6	33	354	2182	6160	3931
1B	12	86	305	348	807	284	12	8	48	77	173	83
1BA	3	23	58	771	1804	1273	3	8	16	129	296	205
2AA	1	10000	10000	10000	10000	-	1	10000	10000	10000	10000	-
2AP	2	110	173	173	236	112	2	25	31	31	37	10
2AS	1	1730	1730	1730	1730	-	1	670	670	670	670	-
D-Zone	5	394	1440	1214	1914	770	5	69	1755	3407	8048	4221
LZ	11	10000	10000	10000	10000	0	11	2490	10000	8372	10000	3119
MLS	16	13	116	542	1372	887	16	7	70	309	1091	548
O-Zone	2	1397	2723	2723	4049	2344	2	996	1374	1374	1751	667

Rock Type	As						Cu					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	6	50	94	498	1349	1016	6	26	32	96	231	142
1B	12	29	104	149	337	138	12	10	35	33	48	16
1BA	3	22	72	65	104	51	3	26	42	44	62	23
2AA	1	582	582	582	582	-	1	384	384	384	384	-
2AP	2	19	30	30	41	20	2	40	54	54	68	25
2AS	1	122	122	122	122	-	1	85	85	85	85	-
D-Zone	5	65	1010	1088	2244	1097	5	35	101	176	395	221
LZ	11	1240	6770	5757	8820	3266	11	358	1065	1208	1640	1072
MLS	16	2	26	55	171	83	16	2	7	16	54	21
O-Zone	2	57	123	123	189	117	2	23	39	39	55	28

TABLE 3-2
As-Built Specifications for Individual Pads
Field Test Pads 1998

PAD	APPROX. VOLUME PLACED (Tonnes)	DIMENSIONS (m)
Earn (OP)	17	4.0 x 4.8 x 0.32
Ore (HG)	20	4.1 x 4.6 x 0.25
Discovery Zone (D)	20	4.0 x 4.5 x 0.48

TABLE 3-3
Summary of Mineralological Characteristics

ROCK TYPE	MINERAL GROUP	Proport'n of Mineral Group (%)	Mineral	Prop'n of Mineral (%)	Proportion of Major Forms (%)						Dimensions of Forms (mm)						Condition of Rock in Core
					Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix (Rank*)	Dissemin.	Laminae	Massive	Veinlet, Fracture Filling	P'blast Nodule Clast	Matrix	
SANDSTONE	SULPHIDES	2	Pyrite	99.5	93	1	0	3	3	0	0.3	1	-	1	2	-	Fractured to competent
			Pyrrhotite	< 1	0	0	0	0	100	0	-	-	-	-	5	-	
			Base Metal	< 1	0	0	0	100	0	0	-	-	-	2	-	-	
Expected proportion of waste rock	CARBONATES	1	Calcite	98	0	100	0	0	0	4*	-	6	-	-	-	< 0.1	
			Dolomite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Fe-Carb.	2	0	0	0	100	0	0	-	-	-	1	-	-	
=	SILICATES	97	Quartz	86	0	0	0	3	0	97	-	-	-	4	-	0.3	
38 per cent			Albite	6	0	0	0	0	0	100	-	-	-	-	-	0.1	
			Sericite	8	0	0	0	0	0	100	-	-	-	-	-	< 0.1	
SILTSTONE	SULPHIDES	2.5	Pyrite	99.5	78	8	0	10	4	0	0.1	1	-	1	2	-	Highly fractured
			Pyrrhotite	tr	100	0	0	0	0	0	< 0.1	-	-	-	-	-	
			Base Metal	< 1	0	0	0	99	1	0	-	-	-	2	0.5	-	
Expected proportion of waste rock	CARBONATES	3	Calcite	99	0	95	0	5	0	5*	-	10	-	2	-	< 0.1	
			Dolomite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Fe-Carb.	1	0	0	0	100	0	0	-	-	-	1	-	-	
=	SILICATES	94.5	Quartz	88	0	0	0	5	0	95	-	-	-	3	-	< 0.1	
23 per cent			Albite	3	0	0	0	0	0	100	-	-	-	-	-	< 0.1	
			Sericite	9	0	0	0	0	0	100	-	-	-	-	-	< 0.1	
SLATE/ MUDSTONE	SULPHIDES	1.5	Pyrite	99.5	70	10	1	10	9	0	0.1	2	20	1	2.5	-	Highly fractured to rubble
			Pyrrhotite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Base Metal	0.5	10	20	0	60	10	0	0.1	1	-	1	1	-	
Expected proportion of waste rock	CARBONATES	10	Calcite	100	0	70	0	30	0	5*	-	5	-	2	-	< 0.1	
			Dolomite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Fe-Carb.	0	-	-	-	-	-	-	-	-	-	-	-	-	
=	SILICATES	88.5	Quartz	85	0	0	0	5	0	95	-	-	-	2	-	< 0.1	
12 per cent			Albite	3	0	0	0	0	0	100	-	-	-	-	-	< 0.1	
			Sericite	12	0	0	0	0	0	100	-	-	-	-	-	< 0.1	
LIMESTONE	SULPHIDES	2	Pyrite	99	20	0	0	75	5	0	0.1	-	-	1	2	-	Competent to fractured
			Pyrrhotite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Base Metal	1	0	0	0	100	0	0	-	-	-	2	-	-	
Expected proportion of waste rock	CARBONATES	97	Calcite	98	0	0	0	5	0	95	-	-	-	2	-	0.1	
			Dolomite	2	0	0	0	0	0	100	-	-	-	-	-	0.5	
			Fe-Carb.	tr	0	0	0	100	0	0	-	-	-	3	-	-	
=	SILICATES	1	Quartz	90	30	0	0	70	0	0	< 0.1	-	-	2	-	-	
5.5 per cent			Albite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Sericite	10	0	100	0	0	0	0	-	< 0.1	-	-	-	-	
HIGH SULPHIDE	SULPHIDES	30	Pyrite	90	20	8	22	15	35	0	0.1	2	25	2.5	4	-	Fractured
			Pyrrhotite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Base Metal	10	25	0	15	40	20	0	0.2	-	15	5	5	-	
Expected proportion of waste rock	CARBONATES	8	Calcite	65	58	0	2	20	20	0	0.5	-	50	15	5	-	
			Dolomite	0	-	-	-	-	-	-	-	-	-	-	-	-	
			Fe-Carb.	35	65	25	0	10	0	0	0.5	2	-	15	-	-	
=	SILICATES	62	Quartz	92	3	0	0	20	5	72	0.1	-	-	10	5	0.1	
0.2 per cent			Albite	4	0	0	0	0	0	100	-	-	-	-	-	< 0.1	
			Sericite	4	0	15	0	0	0	85	-	0.5	-	-	-	< 0.1	

Notes
1. Balance of waste rock consists of overburden
2. The "rank" of carbonate form in the matrix is based on a detailed field "fizz rating", except for limestone
1=None, 2=Audible, not visble, 3=Barely visble, 4=Visble, not rapid, 5=Rapid brief, 6=Rapid sustained.
3. For further details, refer to Silvertip Report, "1998 Re-Logging of Silvertip Drill Core for Acid-Base Accounting (ABA)". Prepared by Chris Rees.

TABLE 3-4
Statistical Summary for Acid-Base Accounting Parameters
by Rock Unit - Phase 2

Rock Type	Total S						NP						AP					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	16	0.17	1.82	1.72	2.615	1.03	16	1.30	85.25	90.53	193.25	86.20	16	2.0	48.0	45.8	70.7	29.9
1B	54	0.50	1.2	1.45	2.475	1.20	54	35.06	61.15	68.17	114.20	39.40	54	13.1	34.0	40.6	74.1	33.8
1BA	3	1.19	1.19	1.40	1.702	0.37	3	43.22	43.70	43.63	44.02	0.50	3	33.3	33.9	38.3	45.0	8.3
2A	4	1.50	3.59	3.68	5.937	2.39	4	5.48	38.35	63.25	140.94	78.44	4	42.5	106.5	104.7	165.4	66.0
2AA	3	5.65	4.98	4.56	5.516	1.35	3	21.20	23.60	25.53	30.64	6.13	3	85.8	135.3	119.8	147.5	40.9
2AC	1	1.66	1.66	1.66	1.66	NA	1	373.80	373.80	373.80	373.80	NA	1	43.1	43.1	43.1	43.1	NA
2AP	12	0.39	0.975	1.05	2.203	0.70	12	21.74	33.25	36.98	53.46	14.62	12	9.3	24.9	28.4	62.0	20.5
2AS	11	1.73	2.48	2.56	3.38	0.74	11	28.50	50.50	144.07	498.00	217.82	11	48.1	63.4	69.0	99.1	21.5
D-Zone	8	4.62	18.67	16.61	27.591	10.42	8	3.12	8.95	38.86	105.33	48.88	8	141.8	573.1	513.0	857.1	323.5
I-Zone	1	2.90	2.9	2.90	2.9	NA	1	231.50	231.50	231.50	231.50	NA	1	79.1	79.1	79.1	79.1	NA
U-Zone	1	9.54	9.54	9.54	9.54	NA	1	104.30	104.30	104.30	104.30	NA	1	292.2	292.2	292.2	292.2	NA
LZ	2	12.11	14.65	14.65	17.194	4.50	2	49.41	183.05	183.05	316.69	236.24	2	335.5	415.0	415.0	494.5	140.6
LZOX	1	0.23	0.23	0.23	0.23	NA	1	3.10	3.10	3.10	3.10	NA	1	2.8	2.8	2.8	2.8	NA
MLS	29	0.09	0.43	2.54	7.036	3.95	29	488.90	888.30	804.04	996.62	199.18	29	2.6	11.2	75.7	214.3	122.8
YBR	3	3.29	7.38	7.21	11.052	4.85	3	40.72	136.80	294.77	612.00	382.36	3	89.9	218.1	215.1	339.1	155.8
O-Zone	2	2.34	3.78	3.78	5.22	2.55	2	39.52	41.60	41.60	43.68	3.68	2	65.5	104.9	104.9	144.3	69.7

Rock Type	NNP						NP:AP					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	16	-21.65	26.90	44.73	130.75	76.57	16	0.22	1.79	1.87	3.36	1.35
1B	54	1.73	23.50	27.55	82.32	41.22	54	1.06	1.68	2.72	5.43	2.40
1BA	3	-1.44	9.20	5.37	10.64	8.25	3	0.99	1.27	1.17	1.32	0.23
2A	4	-112.03	-36.35	-41.40	25.19	73.90	4	0.06	0.56	0.89	1.99	1.11
2AA	3	-126.34	-111.70	-94.23	-55.14	47.00	3	0.14	0.17	0.25	0.39	0.17
2AC	1	330.70	330.70	330.70	330.70	NA	1	8.67	8.67	8.67	8.67	NA
2AP	12	-4.68	8.70	8.57	25.28	15.99	12	0.86	1.75	1.68	2.30	0.85
2AS	11	-70.60	-8.30	75.05	449.90	231.43	11	0.29	0.86	3.01	10.35	5.35
D-Zone	8	-853.86	-564.15	-474.14	-54.09	366.33	8	0.00	0.02	0.25	0.65	0.33
I-Zone	1	152.40	152.40	152.40	152.40	NA	1	2.93	2.93	2.93	2.93	NA
U-Zone	1	-187.90	-187.90	-187.90	-187.90	NA	1	0.36	0.36	0.36	0.36	NA
LZ	2	-286.07	-231.95	-231.95	-177.83	95.67	2	0.11	0.37	0.37	0.62	0.45
LZOX	1	0.30	0.30	0.30	0.30	#DIV/0!	1	1.11	1.11	1.11	1.11	NA
MLS	29	211.68	882.40	728.36	987.04	303.08	29	2.03	89.06	171.27	379.20	253.97
YBR	3	-226.36	-201.40	79.67	498.12	514.08	3	0.14	0.37	4.36	10.19	7.17
O-Zone	2	-100.57	-63.25	-63.25	-25.93	65.97	2	0.33	0.49	0.49	0.66	0.29

TABLE 3-5
Statistical Summary for Metal Concentrations Determined Following Aqua Regia Digestion by Rock Type - Phase 2

Rock Type	Zn						As					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	16	201	377	1717	1939	4644	16	39	102	239	574	321
1B	52	111	372	918	939	2923	52	26	78	99	247	90
1BA	3	67	155	130	182	75	3	15	16	21	30	10
2A	4	1471	3499	6347	13503	7327	4	167	259	257	345	98
2AA	2	3811	4295	4295	4778	855	2	201	280	280	358	139
2AC	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA
2AP	12	196	620	552	1004	338	12	19	41	67	136	76
2AS	7	752	1544	3452	8234	4465	7	34	60	68	112	36
D-Zone	6	2359	25602	35154	77500	37464	6	246	1344	1271	2222	911
I-Zone	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA
U-Zone	1	12000	12000	12000	12000	NA	1	612	612	612	612	NA
LZ	2	45200	54000	54000	62800	15556	2	2702	3419	3419	4136	1267
LZOX	1	3620	3620	3620	3620	NA	1	3261	3261	3261	3261	NA
MLS	15	26	101	2908	5571	8334	15	-5	12	60	40	183
YBR	1	66	66	66	66	NA	1	62	62	62	62	NA
O-Zone	2	1315	3756	3756	6197	4315	2	57	142	142	227	150

Rock Type	Pb						Cu					
	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev	n	P_{10}	P_{50}	Mean	P_{90}	St.Dev
1AA	16	60	297	1711	5951	2951	16	22	33	85	147	164
1B	52	6	19	249	296	892	52	25	41	48	66	37
1BA	3	6	8	9	12	4	3	41	44	44	48	5
2A	4	638	1630	1746	2946	1323	4	50	103	108	170	65
2AA	2	830	1449	1449	2068	1095	2	68	82	82	96	24
2AC	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA
2AP	12	21	69	231	648	320	12	47	57	58	66	13
2AS	7	318	957	1001	1726	692	7	42	68	91	174	68
D-Zone	6	326	1109	2479	6001	3401	6	33	52	247	658	352
I-Zone	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA
U-Zone	1	1913	1913	1913	1913	NA	1	189	189	189	189	NA
LZ	2	10000	10000	10000	10000	0	2	372	542	542	712	301
LZOX	1	8293	8293	8293	8293	NA	1	175	175	175	175	NA
MLS	15	-2	12	29	67	35	15	0	3	13	38	25
YBR	1	20	20	20	20	NA	1	20	20	20	20	NA
O-Zone	2	180	422	422	664	429	2	49	55	55	61	11

TABLE 3-7
Waste Rock Pad Leachates - Selected Results

Date	pH	TSS	SO_4	As	Cd	Cu	Fe	Mn	Pb	Zn	Ca	Al
OP												
Sept 4-98	6.66	19	<1	0.242	0.0286	0.503	54.6	0.425	0.397	1.64	1.55	15.4
Sept 10-98	6.6	96	5	0.135	0.0209	0.315	29.5	0.246	0.217	1.02	1.39	8.97
DZ												
Sept 4-98	1.93	39	4800	80	18.1	61.6	7580	208	1	3660	164	143
Sept 10-98	1.74	35	36000	117	25.9	88.2	10900	207	<3	5380	197	190
Sept 13-98	1.7	<1	40000	93	21.5	71.9	9410	230	1	4220	181	155
HG												
Sept 4-98	6.93	<1	1350	0.003	0.418	0.005	0.1	3.24	0.0993	43.7	509	0.03
Sept 10-98	6.89	226	1080	0.003	0.452	0.004	<0.03	4.09	0.108	49.9	498	<0.01
Sept 13-98	7.19	<1	1700	0.003	0.486	0.005	<0.03	4.83	0.106	63.8	492	<0.01

All results in mg/L, except pH
No sample collected from OP on September 13.

TABLE 3-8
Observations From East and Northeast Trenches
Ore Pile

Interval from Surface (m)	Description	HCl Reaction	Paste pH (su)	Sample
EAST TRENCH				
Surface	Rubbly mixture of oxidized, massive py/sl, limestone, massive calcite	Strong in limestone.	Geberally 6, locally oxidized boulder fines 2	SD001*
0-0.3	Silty sand, brown fines	Strong	7.0	SD002
0.3-1.0	Grey sand, fresh sulphide grains	Strong	7.6	SD003
1.0-3.5	Grey sandy gravel, fresh sulphides throughout, ~1% orange mottles	Strong throughout	6.5	SD101 (2.5 m)*
3.5-4.2	Gravel, limestone, cemented, no fines	Strong throughout	Not measured	SD102 (4.0 m)*
4.2-4.5	Loam, olive brown, damp	None	Not measured	SD103*
4.5	End of Pit			
NORTHEAST TRENCH				
0.0-0.5	Rubbly mixture of oxidized, massive py/sl, limestone, massive calcite			
0.5-0.6	Orange brown fines			SD109
0.6-2.5	Gravel, pyritic, dry grey, orange reaction rim between galena and pyrite noted.	Strong throughout	Not measured	SD110(2.2 m)
2.5-3.5	Gravel, limestone, cemented, no fines	Strong throughout	Not measured	SD111(2.8 m)
3.5	End of Pit			

Note
Samples analysed indicated by *

TABLE 3-9
ACID-BASE ACCOUNTING
ORE PILE EXCAVATION

SAMPLE AND FRACTION	Description	pH	S_{total}	$S_{Non\text{-}Sulphate}$	$S_{Sulphate}$	TIC	TIC	NP	AP	NP/AP	NNP
		su	%	%	%	%C	kg $CaCO_3$/t	kg $CaCO_3$/t	kg $CaCO_3$/t	Ratio	kg $CaCO_3$/t
EAST TRENCH											
001 +10 mm	Ore	7.8	6.5	6.4	0.1	8.64	720	724	200	3.6	524
001 -2 mm	Ore	7.6	10.5	10.3	0.2	2.87	239	251	323	0.8	-72
101 +10 mm	Ore	7.1	32.3	31.9	0.3	0.84	70	83	998	0.1	-915
101 -2 mm	Ore	7.4	26.8	25.9	0.8	1.01	84	71	811	0.1	-739
102 +10 mm	Limestone	8.0	0.5	0.5	0.0	11.73	978	975	14	69.1	961
102 -2 mm	Limestone	7.9	1.2	0.7	0.5	10.91	909	897	22	40.4	875
103 +10 mm	Loam	8.2	0.2	0.1	0.1	2.35	196	184	3	59.4	181
103 -2 mm	Loam	7.8	0.6	0.5	0.1	1.04	87	65	14	4.6	51
NORTH TRENCH											
108 +10 mm	Ore	7.7	21.6	21.2	0.4	4.18	348	342	662	0.5	-320
108 -2 mm	Ore	7.7	30.5	28.9	1.6	1.13	94	102	904	0.1	-802
105 +10 mm	Ore	6.4	41.1	40.2	0.9	0.13	11	6	1255	0.0	-1249
105 -2 mm	Ore	5.3	41.3	39.3	2.0	0.02	2	16	1228	0.0	-1213
107 +10 mm	Ore	6.8	35.6	35.1	0.5	0.04	3	-6	1098	0.0	-1104
107 -2 mm	Ore	7.0	39.9	39.3	0.6	0.21	18	7	1228	0.0	-1221
104 +10 mm	Limestone	7.9	1.5	1.0	0.5	10.49	874	862	32	27.0	830
104 -2 mm	Limestone	7.8	16.3	13.9	2.4	5.31	443	403	435	0.9	-32

TABLE 3-10
AQUA REGIA ELEMENT SCANS
ORE PILE EXCAVATION

SAMPLE AND FRACTION	Description	TOTAL	ICP AQUA REGIA DIGESTIBLE																									
		Ba	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	Bi	As	Sb	Fe	Mn	Te	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	Na	K	Sr	Ga
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	ppm	ppm
EAST TRENCH																													
001 +10 mm	Ore	54	196.4	287	10000	28000	5	4	<1	85.6	100	365	167	3.8	668	17	52	10	3	133	57	<1	0.03	0.86	10	<0.01	0.01	108	9
001 -2 mm	Ore	<10	214	1159	10000	150000	3	11	2	977	155	529	424	8.56	1732	80	10	50	4	271	848	<1	0.09	0.12	5.21	<0.01	0.03	22	125
101 +10 mm	Ore	<10	488	1903	10000	108000	<1	8	4	450.1	14	5857	2000	10	448	26	<1	12	5	1362	256	6	0.01	0.04	2.05	<0.01	<0.01	10	30
101 -2 mm	Ore	23	500	3677	10000	145000	2	15	4	582.2	31	5159	2000	10	757	64	9	9	3	2000	374	4	0.01	0.03	1.74	<0.01	<0.01	9	54
102 +10 mm	Limestone	227	4	8	184	938	1	7	2	3.7	<5	24	26	0.59	566	<10	80	<1	2	<20	<20	<1	0.01	0.34	10	<0.01	<0.01	132	<2
102 -2 mm	Limestone	8327	17.1	75	3325	5687	2	59	16	27.2	<5	87	170	1.95	2820	<10	133	2	2	57	<20	<1	0.04	0.37	10	<0.01	<0.01	113	<2
103 +10 mm	Loam	1747	6.5	70	1295	2147	3	26	10	10.8	<5	106	62	2.06	440	<10	419	205	32	28	<20	9	0.83	0.38	6.51	0.02	0.29	56	3
103 -2 mm	Loam	2217	28.6	172	6360	5474	3	37	14	25.5	<5	217	237	2.74	551	<10	324	82	31	102	<20	11	0.88	0.28	2.51	0.02	0.18	42	4
NORTH TRENC																													
108 +10 mm	Ore	140	143.2	667	10000	63000	7	15	3	272.3	10	4424	1227	10	837	27	8	25	6	566	150	3	0.02	0.66	6.21	<0.01	<0.01	52	23
108 -2 mm	Ore	1048	328	1514	10000	126000	3	11	2	380.4	43	4203	1758	10	572	35	8	8	3	1121	243	8	0.01	0.09	2.35	<0.01	<0.01	11	37
105 +10 mm	Ore	<10	122.9	933	9920	116000	4	6	2	487.4	<5	9093	703	10	456	31	<1	5	5	620	258	16	<0.01	0.04	0.43	<0.01	<0.01	5	39
105 -2 mm	Ore	<10	148.6	817	10000	84000	6	7	2	<371.3	<5	10000	739	10	360	37	<1	17	5	615	197	14	<0.01	<0.01	0.21	<0.01	<0.01	3	42
107 +10 mm	Ore	14	95.6	659	10000	135000	6	18	<1	650.7	<5	7190	1171	10	500	54	1	58	10	477	355	10	0.03	<0.01	0.3	<0.01	0.01	4	49
107 -2 mm	Ore	<10	124.3	893	9914	108000	3	11	2	477.9	<5	9631	968	10	459	42	<1	24	6	628	270	14	0.02	0.03	0.48	<0.01	<0.01	4	36
104 +10 mm	Limestone	160	3.9	19	520	8467	<1	18	6	89.8	<5	244	35	1.34	1021	<10	76	4	2	<20	26	<1	0.03	0.16	10	<0.01	<0.01	116	<2
104 -2 mm	Limestone	715	66.6	356	10000	77000	3	56	18	410.9	<5	3234	441	10	1832	29	17	11	3	252	166	5	0.08	0.11	10	<0.01	<0.01	46	15

TABLE 3-11
WATER LEACHABLE ELEMENTS
ORE PILE EXCAVATION

SAMPLE AND FRACTION	Description	Ag	Cu	Pb	Zn	Ni	Co	Cd	Fe	Mn	Ba	La	Mg	Ca	Na	K	Sr
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EAST TRENCH																	
001 -2 mm	Ore	<0.02	<0.1	<0.2	0.3	<0.1	<0.1	<0.02	<1	<0.1	0.2	<0.1	8	353	3	7	0.4
101 -2 mm	Ore	<0.02	<0.1	1.4	24	<0.1	<0.1	0.12	<1	4.7	<0.1	<0.1	<1	805	2	2	<0.1
102 -2 mm	Limestone	0.68	<0.1	<0.2	0.5	<0.1	<0.1	<0.02	<1	<0.1	<0.1	<0.1	<1	220	2	<1	0.2
103 -2 mm	Loam	0.25	<0.1	<0.2	0.3	<0.1	<0.1	<0.02	<1	0.1	0.1	<0.1	<1	137	3	6	0.1
NORTH TRENCH																	
108 -2 mm	Ore	<0.02	<0.1	0.3	6.6	<0.1	<0.1	0.05	<1	1.8	<0.1	<0.1	<1	745	2	1	0.3
105 -2 mm	Ore	0.02	0.5	3.7	701.7	0.4	<0.1	4.78	2	7.9	<0.1	0.2	<1	611	2	<1	<0.1
107 -2 mm	Ore	0.18	<0.1	2.7	278.8	0.3	0.1	2.37	<1	6.3	<0.1	<0.1	<1	713	3	1	<0.1
104 -2 mm	Limestone	0.17	<0.1	<0.2	7.7	<0.1	<0.1	<0.02	<1	0.5	<0.1	<0.1	<1	760	2	1	0.3

Note

Mo(0.1), Bi(0.5), As(0.5), Sb(0.5),Te(1), Cr(0.1), V(0.1), Sn(0.1), W(0.1),Al(1), Y(0.1), Ga(0.2), Li(0.1), Nb(0.1), Sc(0.5), Ta(1), Ti(1), Zr (0.1)

TABLE 3-12
NATURAL GROUNDWATER AND SURFACE WATER

Date	Type	pH	TSS	SO_4	As	Cd	Cu	Fe	Pb	Zn	Ca	Al
Groundwater												
TH-1												
Aug 14-98	Total	3.47	9	202	<0.2	0.06	0.05	10.7	0.15	6.72	33.9	8.5
TH-3												
Aug 14-98	Total	7.97	21	218	<0.2	0.02	0.02	3.1	0.032	4.41	138	0.3
81-05												
Aug 14-98	Total	3.76	9	180	<0.2	0.08	0.64	5.87	0.002	5.6	28.2	8.7
81-06												
Aug 14-98	Total	6.78	43	250	<0.2	0.002	<0.001	19.2	0.002	3.31	78.2	<0.2
Silver Creek - Headwaters												
1385 m	Total	#N/A	<1	#N/A	#N/A	0.17	2.51	39.5	<0.001	22.1	40	#N/A
1305 m	Total	#N/A	19	#N/A	#N/A	0.1	0.77	1.3	0.098	14.4	121	#N/A
Silver Creek - WQ-5												
June 28-98	Dissolved	2.98	#N/A	#N/A	#N/A	0.17	1.99	19.9	0.029	23.9	55.7	#N/A
Aug 6-98	Dissolved	2.76	7	770	<0.2	0.19	1.66	56.2	0.001	30.6	67.1	35

All results in mg/L, except pH
No sample collected from OP on September 13.

APPENDIX A

Phase 1 ABA Study - Raw Data

Appendix A
Phase 1 ABA Data

Sample Description	Lithology	Crushed (Paste)	Sulfate (S %)	Sulfide (S %)	Total (S %)	del (S %)	TAP	SAP	NP	CO_2 % Inorganic	Al %	Sb ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Ca %	Cr ppm	Co ppm	Cu ppm	Ga ppm	Fe %	Pb ppm	La ppm	Mg %	Mn ppm	Mo ppm	Hg ppm	Ni ppm	P ppm	K %	Ag ppm	Na %	Sc ppm	Sr ppm	Tl ppm	Ti %	W ppm	U ppm	V ppm	Zn ppm
199651	Unknown	7.5	0.04	2.63	2.69	0.02	84	82.8	85	4.4	0.26	56	124	80	0.25	1	10	2.89	78	8	137	5	2.38	5310	5	0.72	380	13	0.5	87	380	0.09	20.8	0.005	1	123	5	0.005	5	5	26	1975
199652	MLS	8.6	0.005	0.04	0.04	0	1	1.3	935	38.9	0.005	1	2	30	0.25	1	0.25	15	13	0.6	2	5	0.05	4	5	0.68	835	0.5	0.5	4	5	0.005	0.1	0.005	0.5	155	5	0.005	5	5	1	6
199653	2AP	6.6	0.06	0.16	0.29	0.07	9	7.2	3	0.1	1.71	2	44	250	0.25	1	7.5	0.18	58	4	72	5	2.98	38	10	0.69	115	3	0.5	29	690	0.18	0.2	0.03	4	75	5	0.005	10	5	78	252
199654	2AS	7.6	0.31	4.76	5.52	0.45	173	162.8	46	2.4	0.27	14	122	20	0.25	2	5	1.98	71	10	85	5	4.54	670	5	0.15	465	0.5	0.5	64	470	0.14	6.2	0.005	1	40	5	0.005	5	5	12	1730
199655	O-Zone	7.9	0.32	2.07	2.39	0	75	64.7	29	1.6	0.31	8	40	50	0.25	1	2.5	1.09	94	19	19	5	2.28	1845	5	0.26	550	0.5	0.5	69	120	0.11	8.8	0.005	3	41	5	0.005	5	5	11	1065
199656	2AA	7.5	0.07	8.88	9.03	0.08	282	280.0	3	0.3	0.29	56	582	5	0.25	30	100	0.19	74	22	384	10	5.72	10000	5	0.02	290	0.5	0.5	37	500	0.17	79	0.005	0.5	0.5	5	0.005	5	5	9	10000
199657	1B	8.2	0.07	0.79	1.02	0.16	32	29.7	40	1.8	0.17	4	28	130	0.25	1	1.5	1.16	121	8	9	5	1.19	132	5	0.43	330	1	0.5	39	1310	0.08	0.6	0.005	0.5	38	5	0.005	5	5	13	494
199658	1B	8.6	0.02	0.79	0.9	0.09	28	27.5	59	2.7	1.67	1	38	170	0.25	1	0.25	1.59	45	14	42	5	3.5	44	5	1.19	320	1	0.5	48	880	0.17	0.2	0.005	2	85	5	0.005	5	5	28	150
199659	1BA	8.6	0.01	0.28	0.34	0.05	11	10.3	10	0.4	0.42	1	10	80	0.25	1	0.25	0.38	167	8	22	5	1.02	8	5	0.21	80	0.5	0.5	27	590	0.12	0.1	0.005	0.5	26	5	0.005	5	5	10	14
199660	1AC	8.1	0.02	4.35	4.93	0.58	154	153.4	43	1.8	0.49	8	32	20	0.25	1	0.5	1.3	60	11	38	5	4.11	24	5	0.33	95	1	0.5	61	730	0.19	0.8	0.005	1	52	5	0.005	5	5	16	224
199661	MLS	8.6	0.04	0.3	0.37	0.03	12	10.3	949	40.5	0.006	1	2	750	0.25	1	0.25	15	100	0.5	3	5	0.59	4	5	0.45	340	0.5	0.5	8	5	0.005	0.1	0.005	0.5	236	5	0.005	5	5	1	32
199662	1AC	8.6	0.03	3.28	3.38	0.07	106	104.7	106	4.9	0.58	1	18	30	0.25	1	0.5	3.24	90	7	30	5	2.98	18	5	0.85	210	1	0.5	38	760	0.17	0.1	0.005	2	254	5	0.005	5	5	23	196
199663	1AA	8.2	0.02	2.81	2.84	0.01	89	88.1	56	2.5	0.4	2	34	80	0.25	1	0.8	1.53	60	8	31	5	2.52	38	5	0.63	120	8	0.5	49	430	0.18	0.4	0.005	1	62	5	0.005	5	5	21	200
199664	MLS	8	0.02	1.88	2	0.1	63	61.8	922	39.2	0.16	24	290	10	0.25	14	2	15	14	0.5	61	5	1.71	182	5	1.68	1225	24	0.5	8	30	0.005	4.4	0.005	0.5	105	10	0.005	5	10	5	586
199665	Unknown	7.5	0.04	29.65	30.5	0.81	953	951.9	27	2.5	0.01	246	912	5	0.25	244	100	0.65	16	0.5	1915	40	14.35	10000	5	0.08	685	0.5	0.5	0.5	40	0.005	100	0.005	0.5	0.5	10	0.005	5	10	0.5	10000
199666	L-Zone	7.5	0.21	0.01	0.24	0.02	8	0.9	10	0.5	6.36	64	688	3220	4.5	1	28.5	0.39	14	23	1065	5	15	2490	10	0.03	185	11	0.5	494	650	0.04	12.4	0.005	4	64	5	0.005	5	40	69	10000
199667	MLS	8.4	0.005	0.23	0.25	0.02	8	7.7	978	41.5	0.07	2	38	30	0.25	2	2	15	5	0.5	11	5	0.41	114	5	0.22	410	1	0.5	5	10	0.005	1.2	0.005	0.5	186	5	0.005	5	5	0.5	540
199668	MLS	8.6	0.005	0.35	0.39	0.04	12	12.0	931	41.2	0.04	1	10	20	0.25	1	0.5	15	8	0.5	8	5	0.35	24	5	0.18	810	0.5	0.5	8	5	0.005	0.5	0.005	0.5	178	5	0.005	5	5	1	255
199669	1B	8.2	0.04	2.23	2.29	0.02	72	70.3	47	2.1	0.24	1	344	70	0.25	1	3.5	1.29	96	11	9	5	2.39	78	5	0.45	345	0.5	0.5	33	450	0.12	0.5	0.005	1	41	5	0.005	5	5	4	170
199670	1BA	8.8	0.01	1.87	1.88	0	59	58.4	93	5.5	0.25	1	72	140	0.25	1	0.25	3.26	27	8	42	5	2.45	16	5	1.05	390	8	0.5	40	760	0.17	0.8	0.005	1	197	5	0.005	5	5	11	58
199671	1AA	8.3	0.02	1.53	1.56	0.01	49	48.1	68	2.7	0.22	8	114	130	0.25	1	8	2.16	49	8	27	5	1.4	670	5	0.31	140	15	0.5	55	310	0.09	2.6	0.005	0.5	60	5	0.005	5	5	27	1050
199672	L-Zone	8.6	0.02	6.85	6.93	0.06	217	215.9	695	29.3	0.02	256	1240	70	0.25	1	100	15	16	0.5	358	10	3.75	10000	5	1.85	600	5	0.5	13	180	0.005	77.2	0.005	0.5	90	5	0.005	5	5	5	10000
199673	MLS	8.6	0.005	0.1	0.09	-0.02	3	2.7	965	41	0.005	2	14	80	0.25	1	0.25	15	5	0.5	2	5	0.11	82	5	0.46	415	9	0.5	4	690	0.005	0.8	0.005	0.5	161	5	0.005	5	5	3	122
199674	MLS	8.3	0.01	1.04	1.06	0.01	52	51.6	955	40.3	0.28	2	34	130	0.25	1	0.25	2.06	60	28	48	5	1.24	46	5	0.11	845	0.5	0.5	46	1470	0.17	0.6	0.005	4	79	5	0.005	10	5	11	110
199675	2AC	8.5	0.02	1.09	1.16	0.05	30	35.6	73	3.2	0.006	8	22	40	0.25	1	0.25	15	7	0.6	10	5	1.2	304	5	0.8	325	0.5	0.5	7	5	0.005	1.4	0.005	0.5	178	5	0.005	5	5	3	266
199676	1B	8.5	0.01	1.33	1.39	0.05	43	43.1	56	2.7	0.27	2	188	70	0.25	1	0.5	1.88	111	6	28	5	1.8	282	5	0.62	535	1	0.5	25	1260	0.14	1.8	0.005	1	66	5	0.005	5	5	16	118
199677	L-Zone	5.5	0.2	36.08	36.5	0.22	1140	1134.4	-2	0.1	0.005	380	1785	5	0.25	528	100	0.03	48	0.5	1640	5	15	10000	5	0.005	95	0.5	0.5	0.5	10	0.005	100	0.005	0.5	0.5	5	0.005	5	10	0.5	10000
199678	MLS	8.6	0.005	0.29	0.3	0	9	9.1	978	40.7	0.005	38	170	250	0.25	2	3.5	15	5	0.5	19	5	0.33	592	5	0.22	130	2	0.5	2	240	0.005	2.8	0.005	0.5	336	5	0.005	5	5	1	676
199679	MLS	8.7	0.005	0.03	0.05	0.02	2	1.4	998	41.4	0.04	1	6	650	0.25	1	0.25	18	8	0.5	7	5	0.09	88	5	0.78	90	0.5	0.5	2	5	0.005	0.8	0.005	0.5	318	5	0.005	5	5	1	88
199680	2AP	8.4	0.01	1.39	1.4	0	44	43.4	42	2	0.58	1	16	60	0.25	1	0.25	1.74	71	6	38	5	1.4	24	5	0.08	65	0.5	0.5	37	70	0.14	1.2	0.005	1	57	5	0.005	5	5	9	94
199681	O-Zone	8.6	0.03	2.29	2.38	0.06	74	73.4	51	2.5	0.36	28	206	40	0.25	1	17.5	1.85	79	4	59	5	2.05	902	5	0.29	245	0.5	0.5	35	100	0.13	9.2	0.005	3	92	5	0.005	5	5	10	4360
199682	D-Zone	8.6	0.02	2.59	3.49	0.88	109	108.4	239	10.3	2.22	1	22	30	0.25	1	0.25	5.7	36	12	42	5	3.03	24	5	1.47	1055	0.5	0.5	39	690	0.28	0.6	0.01	5	177	5	0.005	5	5	9	152
199683	1B	8.8	0.01	3.14	3.21	0.06	100	100.0	87	6.2	0.29	1	438	70	0.25	1	0.25	2.8	80	8	24	5	3.87	6	5	1.12	690	1	0.5	31	540	0.16	0.1	0.005	4	76	5	0.005	5	5	11	16
199684	1AC	8.3	0.01	1.92	2.05	0.12	64	63.8	473	19.8	0.1	18	240	130	0.25	1	7.5	14.9	22	4	31	5	1.62	560	5	0.13	405	18	0.5	50	410	0.04	4.8	0.005	1	489	5	0.005	5	5	15	1515
199685	MLS	8.7	0.01	0.06	0.1	0.03	3	2.8	980	43.2	0.005	8	36	370	0.25	1	11.5	15	8	0.5	10	5	0.11	1725	5	0.86	645	1	0.5	4	5	0.005	5.4	0.005	0.5	209	5	0.005	5	5	4	1880
199686	1B	8.8	0.02	1.72	1.76	0.02	55	54.4	83	5.3	0.67	1	76	150	0.25	1	0.25	2.58	36	12	62	5	3.19	8	5	1.18	600	2	0.5	58	690	0.21	0.1	0.005	3	132	5	0.005	5	5	15	82
199687	1B	8.9	0.005	0.74	0.79	0.05	25	24.5	43	3.3	0.43	8	18	80	0.25	1	3	1.38	66	12	34	5	2.53	32	5	0.63	235	2	0.5	53	760	0.15	0.1	0.005	1	45	5	0.005	5	5	20	460
199688	Gouge	6	0.06	3.63	3.88	0.19	121	119.4	12	0.6	0.58	18	758	30	0.5	1	9.5	0.49	80	15	85	5	3.6	1215	10	0.17	180	3	0.5	45	710	0.14	4.4	0.005	2	28	5	0.005	5	5	30	2440
199689	1B	8.8	0.01	1.8	1.92	0.11	60	59.7	87	7.2	0.66	1	132	130	0.25	1	0.5	3.16	88	12	17	5	3.78	8	5	1.42	476	1	0.5	41	620	0.18	0.1	0.005	2	297	5	0.005	5	5	13	292
199690	1B	8.6	0.01	1.48	1.5	0.01	47	46.6	76	5.3	0.87	2	52	150	0.25	1	0.25	1.91	39	17	46	5	4.19	58	5	1.12	555	1	0.5	58	650	0.19	0.4	0.005	3	149	5	0.005	5	5	23	338
199691	1BA	7.8	0.07	2.55	2.78	0.14	86	84.1	62	2.5	0.47	12	112	50	0.25	1	11.5	1.81	80	8	67	5	2.25	366	5	0.5	590	8	0.5	53	600	0.17	5	0.005	1	87	5	0.005	5	8	24	2240
199692	1AA	7.2	0.06	10.8	11	0.14	344	341.9	35	1.1	0.12	470	2670	10	0.25	1	84	1.23	99	4	383	8	7.98	10000	5	0.06	740	14	0.5	42	240	0.06	100	0.005	0.5	10	5	0.005	5	5	7	10000
199693	L-Zone	7.1	0.04	38.09	38.7	0.57	1210	1208.1	6	0.4	0.005	5290	8820	5	0.25	1	100	0.17	18	0.5	4010	110	15	10000	10	0.005	715	3	0.5	8	80	0.005	100	0.005	0.5	0.5	10	0.005	5	10	0.5	10000
199694	MLS	8.6	0.005	1.22	1.42	0.2	44	44.2	980	39.2	0.005	58	172	60	0.25	1	15.5	15	14	0.5	59	5	1.04	1590	5	2.83	1735	3	0.5	8	5	0.005	9.6	0.005	0.5	150	5	0.005	5	5	3	3320
199695	L-Zone	7.9	0.05	24.32	24.6	0.23	769	767.2	103	5.2	0.005	330	8620	5	0.25	12	100	2.72	33	16	480	30	15	7630	5	0.03	1965	3	0.5	57	50	0.005	74.4	0.005	0.5	3	5	0.005	5	10	0.5	10000
199696	MLS	8.8	0.005	0.14	0.14	-0.01	4	4.2	971	41.4	0.006	22	50	10	0.25	1	4	15	7	0.5	14	5	0.15	312	5	0.53	185	0.5	0.5	3	5	0.005	1.8	0.005	0.5	228	5	0.005	5	5	1	864
199697	1B	8.3	0.01	0.62	0.7	0.07	22	21.6	30	3	0.58	4	42	130	0.25	1	1	0.09	78	14	38	5	3.07	52	10	0.62	265	1	0.5	38	660	0.18	0.6	0.005	2	55	5	0.005	5	5	14	318
199698	1AA	8.2	0.02	2.11	2.16	0.05	68	67.5	73	3.6	0.26	4	128	90	0.25	1	0.5	1.63	103	8	25	5	1.98	36	5	0.69	295	8	0.5	45	470	0.11	1	0.005	1	72	5	0.005	5	5	12	122
199699	MLS	8.6	0.005	0.02	0.03	0	1	0.6	990	41.6	0.005	1	2	10	0.25	1	0.25	15	5	0.5	2	5	0.05	10	5	0.39	180	0.5	0.5	1	5	0.005	0.1	0.005	0.5	169	5	0.005	5	5	1	12
199700	L-Zone	8.4	0.02	15.62	16.3	0.66	509	508.8	447	19.4	0.005	406	4390	10	0.25	1	100	11.6	30	0.5	820	60	8.03	10000	10	2.34	1525	1	0.5	6	60	0.005	100	0.005	0.5	40	5	0.005	5	5	4	10000
199701	1B	8.4	0.01	1.76	1.91	0.14	60	59.4	28	2	0.67	10	160	120	0.25	1	3	0.87	79	17	36	5	2.92	44	10	0.3	366	2	0.5	48	800	0.22	0.4	0.005	2	60	5	0.005	5	5	17	842
199702	1B	6.5	0.02	2.76	2.99	0.21	93	92.8	67	3.3	0.38	8	276	60	0.25	1	4	1.62	46	16	48	5	2.97	178	5	0.69	515	2	0.5	47	780	0.21	1	0.005	2	65	5	0.005	5	5	11	898
199703	Gouge	7.7	0.07	2.54	2.8	0.19	88	85.3	85	3.3	0.38	10	138	50	0.25	1	4.8	2.73	96	9	39	5	2.34	1185	5	0.48	470	15	0.5	75	310	0.08	8	0.005	1	189	5	0.005	5	10	34	896
199704	1AA	8	0.04	2.57	2.78	0.17	87	85.6	61	2.7	0.23	10	66	60	0.25	1	0.25	2.09	82	8	33	5	2.39	30	5	0.3	230	14	0.5	76	340	0.1	1.6	0.005	1	19	5	0.005	5	5	22	30
199705	MLS	8.8	0.005	0.3	0.33	0.03	10	10.2	955	41.4	0.02	1	32	100	0.25	1	0.25	16	7	0.5	8	5	0.25	22	5	0.38	580	1	0.5	13	70	0.005	0.4	0.005	0.5	193	5	0.005	5	5	20	106
199706	MLS	8.8	0.005	0.1	0.1	-0.01	3	3.0	1024	43.2	0.005	1	1	60	0.25	1	0.25	15	13	0.5	0.5	5	0.12	12	5	3.84	1070	0.5	0.5	1	200	0.005	0.1	0.005	0.5	190	5	0.005	5	5	3	14
199707	Gouge	8	0.06	4.79	5.14	0.29	161	158.8	614	26.7	0.35	1	10	40	0.25	1	0.25	15	10	9	7	5	3.59	26	5	0.38	570	0.5	0.5	6	1540	0.06	0.4	0.005	2	136	5	0.005	5	5	12	40
199708	Surface	8.6	0.01	0.18	0.18	0.01	6	5.3	990	40.3	0.005	1	6	30	0.25	1	0.25	15	5	0.5	6	5	0.19	14	5	0.44	145	0.5	0.5	2	5	0.005	0.1	0.005	0.5	185	5	0.005	5	5	1	104
199709	Surface	8.7	0.01	0.02	0.06	0.03	2	1.6	463	19.8	0.29	1	10	140	0.25	1	0.5	14.1	55	1	9	5	0.73	18	5	0.83	145	0.5	0.5	11	220	0.09	0.2	0.005	0.5	105	5	0.005	5	5	8	152
199710	Surface	8.6	0.01	0.06	0.08	0.01	3	2.2	982	42.2	0.01	1	2	60	0.25	1	0.5	15	5	0.5	1	5	0.12	8	5	0.45	160	0.5	0.5	3	5	0.005	0.1	0.005	0.5	183	5	0.005	5	5	0.5	194
199711	Surface	7.7	0.06	0.3	0.4	0.04	13	10.6	181	8.4	0.64	6	42	170	0.25	1	22.5	5.68	61	11	27	5	2.88	182	5	0.53	1025	2	0.5	25	260	0.14	1.2	0.005	0.5	31	5	0.005	5	5	14	5260
199712	Surface	8.7	0.005	0.11	0.18	0.07	6	5.5	1010	42.1	0.01	1	8	50	0.25	1	0.25	15	14	0.6	2	5	0.14	26	5	3.96	320	0.5	0.5	2	5	0.005	0.1	0.005	0.5	129	5	0.005	5	5	0.5	148
199713	Surface	8.8	0.005	0.02	0.05	0.03	2	1.4	992	42.5	0.005	1	1	30	0.25	1	0.25	15	8	0.5	1	5	0.06	8	5	0.65	125	0.5	0.5	1	5	0.005	0.1	0.005	0.5	158	5	0.005	5	5	0.5	36
199714	Surface	8.5	0.005	0.08	0.12	0.04	4	3.6	943	40.7	0.03	1	6	10	0.25	2	0.25	15	7	0.5	6	5	0.14	10	5	0.57	110	0.6	0.5	4	20	0.005	0.1	0.005	0.5	154	5	0.005	5	5	0.5	102
199715	L-Zone	7.4	0.15	35.14	35.3	0.01	1105	1098.4	89	4.4	0.005	6110	8860	5	0.25	2	100	3.09	14	0.5	1575	10	15	10000	5	0.05	420	4	0.5	8	20	0.005	100	0.005	0.5	10	10	0.005	5	10	0.5	10000
199716	L-Zone	7.4	0.3	26.59	27.6	0.71	863	853.1	194	8.4	0.005	1020	6770	5	0.25	22	100	5.26	21	0.5	1125	40	14.2	10000	30	0.1	645	4	0.5	3	180	0.005	100	0.005	0.8	27	10	0.005	5	10	0.5	10000
199717	L-Zone	7.3	0.15	34.53	35.2	0.52	1100	1095.3	82	3.7	0.005	2450	9280	5	0.25	8	100	2.38	30	0.5	481	20	15	10000	5	0.01	365	0.5	0.8	2	80	0.005	100	0.005	0.5	6	10	0.005	5	10	0.5	10000
199718	L-Zone	7	0.24	32.27	33	0.49	1030	1023.8	10	0.6	0.005	2870	5470	5	0.25	8	100	0.62	28	0.5	1625	70	15	10000	70	0.005	825	1	0.5	3	60	0.01	100	0.005	0.5	0.5	10	0.005	5	10	0.5	10000
199719	L-Zone	7.4	0.25	33.82	34.4	0.33	1075	1067.2	100	4.2	0.005	102	7800	5	0.25	8	100	2.95	31	0.5	128	5	15	1975	5	0.01	410	0.5	0.5	4	30	0.005	18.8	0.005	0.5	12	5	0.005	5	10	0.5	10000
199720	?-Zone	6.4	0.52	0.62	1.28	0.14	40	23.8	1	0.1	1.24	38	130	250	0.25	1	5	0.08	161	3	90	5	2.77	1570	5	0.005	45	1	0.5	35	290	0.3	11.8	0.01	4	20	5	0.005	5	5	33	1240
199721	?-Zone	5.6	0.59	0.34	0.97	0.04	30	11.9	-1	0.1	0.39	12	66	210	0.25	1	2	0.03	108	9	47	5	3.49	142	10	0.01	65	1	0.5	36	380	0.21	2.2	0.005	3	25	5	0.005	5	5	11	966
199722	D-Zone	4.9	1.32	0.11	1.45	0.02	45	4.1	-3	0.1	0.33	138	1620	140	0.25	48	2	0.04	39	0.5	562	10	15	10000	5	0.005	10	0.5	0.5	4	2090	0.19	58.2	0.005	1	245	5	0.005	5	10	30	1440
199723	D-Zone	5	0.22	0.03	0.29	0.04	9	2.2	-1	0.1	0.24	62	1010	400	0.25	8	0.25	0.01	65	1	145	5	9.49	1755	5	0.005	20	0.5	0.5	7	820	0.11	2.4	0.005	0.5	35	5	0.005	5	5	17	756
199724	1AA	8.5	0.01	0.63	0.64	0	20	19.7	773	32.2	0.02	34	74	50	0.25	1	15	15	18	0.5	79	5	0.46	2320	5	1.9	1020	1	0.5	7	10	0.005	13	0.005	0.5	112	5	0.005	5	5	4	2910
199725	MLS	8.4	0.02	0.06	0.09	0.01	3	2.2	966	40.3	0.005	1	20	40	0.25	1	0.25	15	6	0.5	5	5	0.21	166	5	0.47	175	0.5	0.5	3	10	0.005	0.6	0.005	0.5	218	5	0.005	5	5	0.5	66
199734	D-Zone	6.2	0.03	2.64	2.77	0.1	87	85.6	39	1.8	0.54	6	130	50	0.25	2	8	1.17	76	27	30	5	2.76	136	5	0.41	675	0.5	0.5	74	350	0.22	2.2	0.005	4	9	5	0.005	5	5	11	2130
199735	D-Zone	7.5	0.09	27.38	27.7	0.23	866	862.8	11	0.4	0.09	684	2660	5	0.25	254	8	0.41	69	10	101	5	15	5120	5	0.03	20	0.5	0.5	20	290	0.07	17.8	0.005	0.5	9	5	0.005	5	10	7	1590

APPENDIX B

Phase 2 - Rock Core Static Tests - Compiled Data

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						ACID-BASE ACCOUNTING								
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
	m	m	m				N	ml	kg/t	kg/t	kg/t	kg/t		%
84-65	4.8	13	8.2	1B	sandstone	1	0.1	40	4.7	0.4	4.3	3	6.98	0.1
84-65	13	21	8	1B	sandstone	1	0.1	40	6.9	1.2	5.7	2.8	7.41	0.09
84-65	21	28	7	1B	sandstone	1	0.1	40	14.3	13.2	1.1	15.8	7.16	0.51
84-65	28	34.55	6.55	1B	sandstone	2	0.5	40	60.1	27.5	32.6	30.3	8.19	0.97
84-65	34.55	37.3	2.75	1B	sandstone	2	0.5	40	46.7	13.4	33.3	15.3	7.93	0.49
84-65	37.3	40.2	2.9	1B	sandstone	1	0.1	40	38.7	15.6	23.1	17.5	8.3	0.56
84-65	40.2	45	4.8	1B	sandstone	2	0.5	40	60.7	13.1	47.6	16.2	8.15	0.52
84-65	45	52.4	7.4	1B	sandstone	1	0.1	40	57.9	12.5	45.4	14.2	8.32	0.46
84-65	52.4	58.15	5.75	1B	sandstone	1	0.1	40	71.8	17.5	54.3	19.7	8.36	0.63
84-65	58.15	67.65	9.5	1B	sandstone	1	0.1	40	66.9	14.1	52.8	16.9	8.23	0.54
84-65	67.65	70.1	2.45	1B	sandstone	2	0.5	40	68.6	25.9	42.7	30.3	8.42	0.97
84-65	70.1	79.4	9.3	1B	siltstone	1	0.1	40	53.8	32.2	21.6	35	8.23	1.12
84-65	79.4	86.35	6.95	1B	sandstone	1	0.1	40	64.7	22.6	42.1	25.3	8.23	0.81
84-65	86.35	92	5.65	1B	siltstone	2	0.5	40	67.7	43.8	23.9	46.2	8.18	1.48
84-65	92	94.3	2.3	1B	siltstone	2	0.5	40	91.6	31.6	60	35	8.34	1.12
84-65	94.3	98.7	4.4	1B	sandstone	2	0.5	40	43.7	28.8	14.9	32.2	7.65	1.03
84-65	98.7	103.3	4.6	1B	siltstone	2	0.5	40	54	38.4	15.6	41.9	8.24	1.34
84-65	103.3	111.3	8	1B	sandstone	1	0.1	40	44.6	32.5	12.1	36.2	8.01	1.16
84-65	111.3	116.9	5.6	1B	siltstone	2	0.5	40	78.3	23.8	54.5	25.6	8.16	0.82
84-65	116.9	127	10.1	1B	sandstone	2	0.5	40	128	14.7	113.3	16.6	8.33	0.53
84-65	127	133.1	6.1	1B	sandstone	2	0.5	40	125.6	12.8	112.8	14.4	8.28	0.46
84-65	133.1	137.7	4.6	1B	siltstone	1	0.1	40	33.5	18.1	15.4	20.3	8.11	0.65
84-65	137.7	140.5	2.8	1B	sandstone	2	0.5	40	149.9	18.9	131	21.9	8.22	0.7
84-65	140.5	144	3.5	1B	siltstone	2	0.5	40	132.3	23.1	109.2	25.6	8.16	0.82
84-65	144	154	10	1B	siltstone	2	0.5	40	82.5	35.9	46.6	39.7	7.96	1.27
84-65	154	158.35	4.35	1B	siltstone	2	0.5	40	61.3	58.1	3.2	64.4	8.05	2.06
84-65	165.5	172.5	7	1BA	siltstone	2	0.5	40	43.1	33.9	9.2	37	8.15	1.19
84-65	172.5	176.8	4.3	1AA	slate	2	0.5	40	86.2	40	46.2	49.7	8.1	1.59
84-65	176.8	182.7	5.9	1AA	slate	2	0.5	40	108.6	56.9	51.7	70.3	7.88	2.25
84-65	182.7	193	10.3	MLS	limestone	3	0.5	80	734.7	4.1	730.6	5.3	8.39	0.17
84-65	193	203.3	10.3	MLS	limestone	3	0.5	80	885.2	5	880.2	5.6	8.45	0.18
84-65	158.35	165.5	7.15	1B	sandstone	2	0.5	40	60.1	33.8	26.3	37.2	8.2	1.19

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						XRF		Assay	ICP AQUA REGIA																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ba	Se	C NOrg	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
84-65	4.8	13	8.2	1B	sandstone	-	-	-	0.8	64	18	239	9	21	2	2.1	149	15	2.18	34	184	61	-20	20	0.56	0.02	0.14	0.28	145
84-65	13	21	8	1B	sandstone	-	-	-	-0.2	119	34	266	5	30	2	2.1	109	12	1.71	32	206	71	-20	21	0.84	0.03	0.24	0.3	98
84-65	21	28	7	1B	sandstone	-	-	-	0.3	102	17	381	4	47	7	8.6	38	6	1.5	90	206	43	-20	11	0.57	0.08	0.48	0.25	51
84-65	28	34.55	6.55	1B	sandstone	1006	-2	0.9	0.2	66	61	492	3	46	8	17.7	74	-5	1.86	299	196	37	-20	8	0.63	0.51	1.55	0.26	80
84-65	34.55	37.3	2.75	1B	sandstone	-	-	-	-0.2	143	25	906	4	80	9	17.6	48	9	1.6	282	211	64	-20	12	1.1	0.43	1.22	0.27	75
84-65	37.3	40.2	2.9	1B	sandstone	-	-	-	0.3	42	12	249	5	44	8	4.6	12	-5	1.31	158	140	34	-20	15	0.62	0.32	1.05	0.29	61
84-65	40.2	45	4.8	1B	sandstone	-	-	-	-0.2	32	6	209	4	52	7	17.6	28	6	1.49	222	186	44	-20	12	0.71	0.54	1.68	0.28	85
84-65	45	52.4	7.4	1B	sandstone	-	-	-	0.3	41	14	300	4	51	7	18.8	27	5	1.64	227	168	42	-20	14	0.71	0.56	1.61	0.27	86
84-65	52.4	58.15	5.75	1B	sandstone	1467	3	1.15	0.3	38	9	363	4	45	8	14.7	81	6	2.02	331	144	37	-20	12	0.67	0.72	1.91	0.24	102
84-65	58.15	67.65	9.5	1B	sandstone	-	-	-	0.4	22	41	175	4	41	4	7.9	28	6	1.45	208	184	42	-20	8	0.44	0.58	1.93	0.2	105
84-65	67.65	70.1	2.45	1B	sandstone	-	-	-	0.4	39	45	752	4	50	8	13	38	6	2.42	314	145	42	-20	12	0.76	0.76	1.82	0.27	109
84-65	70.1	79.4	9.3	1B	siltstone	-	-	-	0.3	49	13	1834	4	58	10	17.1	78	9	2.81	370	122	40	-20	14	0.91	0.74	1.47	0.28	91
84-65	79.4	86.35	6.95	1B	sandstone	-	-	-	-0.2	26	12	604	3	40	6	1.9	45	5	1.82	260	130	25	-20	10	0.46	0.61	1.65	0.19	88
84-65	86.35	92	5.65	1B	siltstone	1625	-2	0.88	-0.2	45	9	1055	5	50	10	4.9	78	6	2.72	328	73	33	-20	11	0.64	0.64	1.53	0.22	79
84-65	92	94.3	2.3	1B	siltstone	-	-	-	0.2	37	10	515	4	53	9	2.2	34	5	2.92	368	110	32	-20	10	0.66	0.82	1.83	0.22	101
84-65	94.3	98.7	4.4	1B	sandstone	-	-	-	-0.2	18	11	251	5	42	7	1.4	51	-5	1.72	230	169	21	-20	11	0.45	0.42	1.13	0.21	61
84-65	98.7	103.3	4.6	1B	siltstone	-	-	-	-0.2	38	6	1007	5	50	10	2	38	6	2.65	313	99	29	-20	13	0.63	0.53	1.12	0.24	57
84-65	103.3	111.3	8	1B	sandstone	-	-	-	-0.2	25	23	648	4	46	7	2.6	59	-5	2.01	247	139	22	-20	10	0.45	0.44	1.28	0.19	64
84-65	111.3	116.9	5.6	1B	siltstone	2246	3	0.65	-0.2	49	12	766	3	71	18	0.5	26	6	4.17	431	61	33	-20	22	1.44	0.93	1.06	0.26	74
84-65	116.9	127	10.1	1B	sandstone	-	-	-	-0.2	28	6	524	2	52	12	0.5	13	-5	4.42	502	85	25	-20	17	1.49	1.34	2.11	0.22	150
84-65	127	133.1	6.1	1B	sandstone	-	-	-	-0.2	29	18	943	2	67	14	0.6	14	6	4.14	520	91	27	-20	15	1.42	1.41	2.27	0.23	147
84-65	133.1	137.7	4.6	1B	siltstone	-	-	-	-0.2	46	18	560	4	62	15	0.4	93	9	4.05	409	93	36	-20	20	1.6	0.91	0.79	0.26	65
84-65	137.7	140.5	2.8	1B	sandstone	-	-	-	-0.2	37	32	510	3	67	14	1.4	53	11	4.47	600	101	32	-20	13	1.4	1.52	2.71	0.25	183
84-65	140.5	144	3.5	1B	siltstone	2208	2	1.4	-0.2	51	18	248	3	63	14	0.4	74	11	4.82	486	66	34	-20	13	1.52	1.44	2.22	0.25	113
84-65	144	154	10	1B	siltstone	-	-	-	0.4	48	141	124	5	56	13	0.7	87	9	4.13	326	57	29	-20	14	1.21	0.89	1.29	0.23	97
84-65	154	158.35	4.35	1B	siltstone	-	-	-	0.9	52	88	484	17	83	10	2.6	105	9	2.66	229	97	42	-20	8	0.64	0.59	1.37	0.28	113
84-65	165.5	172.5	7	1BA	siltstone	-	-	-	-0.2	44	8	189	8	54	9	1.1	15	-5	2.17	135	58	29	-20	13	0.65	0.54	0.95	0.26	67
84-65	172.5	176.8	4.3	1AA	slate	2817	-2	1.19	0.5	28	73	206	18	55	6	1.1	42	11	1.73	246	136	33	-20	3	0.35	0.75	2.5	0.15	128
84-65	176.8	182.7	5.9	1AA	slate	-	-	-	1.3	37	144	195	19	73	8	1.5	47	16	2.25	283	114	36	-20	3	0.38	0.62	3.73	0.14	76
84-65	182.7	193	10.3	MLS	limestone	-	-	-	0.7	1	-2	40	4	6	-1	0.3	-5	-5	0.1	426	4	14	-20	3	0.04	0.31	10	-0.01	205
84-65	193	203.3	10.3	MLS	limestone	-	-	-	1.4	8	122	224	2	3	-1	1.2	16	-5	0.18	1534	9	3	-20	3	0.02	1.52	10	-0.01	135
84-65	158.35	165.5	7.15	1B	sandstone	-	-	-	0.2	40	19	430	5	41	8	2.3	46	-5	2.22	217	90	19	-20	11	0.58	0.62	1.36	0.22	102

Sample Identification						HCL Leach																							
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
84-65	4.8	13	8.2	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	13	21	8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	21	28	7	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	28	34.55	6.55	1B	sandstone	-0.2	82	78	523	3	28	1	20.8	7	-5	1.07	350	68	135	24	-20	-20	1	0.29	0.4	1.82	0.12	65
84-65	34.55	37.3	2.75	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	37.3	40.2	2.9	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	40.2	45	4.8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	45	52.4	7.4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	52.4	58.15	5.75	1B	sandstone	0.2	22	6	329	-1	22	-1	17.4	22	17	1.34	378	68	70	16	-20	-20	3	0.18	0.62	2.23	0.08	128
84-65	58.15	67.65	9.5	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	67.65	70.1	2.45	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	70.1	79.4	9.3	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	79.4	86.35	6.95	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	86.35	92	5.65	1B	siltstone	-0.2	45	42	652	25	39	2	26.4	52	29	1.28	360	66	71	16	-20	-20	2	0.28	0.52	1.77	0.11	104
84-65	92	94.3	2.3	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	94.3	98.7	4.4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	98.7	103.3	4.6	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	103.3	111.3	8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	111.3	116.9	5.6	1B	siltstone	0.3	35	15	769	3	34	6	0.4	22	-5	2.38	419	82	37	13	-20	-20	3	0.66	0.57	1.2	0.11	97
84-65	116.9	127	10.1	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	127	133.1	6.1	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	133.1	137.7	4.6	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	137.7	140.5	2.8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	140.5	144	3.5	1B	siltstone	-0.2	51	20	234	-1	39	7	-0.2	34	-5	3.07	519	124	41	19	-20	-20	-1	0.72	1.12	2.72	0.11	110
84-65	144	154	10	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	154	158.35	4.35	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	165.5	172.5	7	1BA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	172.5	176.8	4.3	1AA	slate	0.6	19	76	100	6	14	1	0.5	27	-5	0.41	257	148	95	13	-20	-20	-1	0.14	0.73	2.86	0.08	157
84-65	176.8	182.7	5.9	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	182.7	193	10.3	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	193	203.3	10.3	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	158.35	165.5	7.15	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						DI Water Shake Flask																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	m	m	m			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
84-65	4.8	13	8.2	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	13	21	8	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	21	28	7	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	28	34.55	6.55	IB	sandstone	-0.02	-0.1	-0.2	-0.1	0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	7	48	5	61	-0.1
84-65	34.55	37.3	2.75	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	37.3	40.2	2.9	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	40.2	45	4.8	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	45	52.4	7.4	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	52.4	58.15	5.75	IB	sandstone	-0.02	-0.1	-0.2	-0.1	0.2	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	3	36	7	55	0.1
84-65	58.15	67.65	9.5	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	67.65	70.1	2.45	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	70.1	79.4	9.3	IB	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	79.4	86.35	6.95	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	86.35	92	5.65	IB	siltstone	-0.02	-0.1	-0.2	-0.1	0.3	-0.1	-0.1	-0.02	-0.5	-0.5	2	-0.1	-0.1	-0.1	-1	1	6	46	7	67	0.1
84-65	92	94.3	2.3	IB	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	94.3	98.7	4.4	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	98.7	103.3	4.6	IB	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	103.3	111.3	8	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	111.3	116.9	5.6	IB	siltstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	7	49	9	73	0.1
84-65	116.9	127	10.1	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	127	133.1	6.1	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	133.1	137.7	4.6	IB	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	137.7	140.5	2.8	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	140.5	144	3.5	IB	siltstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	0.1	-0.1	-1	-1	20	116	8	78	0.2
84-65	144	154	10	IB	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	154	158.35	4.35	IB	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	165.5	172.5	7	IBA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	172.5	176.8	4.3	IAA	slate	-0.02	-0.1	-0.2	-0.1	0.3	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	64	392	8	55	0.5
84-65	176.8	182.7	5.9	IAA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	182.7	193	10.3	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	193	203.3	10.3	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-65	158.35	165.5	7.15	IB	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Identification						ACID-BASE ACCOUNTING								
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
	m	m	m				N	ml	kg/t	kg/t	kg/t	kg/t		%
84-95	5.2	13.5	8.3	2AP	sand/siltst.	1	0.1	40	13.5	8.1	5.4	11.9	6.64	0.38
84-95	13.5	22.4	8.9	2AP	silt/sandst.	1	0.1	40	21.4	15.6	5.8	19.1	7.35	0.61
84-95	22.4	26.6	4.2	2AP	siltstone	1	0.1	40	33.4	14.4	19	16.2	8.26	0.52
84-95	26.6	32.5	5.9	2AP	silt/sandst.	1	0.1	40	25.5	13.9	11.6	18	8.32	0.58
84-95	32.5	39.1	6.6	2AP	sand/siltst.	1	0.1	40	33	8.8	24.2	10	8.37	0.32
84-95	39.1	42.9	3.8	2AP,	slate/siltst.	1	0.1	40	45.8	25	20.8	31.2	8.2	1
84-95	42.9	52.7	9.8	2AP	sand/siltst.	1	0.1	40	53.1	24.7	28.4	29.7	8.03	0.95
84-95	52.7	62.7	10	2AP	siltstone	1	0.1	40	24.8	28.8	-4	33.8	8.08	1.08
84-95	62.7	69.1	6.4	2AP	slate/siltst.	1	0.1	40	33.1	37.6	-4.5	44.6	7.86	1.42
84-95	69.1	75.5	6.4	2AP	sandstone	2	0.5	40	46.6	71.2	-24.6	77.5	8.24	2.48
84-95	75.5	81.3	5.8	2AP	sand/siltst.	2	0.5	40	53.5	28.1	25.4	31.2	8.07	1
84-95	81.3	83.9	2.6	2AP	sand/slate	2	0.5	40	60	64.7	-4.7	71.6	8.07	2.29
84-95	83.9	86.75	2.85	2AS	siltstone	2	0.5	40	57	63.4	-6.4	69.4	8.12	2.22
84-95	86.75	89.9	3.15	2AS	siltstone	2	0.5	40	43.6	70.8	-27.2	77.4	8.18	2.48
84-95	89.9	91.4	1.5	O-ZONE	exhalite	2	0.5	40	39	55.6	-16.6	61.9	8.26	1.98
84-95	91.4	93.8	2.4	2AS	siltstone	3	0.5	80	89	85.9	3.1	93.8	8.06	3
84-95	93.8	96.1	2.3	2AS	siltstone	2	0.5	40	28.5	99.1	-70.6	105.6	7.73	3.38
84-95	96.1	96.8	0.7	2AS	siltst./lmst	3	0.5	80	498	48.1	449.9	54.1	8.26	1.73
84-95	96.8	99.6	2.8	2AS	siltstone	2	0.5	40	32.6	52.6	-20	64.2	7.84	2.06
84-95	100.1	102.6	2.5	2AS	siltstone	1	0.1	40	50.5	58.8	-8.3	72.8	7.96	2.33
84-95	102.6	105.5	2.9	I-ZONE	exhalite	3	0.5	80	231.5	79.1	152.4	90.8	8.16	2.9
84-95	105.5	108	2.5	2AS	siltstone	1	0.1	40	20.4	109.7	-89.3	129.7	6.88	4.15
84-95	108	108.75	0.75	2AS	limestone	3	0.5	80	656.2	39.7	616.5	50.3	7.75	1.61
84-95	115	121.1	6.1	2AS	slate/siltst.	1	0.1	40	67.6	61.2	6.4	78.4	7.75	2.51
84-95	121.1	126.3	5.2	2AC	siltstone	3	0.5	80	373.8	43.1	330.7	51.9	7.96	1.66
84-95	126.3	132.3	6	U-ZONE	ex/hi sulph	2	0.5	40	104.3	292.2	-187.9	298.1	6.63	9.54
84-95	132.3	133.9	1.6	YBR	quartz vein	3	0.5	80	730.8	57.8	673	70.9	8.62	2.27
84-95	133.9	137.5	3.6	YBR	exh/qz vein	1	0.1	40	16.7	218.1	-201.4	230.6	7.39	7.38
84-95	137.5	141.9	4.4	D-ZONE	hi sulphide	1	0.1	40	3.7	834.1	-830.4	834.4	6.39	26.7
84-95	141.9	145.5	3.6	D-ZONE	exhalite	2	0.5	40	122.2	200	-77.8	206.2	8	6.6
84-95	145.5	150.3	4.8	2AA	slate/mdst	1	0.1	40	23.5	135.3	-111.7	155.6	6.52	4.98
84-95	150.3	154.9	4.6	2AA	slate/mdst	1	0.1	40	32.4	73.4	-41	95.3	6.95	3.05
84-95	154.9	160	5.1	1B	sandstone	1	0.1	40	42	37.5	4.5	45.9	7.74	1.47
84-95	160	165.4	5.4	1B	sandstone	2	0.5	40	109.3	25	84.3	30.2	8.2	0.96
84-95	108.75	115	6.25	2AS	siltstone	1	0.1	40	41.4	70	-28.6	84.4	7.92	2.7

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						XRF		Assay	ICP AQUA REGIA																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ba	Se	C NOrg	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
84-95	5.2	13.5	8.3	2AP	sand/siltst.	-	-	-	-0.2	62	20	128	3	30	4	0.5	41	6	2.75	53	79	29	-20	20	1.63	0.42	0.21	0.31	40
84-95	13.5	22.4	8.9	2AP	silt/sandst.	-	-	-	-0.2	90	21	238	3	46	10	6.9	18	-5	3.3	125	59	43	-20	19	2.14	0.8	0.28	0.4	43
84-95	22.4	26.6	4.2	2AP	siltstone	-	-	-	-0.2	42	22	224	2	43	10	4.1	30	-5	3.14	361	50	26	-20	15	1.52	0.8	0.67	0.24	87
84-95	26.6	32.5	5.9	2AP	silt/sandst.	2442	-2	0.07	0.4	59	44	662	3	46	11	4	28	-5	3.48	230	62	37	-20	18	1.91	0.78	0.43	0.36	63
84-95	32.5	39.1	6.6	2AP	sand/siltst.	-	-	-	-0.2	47	24	193	2	43	10	1.1	17	-5	3.34	284	74	36	-20	20	1.93	0.87	0.56	0.34	81
84-95	39.1	42.9	3.8	2AP	slate/siltst.	-	-	-	-0.2	47	27	231	3	45	10	1.1	29	-5	3.12	395	61	34	-20	14	1.56	0.83	0.91	0.29	100
84-95	42.9	52.7	9.8	2AP	sand/siltst.	-	-	-	1.3	49	346	748	3	40	9	3.9	44	-5	2.99	300	88	32	-20	14	1.54	0.79	0.79	0.32	103
84-95	52.7	62.7	10	2AP	siltstone	-	-	-	0.5	57	117	631	3	42	9	3.3	46	8	3.17	268	79	35	-20	15	1.66	0.79	0.64	0.36	85
84-95	62.7	69.1	6.4	2AP	slate/siltst.	3726	2	0.19	0.6	52	93	608	3	42	9	2.9	90	-5	3.09	284	50	29	-20	12	1.32	0.69	0.69	0.27	64
84-95	69.1	75.5	6.4	2AP	sandstone	-	-	-	2.2	57	364	1015	2	40	10	5.1	280	6	3.21	556	69	18	-20	8	0.8	0.61	1	0.35	38
84-95	75.5	81.3	5.8	2AP	sand/siltst.	-	-	-	3.4	64	680	940	2	38	10	4	41	9	2.84	358	55	20	-20	11	1.2	0.64	0.81	0.31	60
84-95	81.3	83.9	2.6	2AP	sand/slate	-	-	-	5.7	66	1010	1011	2	48	9	4.6	141	11	2.69	513	70	16	-20	7	0.55	0.59	1.39	0.3	105
84-95	83.9	86.75	2.85	2AS	siltstone	-	-	-	7.5	75	1325	1335	2	48	9	5.7	132	11	2.67	492	87	17	22	8	0.6	0.58	1.35	0.32	105
84-95	86.75	89.9	3.15	2AS	siltstone	6736	2	0.43	5.3	68	957	888	1	53	7	3.6	69	8	2.64	319	85	19	30	5	0.58	0.22	1.42	0.24	72
84-95	89.9	91.4	1.5	O-ZONE	exhalite	-	-	-	2.8	47	119	705	1	45	4	2.8	36	5	2.1	204	89	24	-20	4	1.06	0.19	0.9	0.16	43
84-95	91.4	93.8	2.4	2AS	siltstone	-	-	-	3	49	271	549	1	41	6	2.2	38	7	3.1	442	77	22	-20	3	0.72	0.26	3.04	0.24	80
84-95	93.8	96.1	2.3	2AS	siltstone	-	-	-	6.6	143	1006	5056	2	48	6	19	52	15	3.23	283	79	19	93	5	0.42	0.18	0.91	0.21	25
84-95	96.1	96.8	0.7	2AS	siltst./lmst	-	-	-	3.1	31	350	1794	-1	16	3	8.1	29	8	1.79	1517	14	8	-20	5	0.27	0.22	10	0.15	855
84-95	96.8	99.6	2.8	2AS	siltstone	3771	5	0.36	4.2	51	773	1544	1	44	5	6.3	60	65	2.08	293	117	21	-20	4	0.34	0.18	1.19	0.18	57
84-95	100.1	102.6	2.5	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	102.6	105.5	2.9	I-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	105.5	108	2.5	2AS	siltstone	8287	3	0.24	13.2	221	2327	13000	2	75	10	47.9	99	73	3.76	381	105	20	112	3	0.45	0.12	0.8	0.18	26
84-95	108	108.75	0.75	2AS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	115	121.1	6.1	2AS	slate/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	121.1	126.3	5.2	2AC	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	126.3	132.3	6	U-ZONE	ex/hi sulph	5890	2	0.27	13.6	189	1913	12000	8	84	13	44.6	612	39	8.75	330	161	53	45	1	0.66	0.21	1.17	0.28	16
84-95	132.3	133.9	1.6	YBR	quartz vein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	133.9	137.5	3.6	YBR	exh/qz vein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	137.5	141.9	4.4	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	141.9	145.5	3.6	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	145.5	150.3	4.8	2AA	slate/mdst	2649	25	0.19	7.3	99	675	3690	35	100	4	24.3	181	46	4.94	101	157	282	21	3	0.44	0.03	1.42	0.19	58
84-95	150.3	154.9	4.6	2AA	slate/mdst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	154.9	160	5.1	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	160	165.4	5.4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	108.75	115	6.25	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						HCL Leach																						
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
84-95	5.2	13.5	8.3	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	13.5	22.4	8.9	2AP	silt/sandst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	22.4	26.6	4.2	2AP	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	26.6	32.5	5.9	2AP	silt/sandst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	32.5	39.1	6.6	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	39.1	42.9	3.8	2AP	slate/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	42.9	52.7	9.8	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	52.7	62.7	10	2AP	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	62.7	69.1	6.4	2AP	slate/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	69.1	75.5	6.4	2AP	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	75.5	81.3	5.8	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	81.3	83.9	2.6	2AP	sand/slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	83.9	86.75	2.85	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	86.75	89.9	3.15	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	89.9	91.4	1.5	O-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	91.4	93.8	2.4	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	93.8	96.1	2.3	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	96.1	96.8	0.7	2AS	siltst./lmst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	96.8	99.6	2.8	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	100.1	102.6	2.5	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	102.6	105.5	2.9	I-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	105.5	108	2.5	2AS	siltstone	-0.2	13	864	1276	-1	19	3	4.4	21	9	0.49	337	382	58	4	-20	-20	-1	0.13	0.01	-	0.07	62
84-95	108	108.75	0.75	2AS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	115	121.1	6.1	2AS	slate/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	121.1	126.3	5.2	2AC	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	126.3	132.3	6	U-ZONE	ex/hi sulph	-0.2	9	1070	2435	2	10	-1	10.5	20	-5	0.45	347	939	122	12	-20	-20	1	0.26	0.09	-	0.12	48
84-95	132.3	133.9	1.6	YBR	quartz vein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	133.9	137.5	3.6	YBR	exh/qz vein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	137.5	141.9	4.4	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	141.9	145.5	3.6	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	145.5	150.3	4.8	2AA	slate/mdst	-0.2	19	487	804	6	47	1	5.6	61	5	0.52	103	149	86	44	-20	-20	3	0.08	-0.01	-	0.05	76
84-95	150.3	154.9	4.6	2AA	slate/mdst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	154.9	160	5.1	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	160	165.4	5.4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	108.75	115	6.25	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Identification						DI Water Shake Flask																			
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	m	m	m			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
84-95	5.2	13.5	8.3	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	13.5	22.4	8.9	2AP	silt/sandst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	22.4	26.6	4.2	2AP	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	26.6	32.5	5.9	2AP	silt/sandst.	-0.02	-0.1	-0.2	-0.1	0.2	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	2	19	11	65	-0.1
84-95	32.5	39.1	6.6	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	39.1	42.9	3.8	2AP	slate/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	42.9	52.7	9.8	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	52.7	62.7	10	2AP	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	62.7	69.1	6.4	2AP	slate/siltst.	-0.02	-0.1	-0.2	-0.1	0.2	-0.1	-0.1	-0.02	-0.5	-0.5	-1	0.1	-0.1	-0.1	-1	-1	25	65	7	56	0.1
84-95	69.1	75.5	6.4	2AP	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	75.5	81.3	5.8	2AP	sand/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	81.3	83.9	2.6	2AP	sand/slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	83.9	86.75	2.85	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	86.75	89.9	3.15	2AS	siltstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	10	79	4	63	0.3
84-95	89.9	91.4	1.5	O-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	91.4	93.8	2.4	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	93.8	96.1	2.3	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	96.1	96.8	0.7	2AS	siltst./lmst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	96.8	99.6	2.8	2AS	siltstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	0.7	-1	0.6	-0.1	-0.1	-1	-1	28	399	4	60	0.6
84-95	100.1	102.6	2.5	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	102.6	105.5	2.9	I-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	105.5	108	2.5	2AS	siltstone	-0.02	-0.1	-0.2	0.8	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	3.9	-0.1	-0.1	-1	-1	30	696	5	78	1.2
84-95	108	108.75	0.75	2AS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	115	121.1	6.1	2AS	slate/siltst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	121.1	126.3	5.2	2AC	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	126.3	132.3	6	U-ZONE	ex/hi sulph	-0.02	-0.1	-0.2	1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	5	-0.1	-0.1	-1	-1	39	672	5	105	0.4
84-95	132.3	133.9	1.6	YBR	quartz vein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	133.9	137.5	3.6	YBR	exh/qz vein	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	137.5	141.9	4.4	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	141.9	145.5	3.6	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	145.5	150.3	4.8	2AA	slate/mdst	-0.02	-0.1	-0.2	7.1	-0.1	1.4	-0.1	0.1	-0.5	-0.5	-1	4.4	-0.1	-0.1	-1	-1	7	793	6	57	2
84-95	150.3	154.9	4.6	2AA	slate/mdst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	154.9	160	5.1	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	160	165.4	5.4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-95	108.75	115	6.25	2AS	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						ACID-BASE ACCOUNTING								
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
	m	m	m				N	ml	kg/t	kg/t	kg/t	kg/t		%
97-15	9.14	17.7	8.56	1B	sandstone	1	0.1	40	29.3	6.2	23.1	7.5	8.19	0.24
97-15	17.7	21.5	3.8	1B	sandstone	2	0.5	40	64.3	45.3	19	48.8	8.3	1.56
97-15	21.5	25	3.5	1B	siltstone	2	0.5	40	85	59.1	25.9	64.4	8.34	2.06
97-15	25	28	3	1B	siltstone	1	0.1	40	59.7	37.2	22.5	42.2	8.28	1.35
97-15	28	33.5	5.5	1B	siltstone	1	0.1	40	59.1	125.6	-66.5	135.6	8.07	4.34
97-15	33.5	36.8	3.3	1B	sandstone	2	0.5	40	88	53.1	34.9	64.7	8.47	2.07
97-15	36.8	42.6	5.8	1B	siltstone	1	0.1	40	53.9	90.9	-37	100.3	8.25	3.21
97-15	42.6	47.55	4.95	1AA	slate	2	0.5	40	105	115.9	-10.9	124.7	7.79	3.99
97-15	47.55	54.5	6.95	LZ	hi sulphide	3	0.5	80	350.1	514.4	-164.3	557.2	8.02	17.83
97-15	54.5	56.2	1.7	1AA	slate	3	0.5	80	196	65.6	130.4	74.2	7.52	2.38
97-15	56.2	58	1.8	LZ	hi sulphide	1	0.1	40	16	315.6	-299.6	358.4	6.72	11.47
97-15	58	60.8	2.8	1AA	siltstone	3	0.5	80	106.2	45.6	60.6	54.1	7.59	1.73
97-15	60.8	66.15	5.35	1AA	siltstone	2	0.5	40	40.7	33.1	7.6	44.7	6.85	1.43
97-15	66.15	70.1	3.95	1AA	slate	3	0.5	80	288.8	60.9	227.9	68.8	7.78	2.2
97-15	70.1	74.5	4.4	MLS	limestone	3	0.5	80	915	22.7	892.3	24.7	8.27	0.79
97-15	74.5	84.25	9.75	MLS	limestone	3	0.5	80	937.4	1.6	935.8	2.2	8.38	0.07
97-15	84.25	85	0.75	1AA	siltstone	3	0.5	80	190.5	59.4	131.1	68.4	7.85	2.19
97-15	85	92.66	7.66	MLS	limestone	3	0.5	80	986.6	9.1	977.5	10.6	8.26	0.34

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						XRF		Assay	ICP AQUA REGIA																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ba	Se	C NOrg	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-15	9.14	17.7	8.56	1B	sandstone	-	-	-	0.2	26	6	334	3	31	7	3.8	27	-5	1.88	169	151	16	-20	16	0.59	0.28	0.52	0.21	30
97-15	17.7	21.5	3.8	1B	sandstone	1893	-2	0.86	0.4	18	20	149	2	33	7	3.1	313	-5	2.17	546	157	15	-20	9	0.49	0.53	1.48	0.23	55
97-15	21.5	25	3.5	1B	siltstone	-	-	-	0.7	43	65	299	2	69	16	1.5	151	6	3.35	495	63	18	-20	9	0.59	0.71	1.41	0.27	55
97-15	25	28	3	1B	siltstone	-	-	-	'-0.2	38	3	261	2	59	13	3.1	78	5	3.16	409	65	21	-20	15	0.68	0.69	0.93	0.29	46
97-15	28	33.5	5.5	1B	siltstone	-	-	-	18.4	98	4975	4894	2	47	12	26.7	257	71	4.05	393	85	13	87	6	0.58	0.58	1.27	0.26	40
97-15	33.5	36.8	3.3	1B	sandstone	-	-	-	0.6	23	26	63	1	40	10	1.5	156	-5	2.3	577	101	11	-20	7	0.49	0.86	1.88	0.24	51
97-15	36.8	42.6	5.8	1B	siltstone	2640	-2	0.7	1.9	35	200	625	5	52	11	3.1	151	10	3.38	474	73	17	28	10	0.62	0.57	1.24	0.31	46
97-15	42.6	47.55	4.95	1AA	slate	-	-	-	32.4	185	6823	19000	18	117	21	79.3	471	86	4.72	1224	148	35	182	6	0.46	0.67	2.43	0.15	47
97-15	47.55	54.5	6.95	LZ	hi sulphide	-	-	-	141.2	755	10000	65000	9	27	2	364.3	4315	655	10	1133	94	22	1024	11	0.18	0.22	7.65	0.04	38
97-15	54.5	56.2	1.7	1AA	slate	-	-	-	12.9	38	1462	2069	16	55	6	11.1	385	64	2.39	900	74	23	33	6	0.29	0.18	7.95	0.12	25
97-15	56.2	58	1.8	LZ	hi sulphide	-	-	-	69	329	10000	43000	8	33	5	228	2523	290	8.98	394	189	16	460	14	0.17	0.02	0.43	0.06	4
97-15	58	60.8	2.8	1AA	siltstone	4134	-2	1.68	3.3	30	298	385	17	60	7	2.4	88	20	1.8	626	105	28	-20	5	0.4	0.49	4.17	0.17	29
97-15	60.8	66.15	5.35	1AA	siltstone	-	-	-	2.1	26	75	369	15	57	7	2.1	81	24	1.57	308	198	30	-20	7	0.4	0.05	1.9	0.14	12
97-15	66.15	70.1	3.95	1AA	slate	-	-	-	5.3	38	567	601	15	55	6	4	217	21	2.1	692	91	28	-20	6	0.32	0.24	10	0.09	57
97-15	70.1	74.5	4.4	MLS	limestone	-	-	-	1.3	7	76	1085	4	7	-1	4.6	35	6	0.74	951	7	9	-20	5	0.05	2.1	10	0.01	369
97-15	74.5	84.25	9.75	MLS	limestone	-	-	-	0.8	-1	-2	23	1	1	-1	-0.2	7	-5	0.09	1533	3	2	-20	3	0.02	0.64	10	-0.01	191
97-15	84.25	85	0.75	1AA	siltstone	3252	-2	2.67	4	35	296	488	18	64	7	2.8	141	23	2.26	609	116	32	-20	5	0.35	1.24	5.87	0.11	39
97-15	85	92.66	7.66	MLS	limestone	-	-	-	0.9	2	12	74	1	2	-1	0.3	8	-5	0.35	608	1	2	-20	3	0.02	0.53	10	-0.01	211

Sample Identification						HCL Leach																						
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-15	9.14	17.7	8.56	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	17.7	21.5	3.8	1B	sandstone	0.4	22	48	129	-1	9	2	3.5	38	11	0.99	658	512	119	8	-20	-20	3	0.23	0.54	1.83	0.12	83
97-15	21.5	25	3.5	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	25	28	3	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	28	33.5	5.5	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	33.5	36.8	3.3	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	36.8	42.6	5.8	1B	siltstone	0.4	11	142	187	2	6	-1	0.2	18	12	0.31	520	109	34	5	-20	-20	2	0.15	0.51	1.38	0.1	67
97-15	42.6	47.55	4.95	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	47.55	54.5	6.95	LZ	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	54.5	56.2	1.7	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	56.2	58	1.8	LZ	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	58	60.8	2.8	1AA	siltstone	1.1	16	316	150	5	18	2	1.2	40	8	0.25	658	195	65	8	-20	-20	3	0.1	0.39	4.46	0.06	35
97-15	60.8	66.15	5.35	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	66.15	70.1	3.95	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	70.1	74.5	4.4	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	74.5	84.25	9.75	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	84.25	85	0.75	1AA	siltstone	1.1	13	288	114	10	16	-1	0.9	37	8	0.22	643	108	74	10	-20	-20	3	0.08	1.15	6.51	0.05	51
97-15	85	92.66	7.66	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Identification						DI Water Shake Flask																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	m	m	m			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
97-15	9.14	17.7	8.56	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	17.7	21.5	3.8	1B	sandstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	4	38	8	64	-0.1
97-15	21.5	25	3.5	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	25	28	3	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	28	33.5	5.5	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	33.5	36.8	3.3	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	36.8	42.6	5.8	1B	siltstone	-0.02	-0.1	-0.2	-0.1	0.2	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	3	28	7	65	-0.1
97-15	42.6	47.55	4.95	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	47.55	54.5	6.95	LZ	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	54.5	56.2	1.7	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	56.2	58	1.8	LZ	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	58	60.8	2.8	1AA	siltstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	0.2	-0.1	-0.1	-1	-1	21	274	4	40	-0.1
97-15	60.8	66.15	5.35	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	66.15	70.1	3.95	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	70.1	74.5	4.4	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	74.5	84.25	9.75	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-15	84.25	85	0.75	1AA	siltstone	-0.02	-0.1	-0.2	-0.1	0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	39	173	4	25	-0.1
97-15	85	92.66	7.66	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Identification						ACID-BASE ACCOUNTING								
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
	m	m	m				N	ml	kg/t	kg/t	kg/t	kg/t		%
97-18	25.8	28.4	2.6	2A	siltstone	2	0.5	40	65.2	26.9	38.3	31.2	7.8	1
97-18	28.4	33.7	5.3	2A	siltstone	1	0.1	40	2.9	134.1	-131.2	141.6	6.92	4.53
97-18	33.7	34.2	0.5	D-ZONE	hi sulphide	1	0.1	40	2	910.6	-908.6	927.2	5.73	29.67
97-18	34.2	35.3	1.1	D-ZONE	exhalite	3	0.5	80	63.4	86.9	-23.5	87.2	7.86	2.79
97-18	35.3	39.6	4.3	D-ZONE	hi sulphide	1	0.1	40	13.3	605.6	-592.3	613.2	7.31	19.63
97-18	39.6	41.6	2	2A	siltstone	1	0.1	40	11.5	78.8	-67.3	82.8	7.57	2.65
97-18	41.6	45.25	3.65	D-ZONE	hi sulphide	1	0.1	40	3.6	760.9	-757.3	762.5	5.87	24.4
97-18	45.25	46.75	1.5	D-ZONE	exhalite	2	0.5	40	98.1	165.3	-67.2	168.8	8.01	5.4
97-18	46.75	48.4	1.65	2A	siltstone	2	0.5	40	173.4	178.8	-5.4	204.4	7.99	6.54
97-18	48.4	49.2	0.8	D-ZONE	exhalite	1	0.1	40	4.6	540.6	-536	553.4	5.76	17.71
97-18	49.2	53.7	4.5	2AA	siltstone	1	0.1	40	20.6	150.6	-130	176.6	6.96	5.65
97-18	53.7	60.5	6.8	1B	sandstone	1	0.1	40	31.8	131.9	-100.1	143.8	7.19	4.6
97-18	60.5	67.15	6.65	1B	sandstone	2	0.5	40	68.2	34.1	34.1	37.8	8.28	1.21
97-18	67.15	72.85	5.7	1B	sandstone	2	0.5	40	72.4	44.4	28	49.1	8.26	1.57
97-18	72.85	76.3	3.45	1B	sandstone	1	0.1	40	46.7	41	5.7	45.4	8.14	1.46
97-18	76.3	82	5.7	1B	siltstone	1	0.1	40	42.6	25.3	17.3	26.9	8.43	0.86
97-18	82	86	4	1B	sandstone	1	0.1	40	51.7	18.4	33.3	20.3	8.42	0.65
97-18	86	91.2	5.2	1B	sandstone	1	0.1	40	48.9	43.1	5.8	51.6	8.24	1.65
97-18	91.2	94.5	3.3	1B	sandstone	2	0.5	40	61	115.6	-54.6	120	8.04	3.84
97-18	94.5	97.1	2.6	1B	sandstone	2	0.5	40	71.8	44.4	27.4	46.8	8.46	1.5
97-18	97.1	101.65	4.55	1B	sandstone	2	0.5	40	67	62.5	4.5	67.5	8.4	2.16
97-18	105.6	111	5.4	1B	sandstone	2	0.5	40	74.8	43.4	31.4	48.1	8.54	1.54
97-18	111	118.8	7.8	1B	sandstone	2	0.5	40	116.3	35.8	80.5	40.2	8.35	1.29
97-18	118.8	120.7	1.9	1B	siltstone	2	0.5	40	66.4	79.1	-12.7	81.6	8.41	2.61
97-18	120.7	122.9	2.2	1B	siltstone	2	0.5	40	100.5	178.4	83.1	208.8	8.3	6.68
97-18	122.9	128.15	5.25	1B	siltstone	1	0.1	40	54.8	41.4	13.4	51.2	8.05	1.64
97-18	132.5	137	4.5	1B	siltstone	1	0.1	40	46.1	35.9	10.2	42.8	8.44	1.37
97-18	137	141.5	4.5	1BA	siltstone	1	0.1	40	44.1	33.1	11	37.2	8.5	1.19
97-18	141.5	144.75	3.25	1BA	siltstone	1	0.1	40	43.7	47.8	-4.1	57.2	8.37	1.83
97-18	148.1	155.5	7.4	1AA	slate	1	0.1	40	84.3	29.1	55.2	35.6	8.19	1.14
97-18	155.5	159.9	4.4	1AA	slate	2	0.5	40	176.3	50.3	126	59.7	8.01	1.91
97-18	159.9	166.7	6.8	MLS	limestone	3	0.5	80	888.3	41.9	846.4	44.7	8.37	1.43
97-18	166.7	169.7	3	MLS	dol. lmst.	3	0.5	80	985.4	10.2	975.2	13.4	8.9	0.43
97-18	169.7	176.78	7.08	MLS	limestone	3	0.5	80	991.2	1.2	990	1.9	8.59	0.06
97-18	101.65	105.6	3.95	1B	sandstone	2	0.5	40	75.9	55.6	20.3	64.4	8.34	2.06
97-18	128.15	132.5	4.35	1B	siltstone	1	0.1	40	63.9	59.7	4.2	65.6	8.37	2.1
97-18	144.75	148.1	3.35	1AA	slate	1	0.1	40	55.4	60	-4.6	67.5	8.17	2.16

GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						XRF		Assay	ICP AQUA REGIA																				
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Ba	Sc	C NOrg	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-18	25.8	28.4	2.6	2A	siltstone	2007	-2	0.71	26.1	184	3471	1392	3	51	26	9.3	189	152	3.27	1558	74	20	-20	6	0.95	0.11	2.1	0.33	35
97-18	28.4	33.7	5.3	2A	siltstone	-	-	-	6	137	1537	5342	4	69	26	30.4	329	20	4.62	60	104	20	-20	5	0.63	0.05	0.11	0.33	13
97-18	33.7	34.2	0.5	D-ZONE	hi sulphide	-	-	-	1.8	18	325	1619	2	32	10	14.3	2526	17	10	72	134	12	-20	-1	0.38	0.03	0.2	0.16	5
97-18	34.2	35.3	1.1	D-ZONE	exhalite	-	-	-	3.3	48	327	3099	4	90	30	10	107	17	3.62	956	96	21	-20	3	0.77	0.19	1.77	0.34	27
97-18	35.3	39.6	4.3	D-ZONE	hi sulphide	-	-	-	26.4	417	2933	66000	1	49	14	250	1313	106	10	423	86	15	94	1	0.49	0.08	0.45	0.25	8
97-18	39.6	41.6	2	2A	siltstone	8558	-2	0.22	1.9	42	253	1655	2	95	13	10.3	158	13	2.8	178	110	25	-20	5	0.59	0.14	0.31	0.27	10
97-18	41.6	45.25	3.65	D-ZONE	hi sulphide	-	-	-	39.6	898	9068	89000	-1	37	27	314.3	1918	965	10	301	65	10	143	-1	0.25	0.02	0.11	0.13	7
97-18	45.25	46.75	1.5	D-ZONE	exhalite	-	-	-	3.6	49	343	5204	9	70	11	23.4	384	14	5.28	625	87	31	-20	1	1.49	0.14	3.22	0.34	21
97-18	46.75	48.4	1.65	2A	siltstone	-	-	-	16.1	69	1722	17000	7	89	6	60.8	352	12	5.39	1835	137	20	23	7	0.62	0.07	7.38	0.18	93
97-18	48.4	49.2	0.8	D-ZONE	exhalite	-	-	-	24.5	54	1875	46000	1	53	8	174.4	1375	102	10	309	98	15	-20	-1	0.46	0.03	0.21	0.18	13
97-18	49.2	53.7	4.5	2AA	siltstone	4734	7	0.47	10.4	65	2223	4899	25	101	10	68.1	378	41	5.38	152	108	138	29	5	1	0.13	1.67	0.34	71
97-18	53.7	60.5	6.8	1B	sandstone	-	-	-	16.5	244	4180	21000	4	48	7	103.1	287	230	3.75	335	147	31	110	4	0.52	0.37	1.05	0.23	34
97-18	60.5	67.15	6.65	1B	sandstone	-	-	-	4.3	41	911	648	4	43	7	3.2	85	7	1.86	349	176	29	-20	7	0.55	0.58	1.77	0.22	56
97-18	67.15	72.85	5.7	1B	sandstone	-	-	-	0.3	35	19	84	7	52	7	0.6	66	-5	2.5	280	130	32	-20	9	0.49	0.68	1.77	0.25	83
97-18	72.85	76.3	3.45	1B	sandstone	-	-	-	0.3	41	14	110	6	49	8	0.4	77	12	2.06	316	177	32	-20	11	0.53	0.55	1.44	0.28	57
97-18	76.3	82	5.7	1B	siltstone	1537	2	0.91	0.2	46	11	205	5	43	8	0.8	6	-5	2.87	248	84	44	-20	16	0.78	0.8	1.34	0.28	58
97-18	82	86	4	1B	sandstone	-	-	-	-0.2	27	9	84	9	47	6	-0.2	20	-5	2.04	230	214	31	-20	12	0.59	0.63	1.62	0.28	88
97-18	86	91.2	5.2	1B	sandstone	-	-	-	0.3	32	14	301	5	48	8	1.3	117	-5	2.16	342	173	24	-20	9	0.48	0.58	1.49	0.24	50
97-18	91.2	94.5	3.3	1B	sandstone	-	-	-	0.6	25	33	335	5	51	8	2	283	-5	4.38	482	151	31	-20	7	0.62	0.56	1.75	0.32	40
97-18	94.5	97.1	2.6	1B	sandstone	-	-	-	0.4	37	19	101	8	53	8	0.6	75	-5	2.39	369	151	30	-20	10	0.59	0.64	1.75	0.29	54
97-18	97.1	101.65	4.55	1B	sandstone	1273	-2	0.93	2.3	45	602	460	4	45	7	2.1	125	22	2.78	368	173	28	-20	8	0.56	0.65	1.61	0.29	45
97-18	105.6	111	5.4	1B	sandstone	-	-	-	0.9	28	144	483	4	41	8	2.4	133	-5	2.41	362	244	23	-20	9	0.56	0.67	1.73	0.25	58
97-18	111	118.8	7.8	1B	sandstone	-	-	-	0.5	41	34	58	8	48	12	0.3	85	11	3.52	454	205	28	-20	10	1.07	1.1	2.3	0.35	93
97-18	118.8	120.7	1.9	1B	siltstone	-	-	-	1	51	244	613	4	49	13	2.8	115	-5	4.26	269	99	30	-20	8	1.15	0.91	1.36	0.33	40
97-18	120.7	122.9	2.2	1B	siltstone	4827	-2	1.21	1.4	46	314	295	3	59	12	1.5	440	5	7.68	296	105	27	-20	5	1.19	1.28	1.95	0.39	43
97-18	122.9	128.15	5.25	1B	siltstone	-	-	-	-0.2	58	21	659	3	57	15	3.6	308	14	3.54	255	39	24	-20	11	1.22	0.87	1.3	0.26	48
97-18	132.5	137	4.5	1B	siltstone	-	-	-	-0.2	37	6	138	7	53	9	0.7	37	-5	2.42	196	62	39	-20	12	0.99	0.61	1.11	0.38	43
97-18	137	141.5	4.5	1BA	siltstone	-	-	-	-0.2	49	5	155	6	54	10	0.9	16	-5	2.24	154	34	31	-20	11	0.92	0.64	1.06	0.34	35
97-18	141.5	144.75	3.25	1BA	siltstone	2741	-2	0.38	0.2	40	13	45	8	50	9	0.3	33	6	2.09	103	31	23	-20	8	0.68	0.48	1.04	0.33	36
97-18	148.1	155.5	7.4	1AA	slate	-	-	-	1.1	28	145	249	15	42	4	1	36	12	1.25	307	83	37	-20	4	0.37	0.69	2.49	0.17	43
97-18	155.5	159.9	4.4	1AA	slate	-	-	-	1.4	109	47	796	27	87	9	4	35	13	1.8	275	78	56	49	5	0.49	0.26	6.37	0.2	43
97-18	159.9	166.7	6.8	MLS	limestone	-	-	-	0.9	4	6	47	8	9	-1	0.3	12	6	1.26	180	3	6	-20	3	0.05	0.32	10	0.02	184
97-18	166.7	169.7	3	MLS	dol. lmst.	869	-2	12.22	0.6	3	9	197	2	1	-1	1.1	25	-5	0.54	1009	3	2	-20	3	0.02	7.46	10	-0.01	154
97-18	169.7	176.78	7.08	MLS	limestone	-	-	-	0.6	1	-2	30	-1	1	-1	0.2	-5	-5	0.07	283	2	3	-20	3	0.02	1.35	10	-0.01	152
97-18	101.65	105.6	3.95	1B	sandstone	-	-	-	1.7	22	302	415	5	58	8	2	125	7	2.65	428	243	55	-20	7	0.5	0.69	1.95	0.25	37
97-18	128.15	132.5	4.35	1B	siltstone	-	-	-	0.3	54	35	307	10	64	10	1.5	94	-5	2.94	216	50	30	-20	9	0.82	0.73	1.61	0.32	71
97-18	144.75	148.1	3.35	1AA	slate	-	-	-	0.3	37	13	18	22	67	8	-0.2	64	7	2.17	144	31	24	-20	4	0.43	0.57	1.29	0.22	35

Sample Identification						HCL Leach																						
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-18	25.8	28.4	2.6	2A	siltstone	23.5	163	3676	1380	3	37	20	10.5	70	35	1.45	1708	113	42	4	-20	-20	3	0.52	-0.01	2.27	0.1	56
97-18	28.4	33.7	5.3	2A	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	33.7	34.2	0.5	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	34.2	35.3	1.1	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	35.3	39.6	4.3	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	39.6	41.6	2	2A	siltstone	1.5	7	214	822	-1	27	-1	6.8	26	11	0.22	179	443	53	6	-20	-20	2	0.2	0.04	0.36	0.1	33
97-18	41.6	45.25	3.65	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	45.25	46.75	1.5	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	46.75	48.4	1.65	2A	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	48.4	49.2	0.8	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	49.2	53.7	4.5	2AA	siltstone	0.5	23	1017	1167	6	33	3	56.6	25	-5	0.31	153	392	53	19	-20	-20	3	0.26	-0.01	1.8	0.07	111
97-18	53.7	60.5	6.8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	60.5	67.15	6.65	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	67.15	72.85	5.7	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	72.85	76.3	3.45	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	76.3	82	5.7	1B	siltstone	0.3	15	13	28	-1	7	-1	-0.2	-5	9	1.27	236	47	31	10	-20	-20	2	0.16	0.48	1.35	0.09	71
97-18	82	86	4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	86	91.2	5.2	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	91.2	94.5	3.3	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	94.5	97.1	2.6	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	97.1	101.65	4.55	1B	sandstone	1.6	22	588	217	2	7	-1	1.1	11	15	0.71	390	81	126	9	-20	-20	3	0.22	0.58	1.71	0.13	70
97-18	105.6	111	5.4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	111	118.8	7.8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	118.8	120.7	1.9	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	120.7	122.9	2.2	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	122.9	128.15	5.25	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	132.5	137	4.5	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	137	141.5	4.5	1BA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	141.5	144.75	3.25	1BA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	148.1	155.5	7.4	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	155.5	159.9	4.4	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	159.9	166.7	6.8	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	166.7	169.7	3	MLS	dol. lmst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	169.7	176.78	7.08	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	101.65	105.6	3.95	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	128.15	132.5	4.35	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	144.75	148.1	3.35	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						DI Water Shake Flask																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	m	m	m			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
97-18	25.8	28.4	2.6	2A	siltstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	0.6	-0.1	-0.1	-1	-1	-1	119	5	63	-0.1
97-18	28.4	33.7	5.3	2A	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	33.7	34.2	0.5	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	34.2	35.3	1.1	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	35.3	39.6	4.3	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	39.6	41.6	2	2A	siltstone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	0.02	-0.5	-0.5	-1	0.3	-0.1	-0.1	-1	-1	7	40	4	71	-0.1
97-18	41.6	45.25	3.65	D-ZONE	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	45.25	46.75	1.5	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	46.75	48.4	1.65	2A	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	48.4	49.2	0.8	D-ZONE	exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	49.2	53.7	4.5	2AA	siltstone	-0.02	-0.1	-0.2	0.3	-0.1	-0.1	-0.1	0.94	-0.5	-0.5	-1	2.1	-0.1	-0.1	-1	-1	30	548	10	66	1.1
97-18	53.7	60.5	6.8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	60.5	67.15	6.65	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	67.15	72.85	5.7	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	72.85	76.3	3.45	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	76.3	82	5.7	1B	siltstone	-0.02	-0.1	-0.2	-0.1	0.2	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	-1	22	4	64	-0.1
97-18	82	86	4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	86	91.2	5.2	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	91.2	94.5	3.3	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	94.5	97.1	2.6	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	97.1	101.65	4.55	1B	sandstone	-0.02	-0.1	-0.2	-0.1	0.1	-0.1	-0.1	-0.02	-0.5	0.8	-1	-0.1	-0.1	-0.1	-1	-1	5	27	6	75	-0.1
97-18	105.6	111	5.4	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	111	118.8	7.8	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	118.8	120.7	1.9	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	120.7	122.9	2.2	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	122.9	128.15	5.25	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	132.5	137	4.5	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	137	141.5	4.5	1BA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	141.5	144.75	3.25	1BA	siltstone	-0.02	-0.1	-0.2	-0.1	0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	6	16	5	73	-0.1
97-18	148.1	155.5	7.4	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	155.5	159.9	4.4	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	159.9	166.7	6.8	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	166.7	169.7	3	MLS	dol. lmst.	-0.02	-0.1	-0.2	-0.1	0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	0.2	-0.1	-1	-1	22	1	7	3	-0.1
97-18	169.7	176.78	7.08	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	101.65	105.6	3.95	1B	sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	128.15	132.5	4.35	1B	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-18	144.75	148.1	3.35	1AA	slate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						ACID-BASE ACCOUNTING								
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
	m	m	m				N	ml	kg/t	kg/t	kg/t	kg/t		%
97-46	20.42	27	6.58	1AA	slate	0	0.1	20	3.9	75.8	-71.9	89	6.76	2.85
97-46	27	33.5	6.5	1AA	siltstone	1	0.1	40	2.9	35.3	-32.4	41.9	6.18	1.34
97-46	33.5	39.1	5.6	1AA	siltstone	1	0.1	40	1.1	1.2	-0.1	2.2	6.67	0.07
97-46	39.1	44	4.9	1AA	siltstone	1	0.1	40	1.5	0.9	0.6	4.4	6.42	0.14
97-46	44	49	5	1AA	siltstone	1	0.1	40	1	2.8	-1.8	5.9	6.63	0.19
97-46	49	56.6	7.6	LZOX	oxide	1	0.1	40	3.1	2.8	0.3	7.2	6.6	0.23
97-46	56.6	59.7	3.1	MLS	limestone	3	0.5	80	917.1	2.8	914.3	2.8	8.09	0.09
97-46	59.7	65.2	5.5	MLS	limestone	3	0.5	80	958.3	0.9	957.4	1.2	8.3	0.04
97-46	65.2	66.35	1.15	MLS	hi sulphide	3	0.5	80	596.1	552.5	43.6	548.1	7.61	17.54
97-46	66.35	68.27	1.92	MLS	limestone	3	0.5	80	911.7	7	904.7	7.8	7.88	0.25

APPENDIX B
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
DDH CONTINUOUS SAMPLING
SILVERTIP PROJECT

Sample Identification						XRF		Assay	ICP AQUA REGIA																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ba	Se	C NOrg	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-46	20.42	27	6.58	1AA	slate	1728	-2	0.21	41.8	680	10000	1809	22	70	7	16.3	1227	1242	2.56	68	181	43	256	4	0.39	0.06	0.12	0.18	4
97-46	27	33.5	6.5	1AA	siltstone	-	-	-	3.8	28	199	428	22	47	5	2.9	63	39	1.78	55	148	37	24	4	0.53	0.07	0.16	0.22	6
97-46	33.5	39.1	5.6	1AA	siltstone	-	-	-	1.9	18	1200	244	12	27	2	1.1	116	71	1.54	50	138	50	-20	13	0.6	0.03	0.02	0.2	29
97-46	39.1	44	4.9	1AA	siltstone	-	-	-	2.7	14	953	264	14	17	1	1.4	140	50	1.68	41	111	45	-20	13	0.51	0.02	0.02	0.21	32
97-46	44	49	5	1AA	siltstone	-	-	-	62.4	26	5079	357	30	13	1	3.8	676	662	1.76	139	154	42	135	9	0.31	0.01	0.03	0.13	15
97-46	49	56.6	7.6	LZOX	oxide	585	3	0.13	57.4	175	8293	3620	32	34	6	52.9	3261	431	10	704	110	33	159	7	0.36	-0.01	0.07	0.03	11
97-46	56.6	59.7	3.1	MLS	limestone	-	-	-	1.7	3	45	750	1	3	-1	9.2	15	-5	0.17	306	4	1	-20	1	0.02	0.77	10	-0.01	169
97-46	59.7	65.2	5.5	MLS	limestone	-	-	-	1.5	1	11	438	1	4	-1	4.9	6	-5	0.1	489	2	2	-20	2	0.02	0.22	10	-0.01	202
97-46	65.2	66.35	1.15	MLS	hi sulphide	-	-	-	2.2	88	54	8562	2	35	10	36	719	7	10	1706	30	2	45	7	0.07	0.14	10	-0.01	50
97-46	66.35	68.27	1.92	MLS	limestone	-	-	-	1.1	55	29	32000	-1	50	9	120.5	22	7	2.1	1720	4	3	-20	4	0.03	0.53	10	-0.01	158

Sample Identification						HCL Leach																						
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-46	20.42	27	6.58	1AA	slate	1	12	3528	142	2	16	-1	3.7	158	93	0.3	46	137	103	9	-20	-20	2	0.12	-0.01	0.2	0.07	25
97-46	27	33.5	6.5	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	33.5	39.1	5.6	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	39.1	44	4.9	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	44	49	5	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	49	56.6	7.6	LZOX	oxide	32.8	46	5796	1351	-1	8	5	56.2	19	13	0.59	772	463	45	4	-20	-20	4	0.23	-0.01	0.13	0.01	27
97-46	56.6	59.7	3.1	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	59.7	65.2	5.5	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	65.2	66.35	1.15	MLS	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	66.35	68.27	1.92	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Identification						DI Water Shake Flask																			
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	m	m	m			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
97-46	20.42	27	6.58	1AA	slate	-0.02	-0.1	-0.2	0.6	-0.1	0.1	-0.1	0.06	-0.5	2.1	-1	1.2	0.3	-0.1	-1	-1	12	105	6	74	0.1
97-46	27	33.5	6.5	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	33.5	39.1	5.6	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	39.1	44	4.9	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	44	49	5	1AA	siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	49	56.6	7.6	LZOX	oxide	-0.02	-0.1	-0.2	0.2	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	0.9	-0.1	-0.1	-1	-1	-1	86	7	10	0.1
97-46	56.6	59.7	3.1	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	59.7	65.2	5.5	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	65.2	66.35	1.15	MLS	hi sulphide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-46	66.35	68.27	1.92	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX C

Camp Creek Fault Static Tests - Compiled Data

APPENDIX C
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
CAMP CREEK FAULT
SILVERTIP PROJECT

Sample Identification						ACID-BASE ACCOUNTING								
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
	m	m	m				N	ml	kg/t	kg/t	kg/t	kg/t		%
97-22	98.35	104	5.65	MLS	limestone	3	0.5	80	1000.3	3.4	996.9	4.8	8.44	0.16
97-22	104	105.2	1.2	MLS	limestone	3	0.5	80	503.8	195	308.8	212.2	7.82	6.79
97-22	105.2	109.73	4.53	MLS	limestone	3	0.5	80	886.5	4.1	882.4	4.1	8.51	0.13
97-23	93	96	3	MLS	lmst/mudst	3	0.5	80	785.1	29.4	755.7	31.6	8.18	1.01
97-23	96	104.85	8.85	MLS	limestone	3	0.5	80	417.5	201.9	215.6	208.4	7.95	6.67
97-23	104.85	109.5	4.65	MLS	limestone	3	0.5	80	997.5	11.2	986.3	12.2	8.94	0.39
97-30	89.15	91.44	2.29	MLS	limestone	3	0.5	80	929.1	12.8	916.3	13.8	7.85	0.44
97-30	91.44	94.49	3.05	MLS	limestone	3	0.5	80	584	156.6	427.4	156.9	8.06	5.02
97-31	103.75	106.55	2.8	MLS	limestone	3	0.5	80	635.5	140	495.5	140.9	8.04	4.51
97-31	106.55	109.73	3.18	MLS	limestone	3	0.5	80	949.8	5	944.9	5.6	8.85	0.18
97-14	100.58	106.68	6.1	YBR	alter'd dike	2	0.5	40	136.8	369.4	-232.6	374.1	7.83	11.97
97-45	120	123.44	3.44	MLS	limestone	3	0.5	80	772.2	71.6	700.6	117.5	8	3.76
97-45	123.44	126.49	3.05	MLS	limestone	3	0.5	80	541.4	211.2	330.2	217.5	8.05	6.96
97-49	111.65	116.43	4.78	MLS	limestone	3	0.5	80	996.3	25.3	971.1	26.6	8.28	0.85
97-54	64.85	68.8	3.95	MLS	limestone	3	0.5	80	422.6	226.6	196	229.5	8.12	7.34
97-54	68.8	72.8	4	MLS	limestone	3	0.5	80	999.7	4.4	995.3	5	8.56	0.16
84-101	101.4	105.65	4.25	MLS	lmst+dike?	3	0.5	80	429.3	233.8	195.5	239.7	8.02	7.67
84-101	105.65	109.4	3.75	MLS	dol. lmst.	3	0.5	80	759.3	3.4	755.9	3.4	8.88	0.11

APPENDIX C
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
CAMP CREEK FAULT
SILVERTIP PROJECT

Sample Identification						XRF		Assay	ICP AQUA REGIA																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ba	Se	C NOrg	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-22	98.35	104	5.65	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-22	104	105.2	1.2	MLS	limestone	307	-2	4.85	1.2	12	42	37	2	8	16	-0.2	43	25	6.26	550	11	30	-20	10	0.97	0.77	10	0.16	72
97-22	105.2	109.73	4.53	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	93	96	3	MLS	lmst/mudst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	96	104.85	8.85	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	104.85	109.5	4.65	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-30	89.15	91.44	2.29	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-30	91.44	94.49	3.05	MLS	limestone	245	-2	3.56	1	10	32	101	2	7	14	-0.2	9	8	4.9	255	15	21	-20	6	0.58	0.78	10	0.19	88
97-31	103.75	106.55	2.8	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-31	106.55	109.73	3.18	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-14	100.58	106.68	6.1	YBR	alter'd dike	3595	-2	0.71	0.7	20	20	66	5	12	24	-0.2	62	20	10	133	39	25	-20	6	0.66	0.22	3.06	0.26	17
97-45	120	123.44	3.44	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-45	123.44	126.49	3.05	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-49	111.65	116.43	4.78	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-54	64.85	68.8	3.95	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-54	68.8	72.8	4	MLS	limestone	56	-2	11.96	1.2	-1	6	14	2	2	-1	-0.2	-5	-5	0.13	163	-1	2	-20	-1	0.02	2.12	10	-0.01	143
84-101	101.4	105.65	4.25	MLS	lmst+dike?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-101	105.65	109.4	3.75	MLS	dol. lmst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX C
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
CAMP CREEK FAULT
SILVERTIP PROJECT

Sample Identification						HCL Leach																						
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	K	Sr
	m	m	m			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
97-22	98.35	104	5.65	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-22	104	105.2	1.2	MLS	limestone	-0.2	71	45	42	3	3	2	-0.2	30	-5	0.2	678	47	4	9	-20	-20	6	0.27	0.6	16.86	0.06	75
97-22	105.2	109.73	4.53	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	93	96	3	MLS	lmst/mudst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	96	104.85	8.85	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	104.85	109.5	4.65	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-30	89.15	91.44	2.29	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-30	91.44	94.49	3.05	MLS	limestone	-0.2	17	25	75	1	3	1	-0.2	-5	-5	0.11	313	31	8	6	-20	-20	1	0.14	0.81	20.05	0.06	91
97-31	103.75	106.55	2.8	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-31	106.55	109.73	3.18	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-14	100.58	106.68	6.1	YBR	alter'd dike	-0.2	18	22	61	4	5	1	-0.2	22	-5	0.19	155	171	27	6	-20	-20	5	0.2	0.14	-	0.11	20
97-45	120	123.44	3.44	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-45	123.44	126.49	3.05	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-49	111.65	116.43	4.78	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-54	64.85	68.8	3.95	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-54	68.8	72.8	4	MLS	limestone	-0.2	16	10	22	2	1	-1	-0.2	-5	-5	0.03	211	24	-1	-1	-20	-20	-1	0.01	2.53	34.64	-0.01	145
84-101	101.4	105.65	4.25	MLS	lmst+dike?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-101	105.65	109.4	3.75	MLS	dol. lmst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX C
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
CAMP CREEK FAULT
SILVERTIP PROJECT

Sample Identification						DI Water Shake Flask																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	m	m	m			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
97-22	98.35	104	5.65	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-22	104	105.2	1.2	MLS	limestone	-0.02	-0.1	-0.2	0.2	-0.1	-0.1	-0.1	0.03	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	77	513	7	30	0.5
97-22	105.2	109.73	4.53	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	93	96	3	MLS	lmst/mudst	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	96	104.85	8.85	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-23	104.85	109.5	4.65	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-30	89.15	91.44	2.29	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-30	91.44	94.49	3.05	MLS	limestone	-0.02	-0.1	-0.2	0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	27	146	13	34	0.3
97-31	103.75	106.55	2.8	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-31	106.55	109.73	3.18	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-14	100.58	106.68	6.1	YBR	alter'd dike	-0.02	-0.1	-0.2	0.1	0.3	-0.1	-0.1	-0.02	-0.5	-0.5	-1	0.2	0.1	-0.1	-1	-1	32	404	12	69	0.1
97-45	120	123.44	3.44	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-45	123.44	126.49	3.05	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-49	111.65	116.43	4.78	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-54	64.85	68.8	3.95	MLS	limestone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
97-54	68.8	72.8	4	MLS	limestone	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	-1	-0.1	-0.1	-0.1	-1	-1	-1	17	3	4	0.1
84-101	101.4	105.65	4.25	MLS	lmst+dike?	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
84-101	105.65	109.4	3.75	MLS	dol. lmst.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

APPENDIX D

Waste Rock Pad Static Tests - Compiled Data

APPENDIX D
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
TEST PAD SAMPLES
SILVERTIP PROJECT

Sample Identification							ACID-BASE ACCOUNTING									
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Sample ID	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
	m	m	m					N	ml	kg/t	kg/t	kg/t	kg/t		%
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	40232SD005 +10MM	1	0.1	40	-16.7	122.8	-121.8	131.8	5.86	4.22
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	40232SD005 +2MM	1	0.1	40	-18.3	176.6	-175.6	185	5.15	5.92
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	40232SD005 -2MM	1	0.1	40	-20.9	816.9	-815.9	830	3.7	26.56
Near 97-21	-	-	-	-	Siltstone	OP +10MM	1	0.1	40	-12.4	1.9	-0.9	3.8	7.81	0.12
Near 97-21	-	-	-	-	Siltstone	OP +2MM	1	0.1	40	-0.5	IS	IS	3.4	7.85	0.11
Near 97-21	-	-	-	-	Siltstone	OP -2MM	1	0.1	40	-11.9	-1.6	-0.6	4.4	6.92	0.14
Ore Pile Pad Sample	-	-	-	-	Ore	40232SD004 +10MM	3	0.5	80	202.3	863.1	-660.8	872.8	7.57	27.93
Ore Pile Pad Sample	-	-	-	-	Ore	40232SD004 +2MM	3	0.5	80	234.5	823.4	-588.9	839.4	7.6	26.86
Ore Pile Pad Sample	-	-	-	-	Ore	40232SD004 -2MM	3	0.5	80	165.6	839.1	-673.5	880.9	7.85	28.19

APPENDIX D
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
TEST PAD SAMPLES
SILVERTIP PROJECT

Sample Identification						XRF		Assay	ICP AQUA REGIA			
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Ba	Se	C NOrg	Ag	Cu	Pb	Zn
	m	m	m			ppm	ppm	%	ppm	ppm	ppm	ppm
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	1448	-	0.01	10.7	10	388	306
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	1694	-	-0.01	12.5	7	508	228
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	1178	-	0.03	16.8	10	443	126
Near 97-21	-	-	-	-	Siltstone	1132	-	0.09	1.2	50	133	567
Near 97-21	-	-	-	-	Siltstone	IS	-	0.11	0.8	176	137	831
Near 97-21	-	-	-	-	Siltstone	1696	-	0.47	1	323	272	1142
Ore Pile Pad Sample	-	-	-	-	Ore	210	-	2.46	124	680	10000	64000
Ore Pile Pad Sample	-	-	-	-	Ore	179	-	3.11	193.4	819	10000	78000
Ore Pile Pad Sample	-	-	-	-	Ore	172	-	2.18	211	1210	10000	112000

	ICP AQUA REGIA																
DDH	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K
	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%
D Zone Pad Sample	-1	8	2	1.2	654	15	4.17	16	78	17	-20	1	0.43	0.04	0.04	0.26
D Zone Pad Sample	-1	7	2	0.7	940	12	5.72	12	81	14	-20	1	0.32	0.03	0.02	0.21
D Zone Pad Sample	2	15	10	-0.2	3995	10	10	5	49	14	-20	-1	0.25	0.02	-0.01	0.16
Near 97-21	2	14	2	5.2	53	15	1.55	53	110	20	-20	17	0.41	0.06	0.07	0.15
Near 97-21	5	48	5	11.7	99	12	3.97	183	452	90	-20	33	2.15	0.14	0.14	0.77
Near 97-21	5	71	10	19.6	215	30	5.67	238	155	83	-20	33	1.35	0.14	0.15	0.26
Ore Pile Pad Sample	4	19	3	304.9	5874	1116	10	740	19	7	884	4	0.03	0.4	5.05	0.02
Ore Pile Pad Sample	4	14	2	301.8	4214	1091	10	729	13	5	916	2	0.02	0.34	5.23	-0.01
Ore Pile Pad Sample	3	17	2	324.5	3428	1659	10	695	3	3	1017	4	0.01	0.11	3.05	-0.01

APPENDIX D
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
TEST PAD SAMPLES
SILVERTIP PROJECT

Sample Identification						
DDH	Start	Finish	Thickness	Rock Cod	Rock Type	Sr
	m	m	m			ppm
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	2
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	1
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	2
Near 97-21	-	-	-	-	Siltstone	17
Near 97-21	-	-	-	-	Siltstone	49
Near 97-21	-	-	-	-	Siltstone	65
Ore Pile Pad Sample	-	-	-	-	Ore	32
Ore Pile Pad Sample	-	-	-	-	Ore	38
Ore Pile Pad Sample	-	-	-	-	Ore	21

APPENDIX D
GEOCHEMICAL CHARACTERIZATION OF WASTE ROCK
TEST PAD SAMPLES
SILVERTIP PROJECT

Sample Identification						DI Water Shake Flask																				
DDH	Start	Finish	Thickness	Rock Code	Rock Type	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	m	m	m			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D Zone Pad Sample	-	-	-	D-ZONE	Exhalite	0.11	0.5	2.4	8.9	-0.1	0.1	-0.1	0.04	2.5	-0.5	403	1.2	-0.1	-0.1	-1	19	-1	48	2	18	0.1
Near 97-21	-	-	-	-	Siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Near 97-21	-	-	-	-	Siltstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Near 97-21	-	-	-	-	Siltstone	0.05	-0.1	-0.2	0.6	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	17	0.2	0.2	-0.1	-1	3	-1	-1	4	11	-0.1
Ore Pile Pad Sample	-	-	-	-	Ore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ore Pile Pad Sample	-	-	-	-	Ore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ore Pile Pad Sample	-	-	-	-	Ore	-0.02	-0.1	0.3	9.7	-0.1	-0.1	-0.1	0.12	-0.5	-0.5	-1	1.9	-0.1	-0.1	-1	-1	-1	720	2	2	0.3

APPENDIX E

Waste Rock Pad Leachate Data - Certificates of Analysis

1988 Triumph Street, Vancouver, B.C., Canada V5L 1K5

analytical service laboratories ltd.

FAX: (604) 253-6700 TEL: (604) 253-4188

CHEMICAL ANALYSIS REPORT

cc. S. Day

Date: October 1, 1998

ASL File No. J8399

Report On: Silvertip Water Analysis - ARD test pads

Report To: **Silvertip Mining Corp.**
420 - 355 Burrard St.
Vancouver, BC
V6C 2G8

Attention: **Mr. Peter Campbell**

Received: September 8, 1998

ASL ANALYTICAL SERVICE LABORATORIES LTD.
per:

Miles Gropen

Heather A. Ross, B.Sc. - Project Chemist
Miles Gropen, B.Sc. - Project Chemist

REMARKS File No. J8399

The detection limits for some of the trace metals have been increased for the samples reported in the following data tables due to either high concentrations of Zinc or Iron.

RESULTS OF ANALYSIS - Water File No. J8399

		OP	HG	DZ
Physical Tests				
Conductivity	(umhos/cm)	10	2330	16400
Hardness	$CaCO_3$	9.19	1400	456
pH		6.66	6.93	1.93
Total Suspended Solids		19	<1	39
Dissolved Anions				
Sulphate	SO_4	<1	1350	4800
Total Metals				
Aluminum	T-Al	15.4	0.03	143
Antimony	T-Sb	0.0046	0.0063	<4
Arsenic	T-As	0.242	0.003	80
Barium	T-Ba	0.472	0.0140	<0.2
Beryllium	T-Be	<0.005	<0.005	<0.1
Bismuth	T-Bi	<0.005	<0.005	<2
Boron	T-B	0.05	0.02	<2
Cadmium	T-Cd	0.0286	0.418	18.1
Calcium	T-Ca	1.55	509	164
Chromium	T-Cr	0.023	<0.005	0.3
Cobalt	T-Co	0.019	0.017	6.1
Copper	T-Cu	0.503	0.005	61.6
Iron	T-Fe	54.6	0.10	7580
Lead	T-Pb	0.397	0.0993	1
Lithium	T-Li	<0.01	0.02	<0.2
Magnesium	T-Mg	1.3	31.7	11
Manganese	T-Mn	0.425	3.24	208
Molybdenum	T-Mo	0.0051	0.0011	<0.6
Nickel	T-Ni	0.107	0.019	8
Phosphorus	T-P	2.7	<0.3	31
Potassium	T-K	3	<2	<40
Selenium	T-Se	<0.01	0.02	<4
Silicon	T-Si	2.88	0.29	61
Silver	T-Ag	0.0024	<0.0001	<0.2
Sodium	T-Na	<2	78	51
Strontium	T-Sr	0.110	0.571	0.9
Thallium	T-Tl	0.0007	0.0201	<4
Tin	T-Sn	0.006	<0.001	<0.6
Titanium	T-Ti	0.05	<0.01	<0.2
Uranium	T-U	0.0138	<0.0001	-

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water File No. J8399

		OP	HG	DZ
Total Metals				
Vanadium	T-V	0.09	<0.01	<0.6
Zinc	T-Zn	1.64	43.7	3660

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows:

Conventional Parameters in Water

These analyses are carried out in accordance with procedures described in "Methods for Chemical Analysis of Water and Wastes" (USEPA), "Manual for the Chemical Analysis of Water, Wastewaters, Sediments and Biological Tissues" (BCMOE), and/or "Standard Methods for the Examination of Water and Wastewater" (APHA). Further details are available on request.

Metals in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 19th Edition 1995 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotplate or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption/emission spectrophotometry (EPA Method 7000A), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

End of Report

APPENDIX

CHAIN OF CUSTODY FORMS

CLIENT: Imperial Metals
ADDRESS: 420-355 Burrard St.
CONTACT: Steve Robertson
TELEPHONE: 669-8959 FAX: 687-4030
PROJECT NAME/NO.: Silvertip
QUOTE / P.O. NO.:
DATE SUBMITTED: Sept 4/98 ASL CONTACT:

Vancouver, BC
Canada
FAX: (604) 253-6700
TEL: (604) 253-4188
TOLL FREE: (800) 665-0243

Specialists in Environmental Chemistry

analytical service laboratories ltd.

LAB USE ONLY: 383901

FOR LAB USE ONLY	SAMPLE IDENTIFICATION	DATE / TIME COLLECTED (Y M D)	MATRIX	General	ICP-MS												NOTES
1	OP	: AM/PM		X													No Preserv
	OP	: AM/PM			X												✓
		: AM/PM															✓
2	HG	: AM/PM		X													✓
	HG	: AM/PM			X												✓
		: AM/PM															✓
3	DZ	: AM/PM		X													✓
	DZ	: AM/PM			X												✓
		: AM/PM															
		: AM/PM															
		: AM/PM															
		: AM/PM															
		: AM/PM															
		: AM/PM															
		: AM/PM															
		: AM/PM															

TURN AROUND REQUIRED:
☒ ROUTINE (7 - 10 WORKING DAYS)
☐ RUSH (SPECIFY DATE):
SPECIAL INSTRUCTIONS:

SAMPLE CONDITION UPON RECEIPT:
☐ FROZEN
☐ COLD
☐ AMBIENT

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME
[signature]	DATE: [illegible] TIME: Noon	[signature]	DATE: [illegible] TIME: [illegible]
RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME

1988 Triumph Street, Vancouver, B.C., Canada V5L 1K5

analytical service laboratories ltd.

FAX: (604) 253-6700 TEL: (604) 253-4188

CHEMICAL ANALYSIS REPORT

Date:	October 6, 1998
ASL File No.	J8591
Report On:	Silvertip Water Analysis
Report To:	**Silvertip Mining Corp.** 420 - 355 Burrard St. Vancouver, BC V6C 2G8
Attention:	**Mr. Peter Campbell**
Received:	September 15, 1998

cc: S. Day
E. Robertson

ASL ANALYTICAL SERVICE LABORATORIES LTD.
per:

Heather A. Ross, B.Sc. - Project Chemist
Miles Gropen, B.Sc. - Project Chemist

REMARKS

File No. J8591

The detection limits for the trace metals have been increased for the samples reported in the following data tables due to high concentrations of certain metals in the samples.

RESULTS OF ANALYSIS - Water

File No. J8591

		OP	HG	DZ	HG	DZ
		98 09 10	98 09 10	98 09 10	98 09 13	98 09 13
Physical Tests						
Hardness	CaCO3	6.82	1390	529	1420	501
pH		6.60	6.89	1.74	7.19	1.70
Total Suspended Solids		96	226	35	<1	<1
Dissolved Anions						
Sulphate	SO4	5	1080	36000	1700	40000
Total Metals						
Aluminum	T-Al	8.97	<0.01	190	<0.01	155
Antimony	T-Sb	0.0035	0.0056	<10	0.0060	<4
Arsenic	T-As	0.135	0.003	117	0.003	93
Barium	T-Ba	0.315	0.0061	<0.5	0.0056	<0.2
Beryllium	T-Be	<0.005	<0.005	<0.3	<0.005	<0.1
Bismuth	T-Bi	<0.005	<0.005	<5	<0.005	<2
Boron	T-B	0.01	0.02	<5	0.02	<2
Cadmium	T-Cd	0.0209	0.452	25.9	0.486	21.5
Calcium	T-Ca	1.39	498	197	492	181
Chromium	T-Cr	0.012	<0.005	<0.5	<0.005	0.2
Cobalt	T-Co	0.011	0.021	6.5	0.025	6.8
Copper	T-Cu	0.315	0.004	88.2	0.005	71.9
Iron	T-Fe	29.5	<0.03	10900	<0.03	9410
Lead	T-Pb	0.217	0.108	<3	0.106	1
Lithium	T-Li	<0.01	0.01	<0.5	0.03	<0.2
Magnesium	T-Mg	0.8	36.3	9	46.3	12
Manganese	T-Mn	0.246	4.09	207	4.83	230
Molybdenum	T-Mo	0.0032	0.0010	<2	0.0011	<0.6
Nickel	T-Ni	0.062	0.023	11	0.031	10
Phosphorus	T-P	1.5	<0.3	41	<0.3	32
Potassium	T-K	<2	<2	<100	<2	<40
Selenium	T-Se	<0.01	0.02	<10	0.02	<4
Silicon	T-Si	3.49	0.28	71	0.39	72
Silver	T-Ag	0.0015	<0.0001	<0.5	0.0002	<0.2
Sodium	T-Na	<2	25	<100	103	51
Strontium	T-Sr	0.066	0.570	1.4	0.653	1.0
Thallium	T-Tl	<0.0005	0.0187	<10	0.0187	<4
Tin	T-Sn	0.007	<0.001	<2	<0.001	<0.6
Titanium	T-Ti	0.03	<0.01	<0.5	<0.01	<0.2
Uranium	T-U	0.0089	<0.0001	-	<0.0001	-
Vanadium	T-V	0.05	<0.01	<2	<0.01	<0.6

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

File No. J8591

		OP	HG	DZ	HG	DZ
		98 09 10	98 09 10	98 09 10	98 09 13	98 09 13
Total Metals						
Zinc	T-Zn	1.02	49.9	5380	63.8	4220

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

File No. J8591

Water	DZ	DZ
	98 09 10	QC # 133098
Physical Tests		
Hardness CaCO3	529	529
pH	1.74	1.74
Total Suspended Solids	35	4
Dissolved Anions		
Sulphate SO4	36000	35800

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

Appendix 2 - METHODOLOGY

File No. J8591

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows:

Conventional Parameters in Water

These analyses are carried out in accordance with procedures described in "Methods for Chemical Analysis of Water and Wastes" (USEPA), "Manual for the Chemical Analysis of Water, Wastewaters, Sediments and Biological Tissues" (BCMOE), and/or "Standard Methods for the Examination of Water and Wastewater" (APHA). Further details are available on request.

Metals in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 19th Edition 1995 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotplate or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption/emission spectrophotometry (EPA Method 7000A), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

End of Report

APPENDIX

CHAIN OF CUSTODY FORMS

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

1988 Triumph Street
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Canada V5L 1K5
TEL: (604) 253-4188
TOLL FREE: (800) 665-0243
FAX: (604) 253-6700

Specialists in Environmental Chemistry

analytical service laboratories ltd.

CLIENT: Imperial Metals Mining Corp. Silvertip

ADDRESS: 420-355 Burrard St. Van.

CONTACT: Steve Robertson

TELEPHONE: 669-8959 FAX: 687-4030

PROJECT NAME/NO.: Silvertip

QUOTE / P.O. NO.:

DATE SUBMITTED: Sept 14/98 ASL CONTACT:

LAB USE ONLY: J8591

ANALYSIS REQUESTED

FOR LAB USE ONLY	SAMPLE IDENTIFICATION	Y	M	D	TIME (AM/PM)	MATRIX	BETX / VPH	VOC / VPH	EPH	PAH	LEPH / HEPH	MO+G / SWOG	Metals - PL, RL, CL, IL / AL (S)	Metals - AW / DW (W)	General	ICP-MS				NOTES
1	OP	98	9	10	:										✓					
	OP	-	-	10	:											✓				
2	HG	-	-	10	:										✓	✓				
	HG	-	-	10	:											✓				
3	DZ	-	-	10	:										✓					
	DZ	-	-	10	:											✓				
					:															
					:															
4	HG	98	9	13	:										✓					
	HG	-	-	13	:											✓				
5	DZ	-	-	13	:										✓					
	DZ	-	-	13	:											✓				
					:															
					:															
					:															
					:															

TURN AROUND REQUIRED:

☒ ROUTINE (7 - 10 WORKING DAYS)

☐ RUSH (SPECIFY DATE):

SPECIAL INSTRUCTIONS:

SAMPLE CONDITION UPON RECEIPT:

☐ FROZEN
☐ COLD
☐ AMBIENT

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME
[signature]	DATE Sept 14/98 TIME Noon	[signature]	DATE 98.9.15 TIME 16:40
RELINQUISHED BY:	DATE TIME	RECEIVED BY:	DATE TIME

Questionnaire - British Columbia CSR

APPENDIX F
Soil Samples – Compiled Data

APPENDIX F
GEOCHEMICAL CHARACTERIZATION OF
OPEN PIT AREA SOILS
SILVERTIP PROJECT

Sample Identificatio	ACID-BASE ACCOUNTING								
Sample ID	Fizz	Normal	HCl	NP	AP	NNP	MPA	pH	S
		N	ml	kg/t	kg/t	kg/t	kg/t		%
160601	0	0.1	20	-3.5	0.3	-3.6	6.9	4.51	0.22
160602	0	0.1	20	-3.4	0.5	-3.9	7.8	4.65	0.25
160603	0	0.1	20	-4.6	0.5	-5.1	5	4.83	0.16
160604	0	0.1	20	-3.8	0.5	-4.2	4.4	4.62	0.14
160605	0	0.1	20	-3.9	0.3	-4.2	5	4.4	0.16
160606	0	0.1	20	-2.7	0.4	-3.1	8.1	4.58	0.26
160607	0	0.1	20	-4.2	0.3	-4.5	6.3	4.55	0.2
160608	0	0.1	20	-3.2	0.5	-3.5	8.1	4.78	0.26
160609	0	0.1	20	-2.8	0.3	-3.1	2.5	5.05	0.08
160610	0	0.1	20	-3.8	0.4	-3.8	5	4.68	0.16
160611	0	0.1	20	-3.1	1.4	-4.4	6.6	5.11	0.21
160612	0	0.1	20	-3.5	0.2	-3.7	5.6	4.53	0.18
160613	0	0.1	20	-6.1	0.3	-6.4	5.6	4.42	0.18
160614	0	0.1	20	-2.3	2.8	-5.1	6.9	5.49	0.22
160615	0	0.1	20	-3.3	0.3	-3.4	1.3	4.62	0.04
160616	0	0.1	20	-3.6	0.3	-3.9	3.4	4.14	0.11
160617	0	0.1	20	-3.9	0.3	-4.2	5	3.96	0.16
160618	0	0.1	20	-6	1.7	-7.7	17.5	3.71	0.56
160619	0	0.1	20	-4.3	0.4	-4.7	4.1	4.38	0.13
160620	0	0.1	20	-3	0.6	-3.7	5.6	4.82	0.18
160621	0	0.1	20	-2.5	0.4	-2.9	1.6	4.85	0.05
160622	0	0.1	20	-8.4	0.3	-8.7	5.3	4.35	0.17
160623	0	0.1	20	-2.5	5.8	-8.3	9.1	5.15	0.29
160624	0	0.1	20	-1.9	0.8	-2.7	1.6	7.49	0.05

APPENDIX F
GEOCHEMICAL CHARACTERIZATION OF
OPEN PIT AREA SOILS
SILVERTIP PROJECT

Sample Identificatio	XRF		Assay	ICP AQUA REGIA																				
Sample ID	Ba	Se	C NOrg	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Cr	V	Sn	La	Al	Mg	Ca	K	Sr
	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
160601	-	-	-	2.3	55	428	122	5	12	1	0.4	151	22	2.65	31	9	21	-20	27	0.69	0.16	-0.01	0.12	51
160602	-	-	-	2.4	75	379	198	6	17	2	0.5	189	14	3.47	51	10	23	-20	23	0.77	0.16	-0.01	0.13	68
160603	-	-	-	7.9	69	1447	313	6	19	4	0.9	114	44	3.07	94	12	48	21	18	0.83	0.05	0.03	0.08	80
160604	-	-	-	5.3	58	1555	265	6	14	3	0.9	135	38	2.68	58	11	47	21	24	0.54	0.05	0.06	0.09	98
160605	4316	3	1.08	2	65	405	155	6	12	2	0.5	149	15	2.43	48	5	16	-20	31	0.45	0.05	-0.01	0.1	46
160606	-	-	-	2.6	72	315	214	6	16	2	0.7	274	17	3.59	37	10	26	-20	25	0.71	0.13	-0.01	0.15	83
160607	-	-	-	2.3	47	339	152	4	8	1	0.4	136	10	2.46	31	7	21	-20	24	0.6	0.07	-0.01	0.13	66
160608	-	-	-	5.5	74	1149	269	8	14	3	1.2	261	43	3.03	150	7	25	26	26	0.45	0.06	0.03	0.14	94
160609	-	-	-	3.5	64	674	551	6	39	5	1.5	110	22	3.19	76	15	74	-20	22	1.09	0.12	0.11	0.08	68
160610	2540	5	0.8	7.8	62	974	293	12	18	3	1.1	112	28	2.93	72	12	70	-20	22	0.73	0.07	0.06	0.11	116
160611	-	-	-	9.3	37	3682	94	23	3	-1	1	422	226	2.33	18	4	45	54	16	0.22	-0.01	0.04	0.09	38
160612	-	-	-	1.6	48	315	175	5	15	2	0.4	118	10	2.9	50	8	19	-20	25	0.75	0.17	-0.01	0.1	83
160613	-	-	-	1.2	82	245	288	4	19	3	0.8	123	9	3.47	58	10	27	-20	23	0.93	0.11	0.01	0.12	60
160614	-	-	-	4.3	66	903	384	5	19	5	1.9	152	28	2.59	218	6	19	-20	22	0.44	0.07	0.09	0.09	50
160615	1597	-2	0.55	2.1	38	223	470	3	30	5	1.4	59	14	2.45	68	7	26	-20	27	0.48	0.07	0.08	0.04	79
160616	-	-	-	5.6	34	697	220	5	15	3	0.6	83	20	2.66	61	11	56	-20	18	0.52	0.04	0.05	0.07	44
160617	-	-	-	5.9	40	1230	198	9	12	3	0.6	125	40	2.68	90	11	41	21	18	0.54	0.07	0.08	0.1	46
160618	-	-	-	20.4	366	10000	392	4	7	-1	1.8	531	136	5.52	20	20	146	301	17	0.83	0.02	0.03	0.13	177
160619	-	-	-	2.8	42	728	242	4	13	3	0.6	148	32	2.53	89	5	17	-20	24	0.33	0.05	0.03	0.09	40
160620	3151	3	0.42	3.8	54	920	231	5	12	4	1	191	32	2.21	226	5	20	-20	20	0.29	0.04	0.03	0.09	59
160621	-	-	-	2.3	70	350	430	4	24	3	2	140	14	2.3	89	5	25	-20	34	0.32	0.03	0.07	0.05	43
160622	-	-	-	4.2	56	807	174	4	13	2	0.6	145	21	2.74	46	7	21	-20	22	0.64	0.1	0.04	0.1	66
160623	-	-	-	2.3	67	830	674	5	24	4	2.2	145	21	2.91	110	8	35	-20	20	0.74	0.08	0.03	0.08	38
160624	2660	-2	2.93	2.3	53	273	431	3	32	8	2.6	41	8	2.55	567	14	30	-20	17	1.05	2	3.47	0.08	43

APPENDIX F
GEOCHEMICAL CHARACTERIZATION OF
OPEN PIT AREA SOILS
SILVERTIP PROJECT

Sample Identificatio	HCL Leach																						
Sample ID	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	V	Sn	W	La	Al	Mg	Ca	K	Sr
	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm
160601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160604	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160605	1.7	26	25	4	-1	4	-1	-0.2	6	-5	0.32	5	76	-1	1	-20	-20	-1	0.15	-0.01	-0.01	0.02	-1
160606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160607	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160608	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160609	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160610	6.1	26	116	53	-1	4	-1	0.7	-5	9	0.26	29	189	-1	6	24	-20	-1	0.27	-0.01	-0.01	0.02	-1
160611	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160612	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160613	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160614	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160615	2.9	24	21	20	-1	5	-1	1.4	-5	-5	0.32	14	43	-1	4	-20	-20	-1	0.17	-0.01	-0.01	0.01	2
160616	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160617	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160619	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160620	1.8	36	137	13	-1	5	-1	-0.2	-5	20	0.16	212	135	-1	-1	-20	-20	-1	0.08	-0.01	-0.01	0.01	-1
160621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160622	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160623	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160624	2.7	37	140	146	-1	7	-1	2.1	-5	10	0.27	468	437	-1	5	-20	-20	-1	0.23	1.19	2.45	0.02	-1

APPENDIX F
GEOCHEMICAL CHARACTERIZATION OF
OPEN PIT AREA SOILS
SILVERTIP PROJECT

Sample Identificatio	DI Water Shake Flask																				
Sample ID	Ag	Cu	Pb	Zn	Mo	Ni	Co	Cd	As	Sb	Fe	Mn	Ba	Cr	Sn	Al	Mg	Ca	Na	K	Sr
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
160601	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160604	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160605	-0.02	-0.1	0.6	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	20	-0.1	0.4	-0.1	-1	4	-1	-1	3	5	-0.1
160606	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160607	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160608	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160609	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160610	-0.02	-0.1	0.8	0.3	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	26	0.3	0.8	-0.1	-1	7	-1	-1	3	2	-0.1
160611	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160612	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160613	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160614	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160615	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	5	-0.1	0.1	-0.1	-1	2	-1	-1	2	2	-0.1
160616	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160617	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160619	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160620	-0.02	-0.1	0.8	0.2	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	14	0.8	0.6	-0.1	-1	3	-1	-1	3	5	-0.1
160621	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160622	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160623	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
160624	-0.02	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.02	-0.5	-0.5	1	0.1	0.3	-0.1	-1	-1	6	23	3	1	-0.1

APPENDIX C

GEOPHYSICS – CSAMT SURVEY

Silvertip CSAMT Survey

Final Report

◆

Whytecliff Geophysics

Partners: D. B. Butler and K. D. G. Jarvis

September 16, 1998

By
Kevin D.G. Jarvis, P. Geo.
David B. Butler, Ph. D.

Prepared for
Silvertip Mining Corporation

98-09-16

Table of Contents

Executive Summary

The CSAMT survey discussed in this report has provided Silvertip Mining Corporation with images of the electrical resistivity structure under five lines on the Silvertip Property. These images indicate that a very large, highly electrically conductive anomaly, which may represent a massive sulphide ore body, exists under Silver Creek South. The anomaly suggests that the ore body may extend from the top of the McDame Limestone, through the underlying McDame Dolostone, and into the Tapioca Sandstone. This is an important development, as it implies that two other horizons, in addition to the McDame limestone, are prospective exploration targets. The results also suggest that additional ore bodies may exist under Tour Ridge, and north of Discovery North.

Introduction

This report describes a controlled-source audio-frequency magnetotelluric (CSAMT) survey carried out at the Silvertip property during August of 1998. The survey was designed to detect large, vertically oriented, massive sulphide deposits. These deposits, postulated to exist beneath, or far removed from the known ore deposits, may represent mineralized fluid pathways that acted as feeder channels for the known mineralization.

This report gives a brief description of the local geology, a summary of the CSAMT technique, and a description of the field techniques employed at Silvertip. It then summarizes the results of five lines of data, placing the results in context with the known geology.

The results suggest that a large, vertically oriented, electrically conductive body exists near the Camp Creek Fault. This conductor may represent a substantial massive sulphide ore body. Based on these results, we suggest that a small follow-up CSAMT survey be conducted, to detail the extent of the body. We further suggest that the conductor be drilled, to test whether it does represent massive sulphides.

Geologic Setting

The following geologic description is not intended to be exhaustive. More detailed descriptions are available from Silvertip Mining Corporation. In particular, work by Chris Rees, as well as a recent report by Peter Megaw (1998), provide in-depth descriptions and analyses of the geologic setting. The following brief summary enables the geophysical results to be placed in context with the local geology.

There are three formations of interest in this area: the Tapioca, the McDame, and the Earn. The Tapioca, at the base of the sequence, is a fine-grained siliceous sandstone. Above this is the McDame, which comprises 350 m of dolostone and overlying limestone. The Earn Group, whose thickness can be as much as 800 m, unconformably overlies the McDame, and consists of sandstones, siltstones, and conglomerates, as well as some syngenetic exhalites.

Rocks in the area dip moderately to the east. As well, there are a number of steeply dipping, north-south trending normal faults. These faults drop the section to the east, so that the McDame, which is exposed in the western part of the property, is as much as 800 m below surface in the east.

The known massive sulphide ore bodies at Silvertip exist as manto deposits in the McDame limestone. A large number of the mantos exist at or just below the unconformity at the top of the limestone. It has been suggested by Peter Megaw that these mantos represent fringing ore bodies at the edge of a potentially much larger ore system. The mantos may have been fed from below, through fractures or faults that at one time may have been highly permeable relative to the surrounding limestone. If this is correct, then these feeder channels may also be mineralized, and may contain the bulk of the ore that exists on the property. It is probable that if these mineralized feeders exist, then they would be associated with the high-angle normal faults in the area. The goal of this survey, therefore, was to determine whether mineralized feeder channels exist on the Silvertip property.

Overview of the CSAMT technique

If mineralized feeders exist on the property, then, geophysically, they would appear as vertically oriented, electrically conductive bodies that extend from the top of the McDame to depth. CSAMT is well suited to the search for vertical conductors, and was therefore chosen as a reconnaissance-mapping tool.

Magnetotellurics (MT) makes use of time-varying electromagnetic (EM) waves that exist naturally in the atmosphere and magnetosphere. When these waves reach the surface, they penetrate the earth and induce the flow of electrical currents in the crust. These currents, which flow roughly parallel to the surface, flow through electrically resistive earth materials, thereby creating electric fields (voltage distributions in the ground). These electric fields can be measured at the surface; and their magnitudes depend on whether the currents flow though electrically resistive or electrically conductive rocks. Rocks such as limestones or sandstones, if they are devoid of metallic ores, range from mildly resistive to very resistive, and would create large electric fields. However, those same rocks, if they contained large quantities of metallic ores (such as massive sulphides), would not be very resistive at all (they would be electrically conductive), and would create very small electric fields. Thus the presence of electric fields that are very small in comparison to background fields indicates the possible presence of massive sulphide ore in the subsurface.

Naturally occurring EM waves are created by a wide variety of atmospheric and magnetospheric effects, and exist over a wide range of frequencies. All of these waves are attenuated as they penetrate the earth. The attenuation increases with increasing frequency, and decreases with increasing resistivity (decreasing electrical conductivity) of the ground. For ground of a constant resistivity, high frequency waves are rapidly attenuated, and cannot penetrate farther than a few metres (or tens of metres). Therefore these waves sense only the resistivity of the upper few metres (or tens of metres). Low frequency waves are attenuated very slowly, and can therefore penetrate hundreds or thousands of metres. These low frequency waves therefore provide information about resistivity over a very wide depth range. In addition, waves of a particular frequency will be rapidly attenuated in electrically conductive ground (the ground "shields" itself from the waves), and therefore will not penetrate as far as they would in electrically resistive ground.

MT measurements are made over a frequency band that ranges from less than 0.1 Hz to greater than 100 kHz. Natural fields exist over most of this range, but there is a gap between 500 Hz and 3 kHz, where few natural fields can be detected. This leads, as a result of the different penetration depths of different frequency waves, to a gap in the depth range that can be investigated. To solve this problem, CSAMT (*controlled source audio-frequency* magnetotellurics) uses a transmitter that emits EM waves in the natural frequency gap. Thus CSAMT obtains a more continuous profile of the variation of electrical resistivity with depth.

Field Procedures

Figure 1 shows how CSAMT data are collected in the field. At each station, four measurements are made: two perpendicular electric field measurements, and two perpendicular magnetic field measurements. The station location is at the centre of the electrical probes. The magnetic fields are measured using highly sensitive cylindrical magnetic sensors, which consist of magnetic metal wrapped in many turns of electrical wire. These sensors are oriented horizontally, at right angles to one another, and are buried approximately six inches underground. They are placed within five metres of the station. The electric fields are measured by placing electrical probes in the ground, at a fixed distance apart, and measuring the voltage differences. These probes consist of either titanium spikes, or porous ceramic pots containing a copper wire and a saturated solution of copper sulphate. The probes are placed in holes that are approximately two feet in diameter by one foot deep. These holes are wetted with either fresh or saline water, in order to improve the electrical contact between the sensors and the ground. In rocky ground, thick mud is used in the hole, to provide a more diffuse electrical connection to the earth.

The four data streams collected are time-domain signals, measured over approximately 30 minutes. The data are then converted to the frequency domain using a Fourier transform. The results give the electric and magnetic field amplitudes, versus frequency, over the entire frequency range. These are then translated into estimates of resistivity at varying depths beneath the station. Since each estimate of resistivity requires a measurement of the magnetic field, and a perpendicular measurement of the electric field, the four measurements give two independent estimates of resistivity at each frequency, at every station.

After estimates of resistivity are obtained for all frequencies, the equipment is picked up and moved to the next station. The station spacing equals the separation distance between electrical probes. This leads to station spacings from 20 m for shallow, detailed investigations, to 100 m for deep, reconnaissance investigations. At each station, estimates of resistivity are obtained for a wide frequency range, and are then translated to profiles of resistivity over a wide depth range.

Two different sets of field sensors were used during the program at Silvertip. The first set is designed to investigate approximately the upper five hundred metres of the earth, and uses EM waves between 10 Hz and 92 kHz. The second gear set is designed to look much deeper, and uses waves from 0.1 Hz to 1 kHz. The first set was used for lines 1, 2, and 3. Both sets were used for lines 4 and 5.

Survey Location

Figure 2 shows the location of the five lines on a 1:20,000 UTM grid. The exact positions are given in the Appendix. Line 1, at a northing of 6,643560 m, was located to coincide with a known ore body. It served as a test of the CSAMT technique, to determine whether the technique could detect massive sulphides.

Lines 2 through 5 were exploration lines. Line 2, at a northing of 6,641,500 m, was located to test Tour Ridge, an area identified by Peter Megaw as being prospective for mineralization. Line 3, located between the camp and the shop at a northing of 6,644,440 m, was located to explore the area to the north of the known mineralization. Line 4, at an approximate northing of 6,643,300 m, was located to test the Silver Creek South area, where underground drilling had intersected some sulphides well below the Earn-McDame unconformity. Line 5, at a northing of 6,642,550 m, was located to test the region beneath Silvertip Hill and Silvertip Mountain.

Results and Interpretation

At each station along a line, estimates of resistivity are obtained at different depths. These profiles are then plotted side-by-side, and contoured to produce two-dimensional cross-sections. The results are presented twice: once by themselves, and once with independent geologic information superimposed. This geologic information was obtained from Silvertip Mining Corporation.

Line 1 - Seismic Line A

Line 1 was run to test the CSAMT method, to see whether it could detect known mineralization. The results are shown in Figures 3a and 3b. Figure 3a is a contour plot of resistivity versus easting and elevation. The station interval on the line was 20 m. Small crosses on the section represent positions where resistivity estimates were obtained. The cooler, blue colours represent relatively resistive materials, while the warmer, red colours represent relatively conductive materials.

Two major features are evident in Figure 3a. The first is a resistive layer between the surface and 1200 m elevation. This layer extends across most of the section, with slightly more conductive regions appearing at the east and west edges of the plot. The second feature is a very conductive region below 1180 m elevation, and west of easting 25025 m. Note that the data crosses do not appear in the lower, western part of the plot: this is indicative of a conductive layer shielding the earth from EM wave penetration.

Figure 3b shows the same results with independent geologic information superimposed. This information was obtained from Silvertip Mining Corporation in late fall of 1997. The section is broken into two layers: the McDame limestone and the overlying Earn. Dashed lines represent interpreted faults. The fault at the bottom left of the diagram is the Camp Creek Fault. The known massive sulphide ore bodies are shown as hatched regions surrounded by thick black outlines. It is clear from the diagram that the largest ore body, between 24820 m and 24975 m, appears as a large, conductive anomaly. The boundaries of the anomaly do not exactly match the outline of the ore body, but this is to be expected, as CSAMT can only produce a smeared image of the subsurface. It is also clear that the Earn, which is devoid of ore in this area, appears resistive. Note as well that the large body appears to act as an EM shield, since only a few estimates were obtained below the ore. This implies that the EM waves were not able to penetrate far beneath the ore.

The smaller ore bodies east of 25000 m are not detected. From these results, it appears that only the larger bodies can be detected with CSAMT. This makes intuitive sense, since the technique obtains, at each frequency, a resistivity estimate that, although centred at a particular depth, is nevertheless the result of averaging over a large volume of earth. Therefore, small ore bodies may become electromagnetically invisible when they are incased in resistive host rock.

Two smaller, conductive anomalies appear in Figure 3a. The first is at the surface, between eastings 24925 m and 25075. This anomaly corresponds to a thick wet clay layer at the surface, and can be disregarded. The second is a vertical structure, approximately 30 m wide, that extends downwards from the surface at easting 25100 m. This corresponds to the YBR fault. There may be minor amounts of mineralization throughout the fault zone, or the fault may contain a higher proportion of water than the surrounding rocks, thereby making it marginally more conductive.

The very good correspondence between the conductive anomaly and the large ore body led us to conclude that CSAMT is capable of detecting large ore bodies in this area. This led us to use the technique in four exploration areas on the property.

Line 2 – Tour Ridge

The Line 2 results are shown in Figures 4a and 4b. Figure 4a shows that the upper 100 m of the line is resistive, aside from two small near-surface anomalies at eastings of 24525 m and 25050 m. The western third of the section is also resistive, from surface to 900 m elevation. A large, vertically oriented, mildly conductive region exists between 24750 m and 24950 m. Note that there are no data below approximately 1100 m elevation, between 24700 m and 24950. The closure of the 10 ohm-m contour is thus an artifact of the contouring; the conductive anomaly itself may extend below 900 m.

Figure 4b shows the data with the geologic information superimposed. The top of the conductive anomaly matches the contact between the Earn 1b and the Earn 2a. Exhalites, which are more conductive than Earn siliclastic rocks, exist at this boundary elsewhere on the property. Therefore the top of this conductive structure may correspond to exhalites on Tour Ridge. The most conductive part of the anomaly exists in the McDame Limestone, and is just east of the Camp Creek Fault. A reasonable explanation for these results is that metal-bearing fluids travelled up the Camp Creek Fault, or up a nearby splay of the fault, and deposited sulphides in the limestone and dolostone. The fact that the resistivity is larger than those values corresponding to the known ore body under Line 1 leads to two possible interpretations. First, the line may have passed over a low-grade ore deposit. Second, a high-grade ore deposit may exist in the area, but the line passed just to the north or the south of it. In the latter case, the recorded resistivity would be an average of very low resistivity ore with higher resistivity host rock.

Line 3 – Discovery North

Figures 5a and 5b show the results of Line 3, without and with geologic information, respectively. The majority of the area under this line is resistive. However, Figure 5b shows that the Camp Creek Fault is again associated with a vertically oriented structure that is mildly more conductive than the surrounding rocks. This structure follows the fault, from 1050 m elevation to approximately 600 m. Here, as for Line 2, there are two interpretations. The anomaly may represent a low-grade ore deposit, or it may indicate that a high-grade deposit is nearby. The overall resistive appearance of the section, however, suggests that this region is slightly less prospective than is Tour Ridge.

Line 4 – Silver Creek South

The results for Line 4 are shown in Figures 6a and 6b. It is evident from Figure 6a that a large, vertically oriented ore body may exist under this line, between eastings 24750 m and 24950 m, extending from 1150 m elevation to depth. Figure 6b shows that this conductive body is associated with the top of the McDame Limestone, and is immediately east of the Camp Creek Fault. In addition, the anomaly broadens at the base of the limestone, and follows the structure of the limestone and the McDame Dolostone. The anomaly is also present in the Tapioca Sandstone.

These resistivity values match, or are less than the values that correspond to the major ore body under Line 1. It is highly unlikely that these values can be explained solely by water in the Camp Creek Fault. We therefore interpret this anomaly as a large massive sulphide body. This structure may represent a mineralized zone that acted as a feeder for the known mineralization to the north. Metal-bearing fluids may have travelled up the Camp Creek Fault, or up a nearby splay, and deposited ore along highly permeable pathways in the limestone and dolostone. The results also indicate that ore may be present in the Tapioca. Chris Rees, in a recent field mapping exercise, discovered massive-sulphide-bearing Tapioca Sandstone. This lends strong credence to the possibility that the conductive region in the Tapioca is mineralized.

These results are highly significant, in that they indicate that mineralization may occur not only at the unconformity at the top of the McDame, but also throughout the McDame Limestone and Dolostone, and in the Tapioca as well. This represents a new set of exploration targets for the Silvertip project.

Line 5 – Silvertip Mountain

The results for Line 5, shown in Figures 7a and 7b, indicate that no large sulphide bodies exist under this line in the upper 500 m of Silvertip Hill and Silvertip Mountain. However, a conductive anomaly exists at great depth east of the Camp Creek Fault, between 550 m and 700 m elevation. This anomaly may represent the deep, southward extension of the anomaly on Line 4. It is associated with the Camp Creek and two splay faults, and the anomaly resides in the McDame and the Tapioca. These resistivity values are comparable to those associated with the ore body in Line 1.

Discussion

The results of the test line (Line 1) indicate that CSAMT can detect large ore deposits, but not small ones. This can be viewed as an economic filter: the technique will not detect small, potentially uneconomic ore bodies.

The results from the exploration part of the survey indicate that the Camp Creek Fault played a major role in the placement of the massive sulphide ore. Known mineralization on the property occurs east of this fault. Mildly conductive anomalies on Lines 2 and 3 indicate that ore bodies may exist near these lines, east of the Camp Creek Fault. Line 4, over Silver Creek South, suggests that a major ore body exists immediately east of the fault. Line 5 suggests that a deep ore body may also exist under Silvertip Mountain, associated with the Camp Creek and two splay faults. On all of the lines, the areas west of the Camp Creek Fault do not appear prospective.

The results also suggest that ore exists far below the unconformity at the top of the McDame. This is most evident on Line 4, where the conductive anomaly broadens significantly at the base of the McDame, and extends into the Tapioca Sandstone.

Suggestions for Future Work

The results from this survey highlight one highly prospective and three prospective exploration areas. The large anomaly on Line 4 should be tested with drilling. However, since the drill holes will be expensive, it would be worthwhile, prior to drilling, to detail this area with a closely spaced CSAMT grid. This grid should have resistivity stations every 50 to 100 m. The results from this detailed survey will increase the chances for success with the drill holes.

Line 5 showed a conductive anomaly that may be connected with the highly prospective target on Line 4. It is therefore worthwhile to run approximately five reconnaissance lines between Lines 4 and 5, to determine whether these bodies represent the same large ore system.

Line 2 indicated that a massive sulphide might exist close to the line, either to the north or south. Therefore at least two more reconnaissance lines should be run in the area, one to the north of Line 2 and one to the south, to test whether a sulphide is nearby. If either of these lines show positive results, additional lines can be run to detail the anomaly. The same approach should be taken towards Line 3, to test whether the vertical anomaly associated with the Camp Creek Fault indicates a nearby ore body.

Conclusions

A test of the CSAMT method has shown that it can detect large massive sulphide bodies on the Silvertip property. This method was then used on four additional lines in an exploration mode. The results provide Silvertip Mining Corporation with images of the electrical resistivity structure under those lines. These images can be related directly to geologic structure and the presence of massive sulphide ore bodies.

The results of Line 4 indicate that a very large, electrically conductive anomaly, which may represent an ore body, exists under Silver Creek South. The anomaly indicates that the ore body may extend from the top of the McDame Limestone, through the underlying McDame Dolostone, and into the Tapioca Sandstone. This is a significant result, as it implies that two other horizons, in addition to the McDame limestone, are prospective exploration targets. Anomalies on Lines 2, 3, and 5 suggest the presence of additional sulphides.

The most prospective anomaly, under Line 4, should be drilled after being delineated by a detailed CSAMT in-fill survey. The other anomalies should be investigated with additional reconnaissance lines.

Reference

Megaw, P. K. M., 1998, Report on field visit to Silvertip Project, B. C.: memo from IMDEX Inc. to Imperial Metals, p. 1-29.

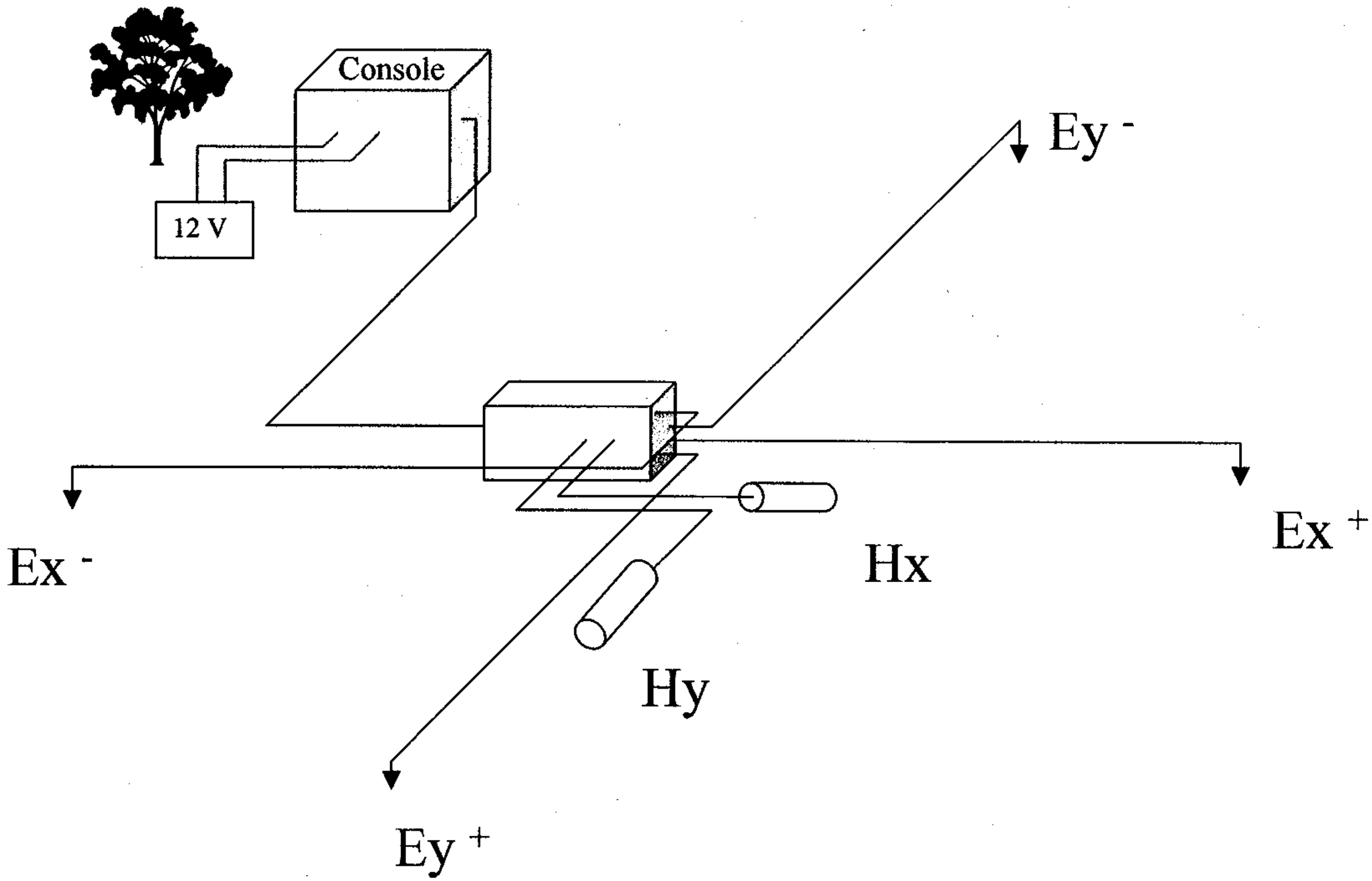


Fig. 1: Schematic of CSAMT data collection method. At each station, two estimates of resistivity are obtained per frequency: one from the ratio of Ex to Hy, and one from the ratio of Ey to Hx.

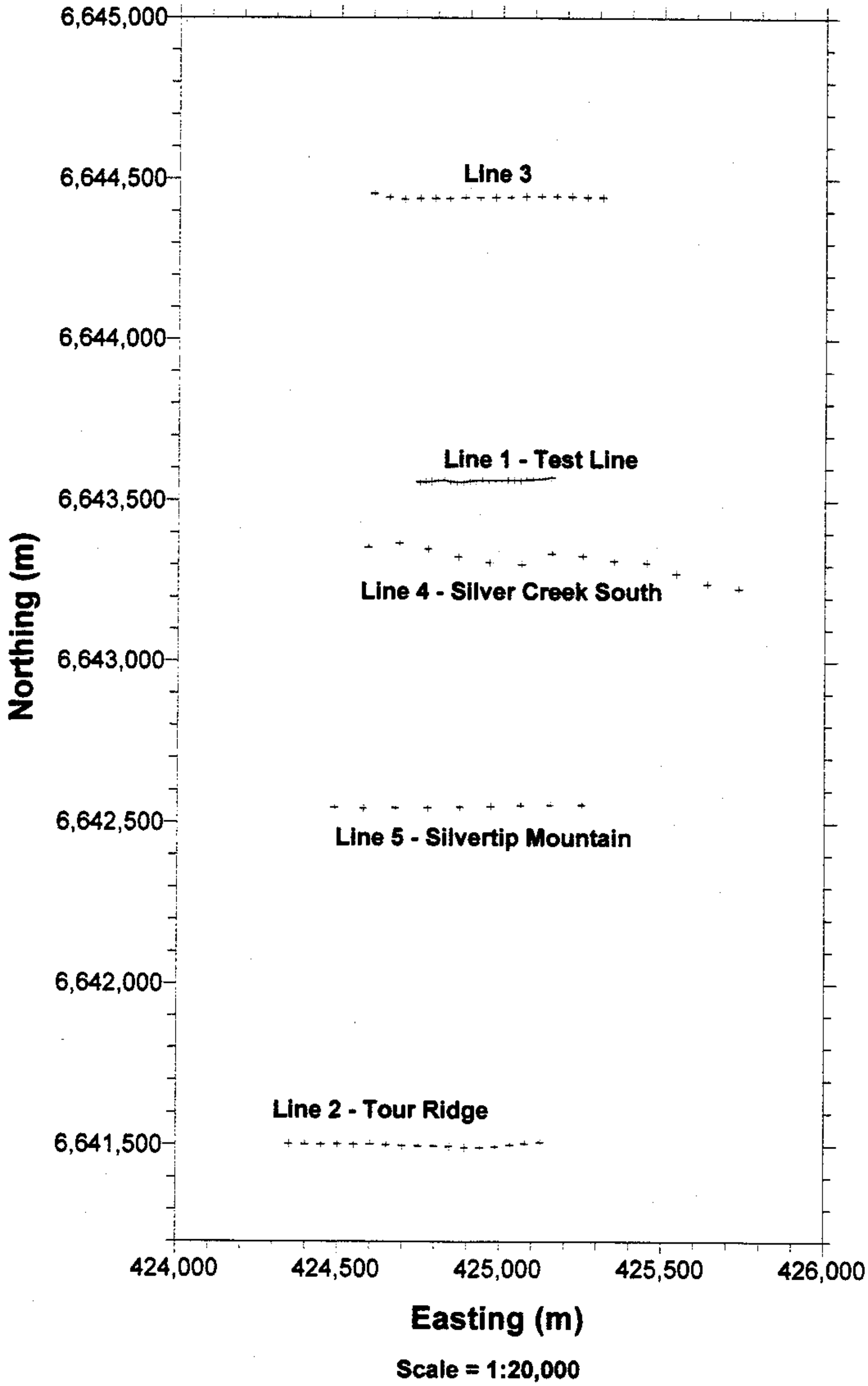
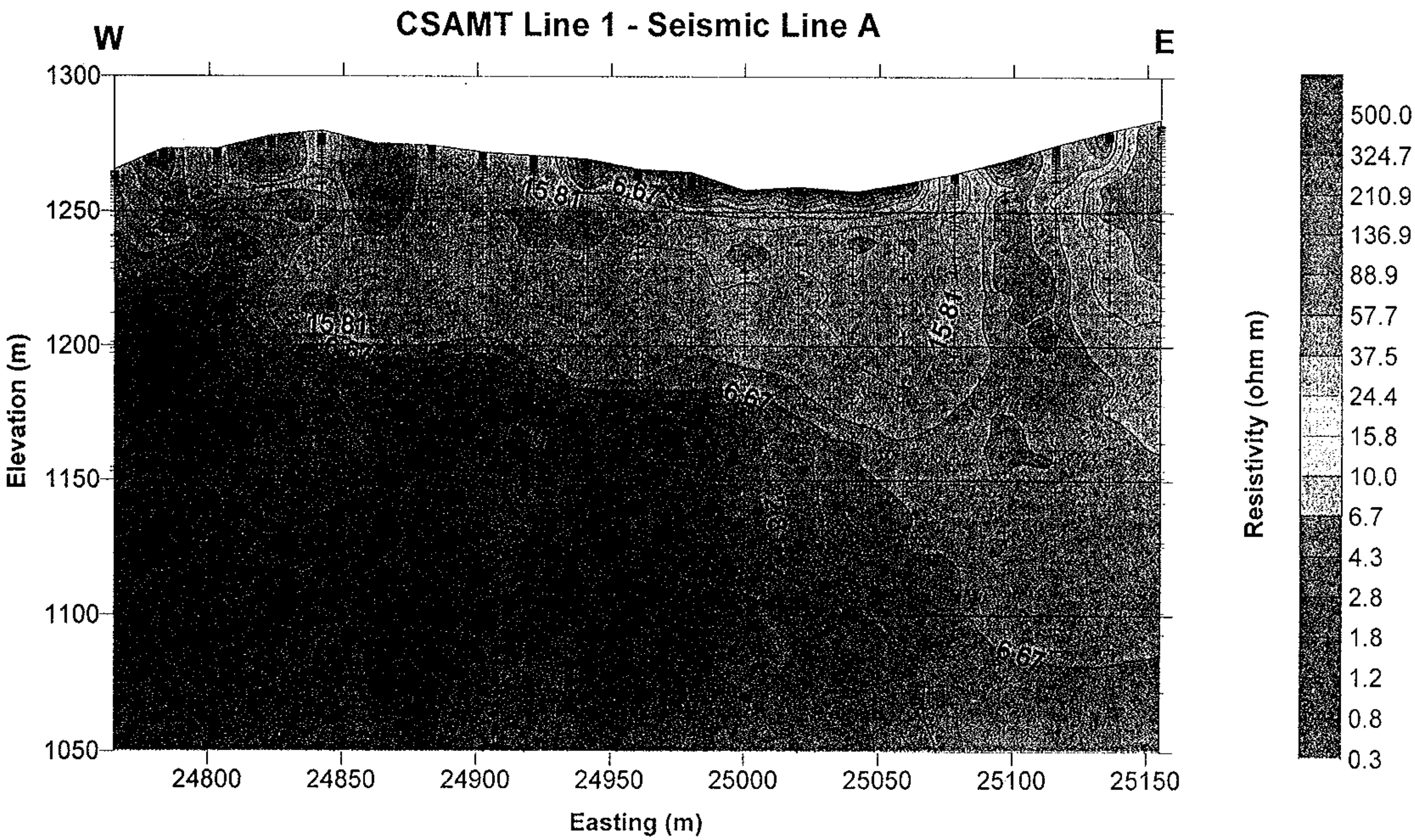
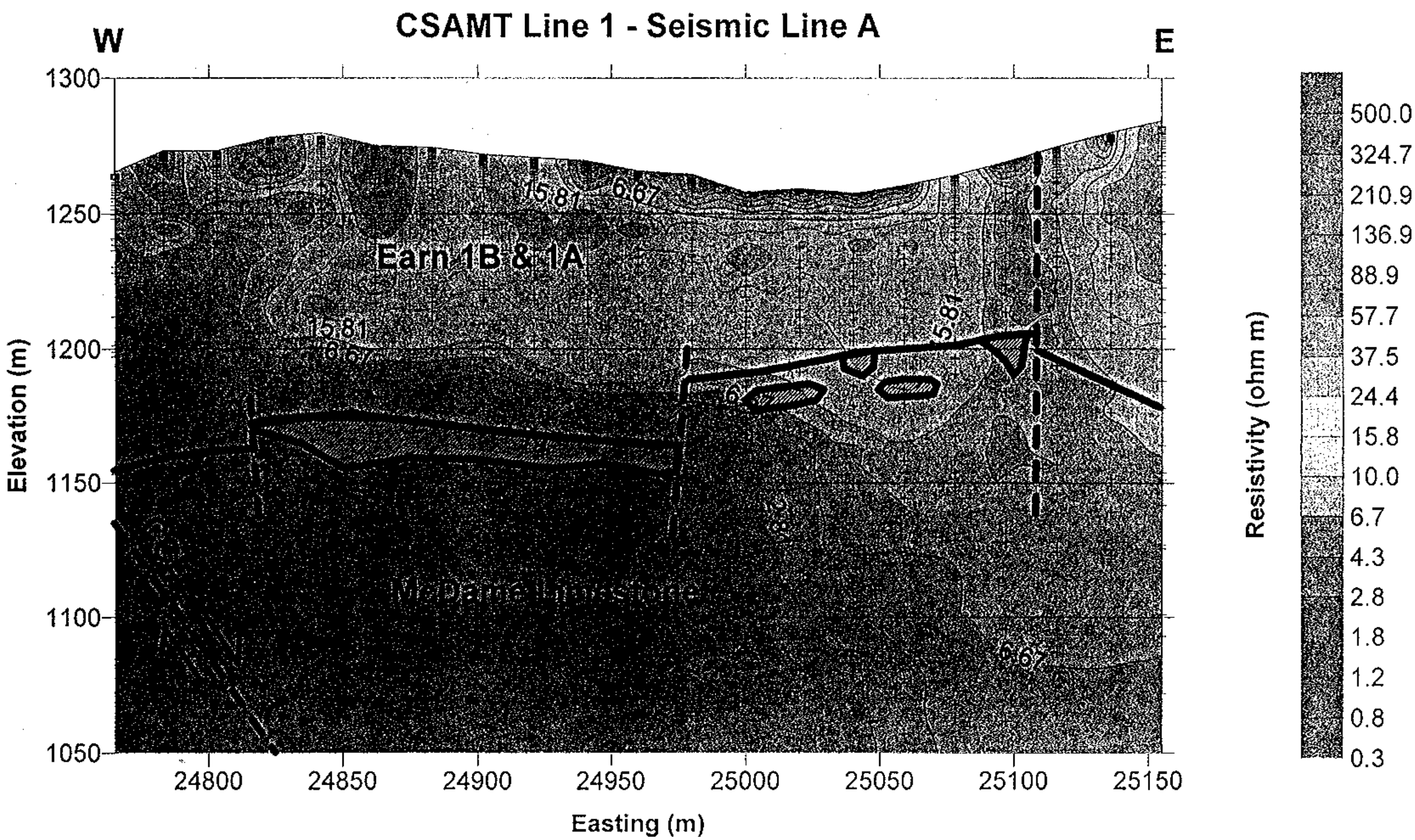


Fig. 2: CSAMT station locations.



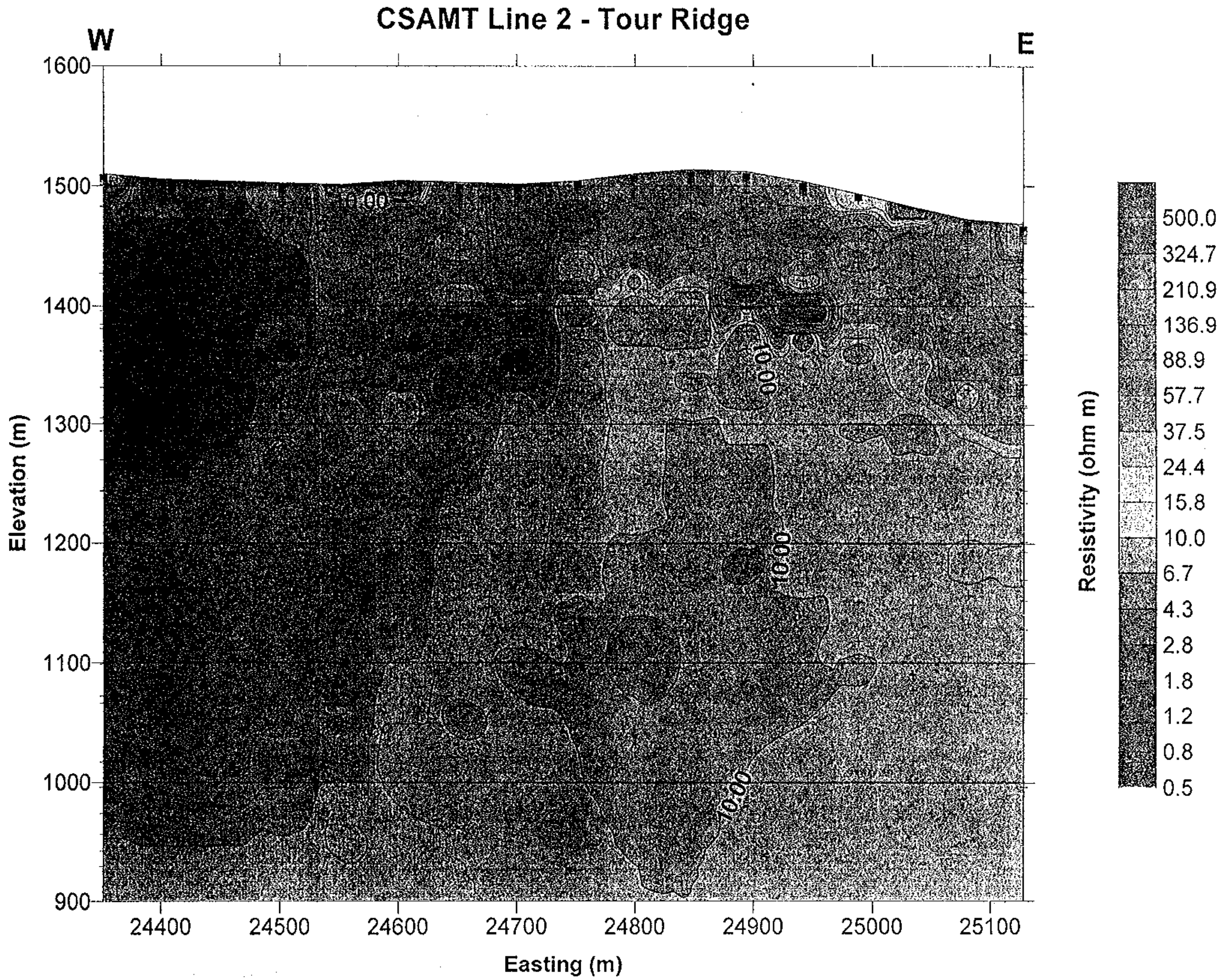
Scale: 1:2500

Fig. 3a: Electrical resistivity distribution beneath Line 1.



Scale: 1:2500

Fig. 3b: Electrical resistivity profile beneath Line 1. Geologic boundaries are shown in black.



Scale: 1:5000

Fig. 4a: Electrical resistivity distribution beneath Line 2, at Tour Ridge.

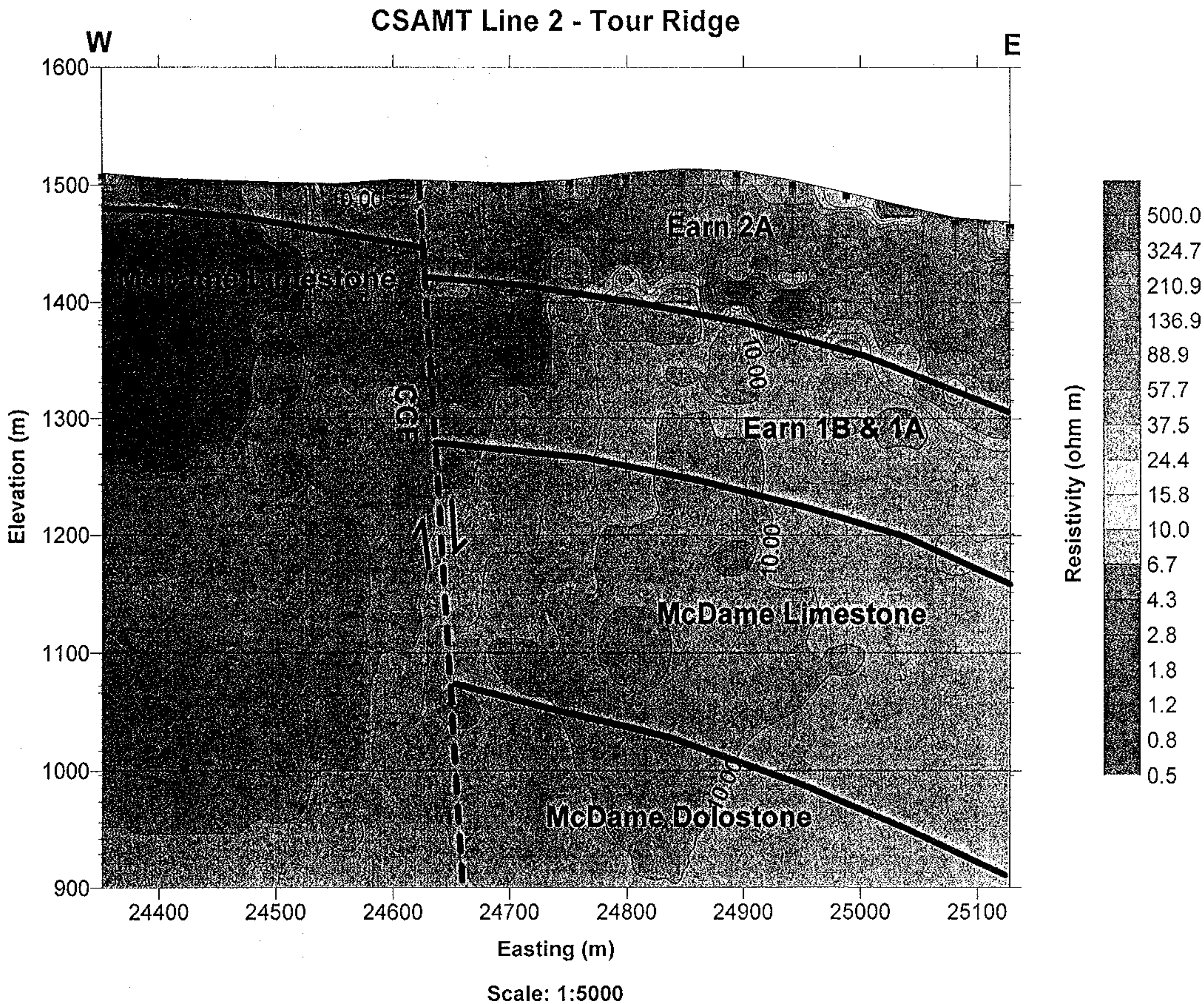


Fig. 4b: Electrical resistivity distribution beneath Line 2, at Tour Ridge. Geologic boundaries are shown in black.

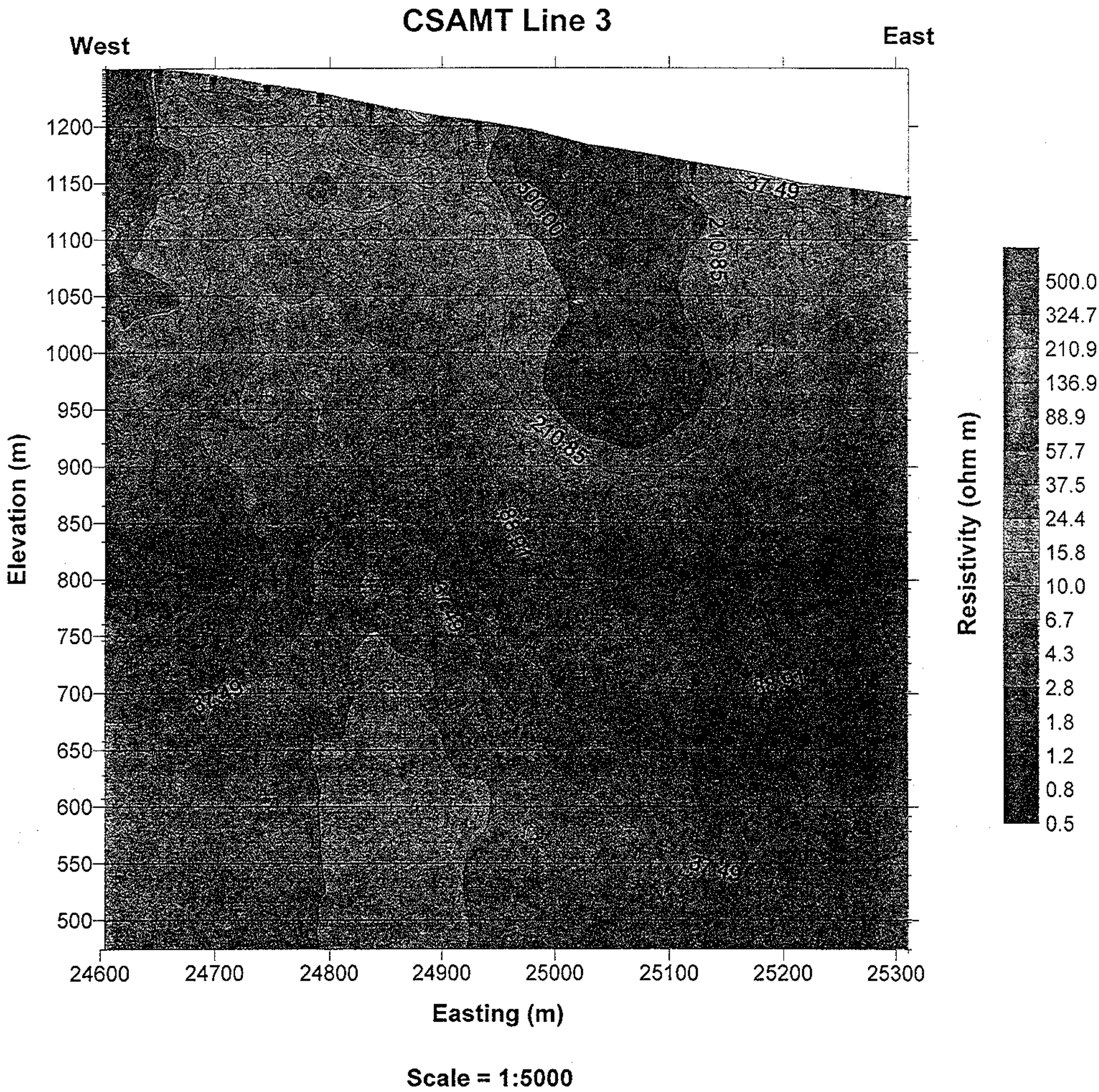


Fig. 5a: Electrical resistivity distribution beneath line 3.

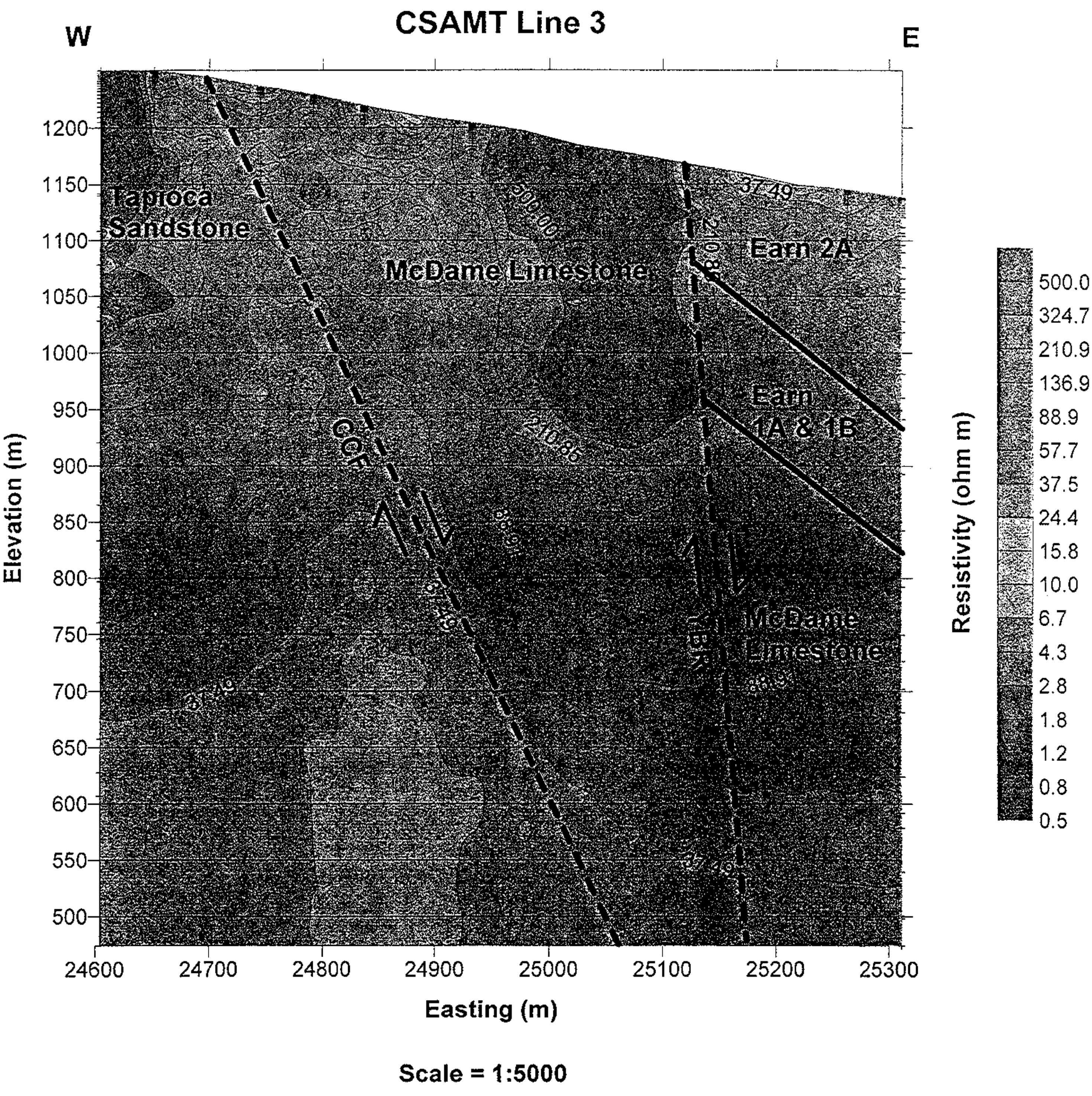


Fig. 5b: Electrical resistivity distribution beneath Line 3. Geologic boundaries are shown in black.

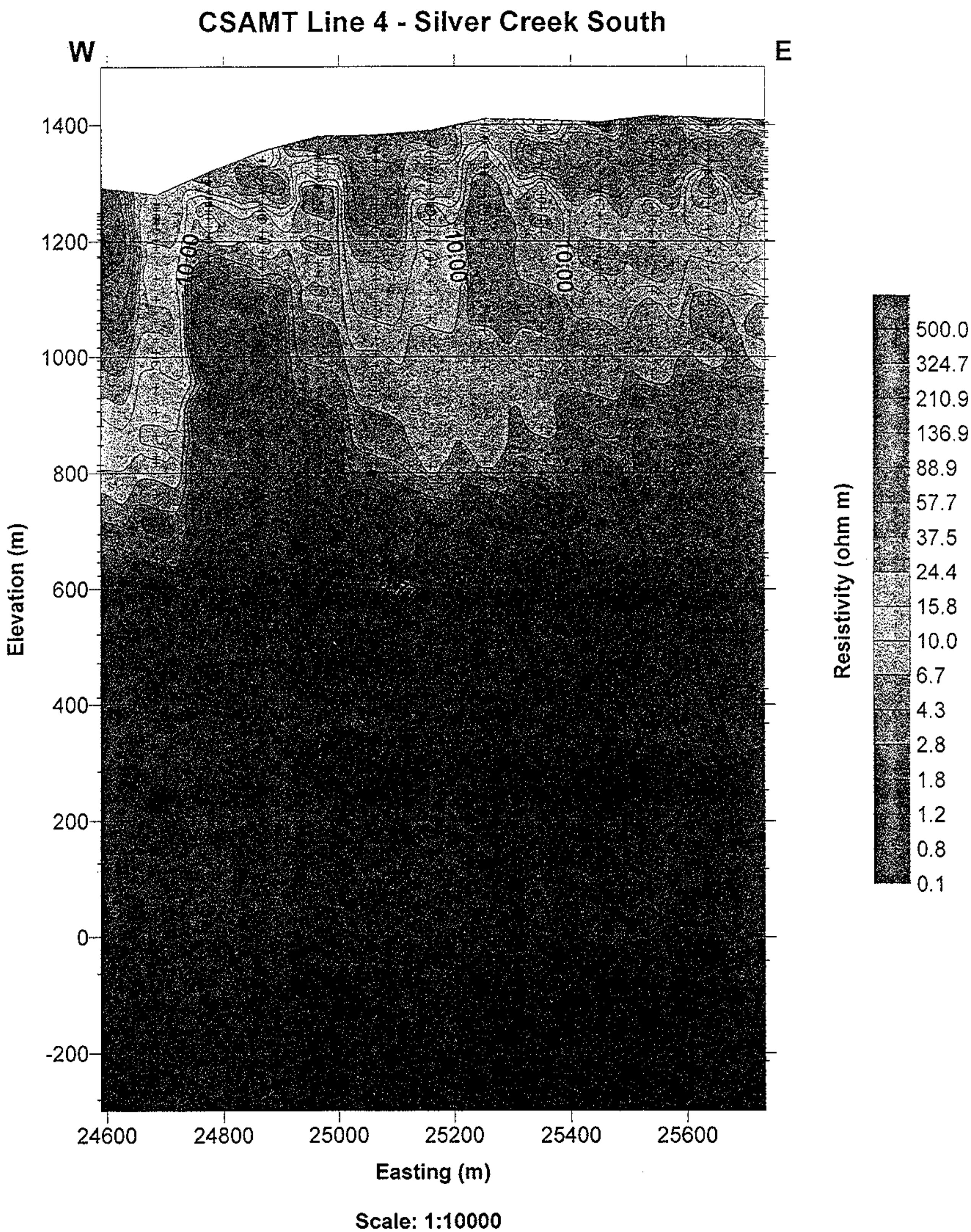


Fig. 6a: Electrical resistivity distribution beneath Line 4, at Silver Creek South.

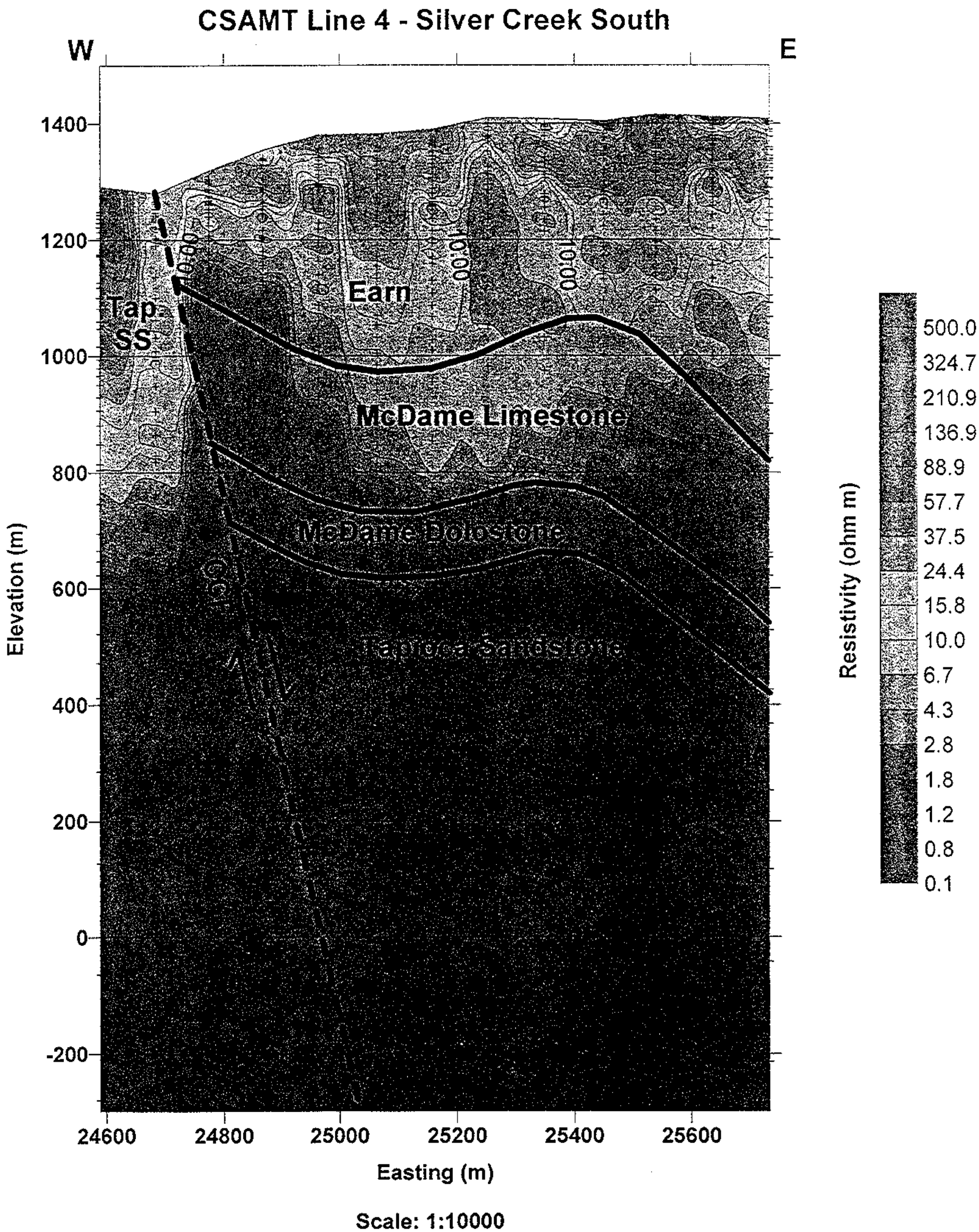


Fig. 6b: Electrical resistivity distribution beneath Line 4, at Silver Creek South. Geologic boundaries are shown in black.

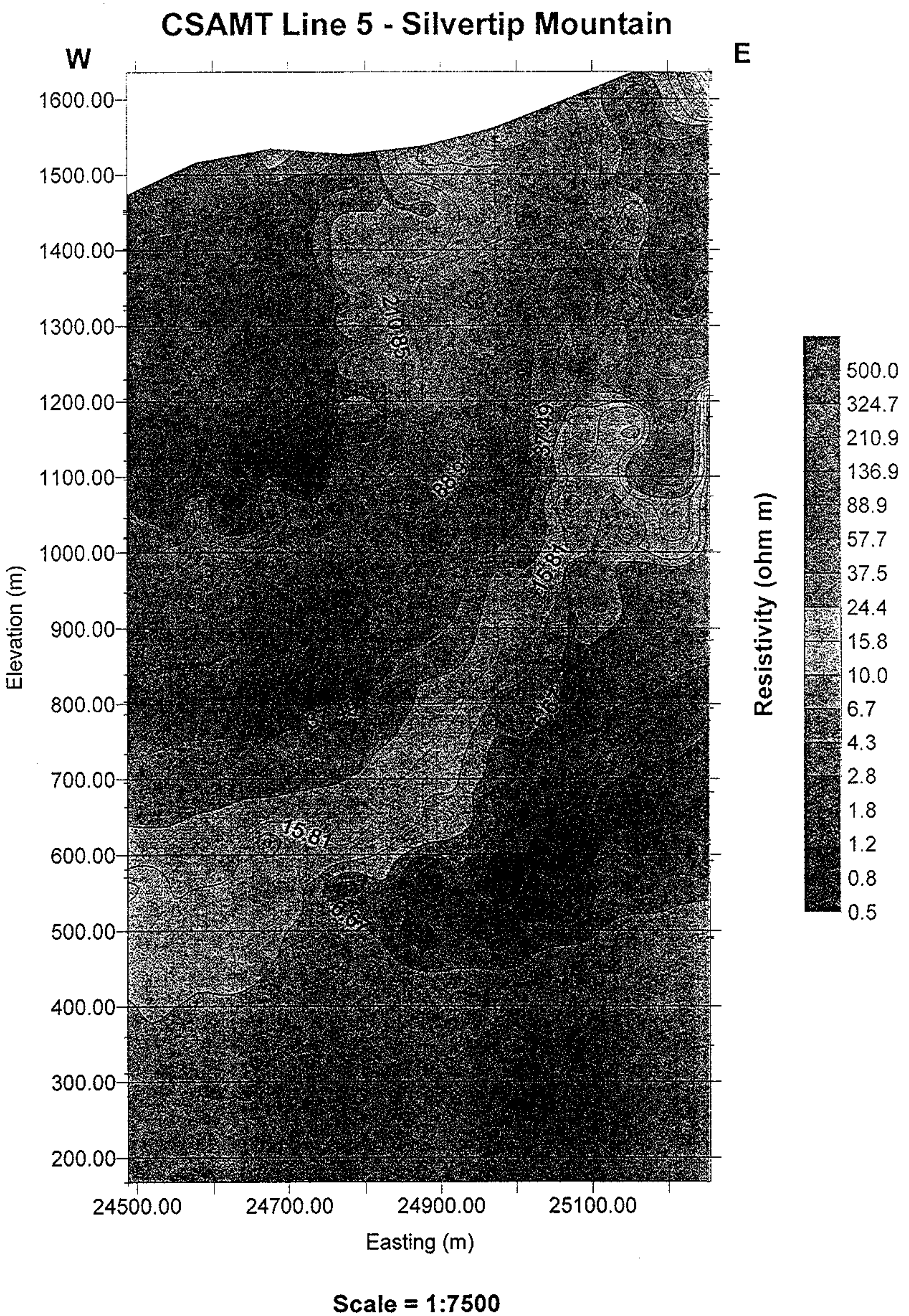
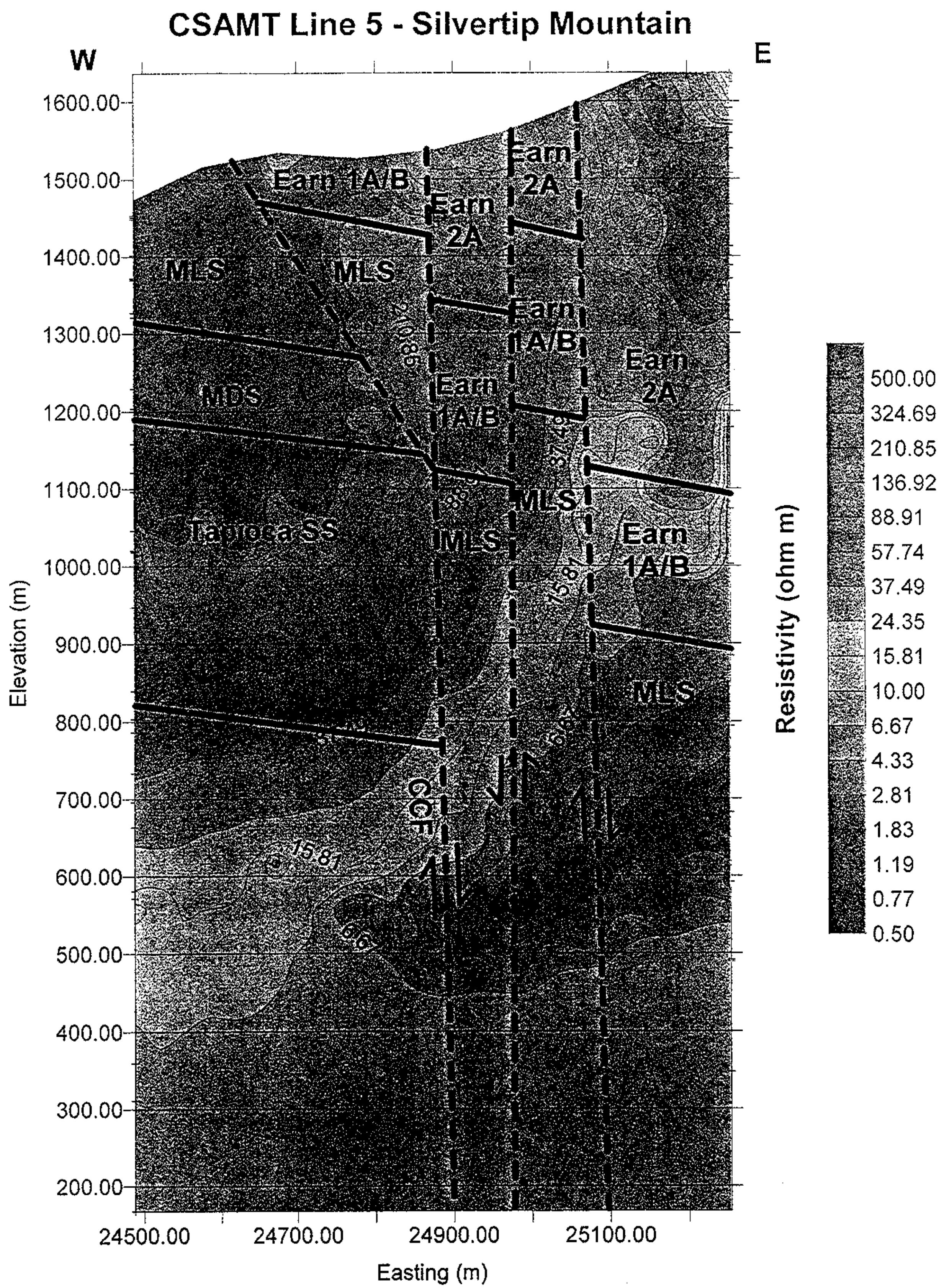


Fig. 7a: Electrical resistivity distribution beneath Line 5, across Silvertip Hill and Silvertip Mountain..



Scale = 1:7500

Fig. 7b: Electrical resistivity distribution beneath Line 5, across Silvertip Hill and Silvertip Mountain. Geologic boundaries are shown in black.

Appendix: CSAMT Station Locations

The following are the locations of the CSAMT stations, as surveyed by Underhill Geomatics Ltd. These data are contained on the diskette marked "Whyte27.out".

Survey Control:

Station	Northing	Easting	Elevation
974	6643864.31	425209.18	1194.35
975	6644003.59	425301.29	1172.23

Line 1:

Station	Northing	Easting	Elevation
1001	6643573.17	425154.65	1284.47
1002	6643568.63	425135.84	1279.58
1003	6643567.28	425116.15	1276.74
1004	6643566.14	425097.32	1269.91
1005	6643565.13	425078.10	1265.85
1006	6643564.13	425058.74	1261.23
1007	6643563.53	425039.71	1259.88
1008	6643563.31	425019.76	1259.57
1009	6643563.06	425000.02	1261.07
1010	6643562.69	424980.31	1264.17
1011	6643562.48	424960.48	1267.97
1012	6643562.48	424940.97	1270.92
1013	6643561.94	424921.16	1271.82
1014	6643560.10	424901.59	1273.40
1015	6643556.52	424883.30	1275.85
1016	6643558.01	424861.99	1276.79
1017	6643559.47	424842.21	1280.40
1018	6643563.48	424822.71	1278.32
1019	6643562.64	424803.32	1274.92
1020	6643559.62	424783.57	1274.00
1021	6643558.63	424765.28	1266.59
1022	6643557.93	424747.53	1257.46

Line 2:

Station	Northing	Easting	Elevation
2001	6641502.50	424351.01	1509.75
2002	6641501.95	424401.02	1506.56
2003	6641502.25	424451.65	1505.76
2004	6641502.45	424501.77	1503.68
2005	6641502.01	424551.56	1502.42
2006	6641502.66	424601.70	1504.92
2007	6641500.30	424651.74	1503.82
2008	6641498.07	424701.44	1502.10
2009	6641496.93	424750.90	1505.64
2010	6641497.02	424799.13	1510.90
2011	6641495.39	424846.81	1514.10
2012	6641492.37	424894.41	1512.84
2013	6641492.14	424941.53	1504.48
2014	6641495.34	424987.82	1493.51
2015	6641501.13	425034.17	1481.58
2016	6641504.77	425080.71	1472.50
2017	6641509.65	425128.07	1467.68

Line 3:

Station	Northing	Easting	Elevation
3001	6644443.02	424931.52	1205.83
3002	6644443.81	424979.34	1197.12
3003	6644443.90	425026.40	1186.49
3004	6644445.44	425073.95	1177.74
3005	6644445.88	425121.09	1168.93
3006	6644445.91	425167.61	1155.36
3007	6644445.57	425214.79	1148.50
3008	6644443.99	425262.52	1146.85
3009	6644443.92	425310.50	1142.99
3010	6644442.01	424884.20	1211.45
3011	6644440.28	424837.12	1220.70
3012	6644439.90	424792.19	1229.52
3013	6644439.76	424744.88	1237.10
3014	6644437.65	424697.68	1245.44
3015	6644443.73	424651.13	1251.81
3016	6644454.47	424603.93	1255.72

Line 4:

Station	Northing	Easting	Elevation
4001	6643355.35	424589.09	1293.54
4002	6643368.69	424684.91	1279.27
4003	6643349.26	424775.16	1318.76
4004	6643326.42	424867.76	1354.81
4005	6643309.24	424964.71	1379.71
4006	6643302.62	425064.11	1381.75
4007	6643336.05	425158.77	1390.57
4008	6643330.02	425252.72	1409.63
4009	6643314.04	425350.28	1406.50
4010	6643308.66	425450.59	1403.66
4011	6643275.30	425541.49	1413.90
4012	6643242.92	425637.28	1412.39
4013	6643227.28	425734.51	1409.07

Line 5:

Station	Northing	Easting	Elevation
5001	6642546.54	424488.17	1472.16
5002	6642544.48	424577.66	1517.26
5003	6642546.45	424676.44	1531.96
5004	6642546.67	424776.28	1527.45
5005	6642547.50	424875.56	1537.22
5006	6642549.90	424971.65	1561.21
5007	6642553.21	425064.22	1598.27
5008	6642554.40	425155.56	1638.55
5009	6642555.76	425253.60	1652.13

YUKON T.
B.C.
425000 E
430000 E
435000 E
6650000 N
6645000 N
6640000 N
6635000 N
N
WAY 9
WAY 8
WAY 7
WAY 3
WAY 2
WAY 1
WAY 35 Fr
WAY 34 Fr
WAY 33 Fr
WAY 32 Fr
WAY 31 Fr
WAY 30 Fr
WAY 29 Fr
WAY 26 Fr
WAY 12
WAY 11
WAY 10
WAY 6
WAY 5
WAY 4
Way 27 Fr
BULL 7
BULL 12 Fr
BULL 8
BULL 28 Fr
BULL 5
BULL 1
BULL 2
WAY 18
WAY 17
WAY 16
Trailer Camp
WAY 25 Fr
BULL 25 Fr
BULL 4 Fr
BULL 24 Fr
BULL 26 Fr
Shop
Drill Camp
Camp
BULL 22
BULL 23
BULL 16
BULL 17
WAY 23
WAY 22
WAY 21
WAY 20
WAY 19
BULL 10
CLIMAX 12
BULL 21
BULL 20
BULL 19
BULL 18
TOOTS 4
WAY 24 Fr
BULL 11 Fr
BULL 27 Fr
Claim Boundary (within B.C.)
BULL 15 Fr
STAR 2 Fr
BETH 4
CLIMAX 7
CLIMAX 1
BETH 1
RENEE 1
CLIMAX 11
STAR 3
CLIMAX 14 Fr
CLIMAX 2
BETH 2
BETH 3
CLIMAX 6
CLIMAX 3
CLIMAX 4
CLIMAX 5
CLIMAX 13
CLIMAX 16
CLIMAX 15
CLIMAX 8
CLIMAX 9
CLIMAX 10
POST 14
POST 16
POST 1
POST 2
POST 4 Fr
POST 5 Fr
POST 15
POST 3
POST 11
POST 12
POST 13
1500
1600
1700
1800
1900
GEOLOGICAL SURVEY BRANCH
25,791
Roads
Legal Corner Post of claim
Coordinates are given in NAD 27 UTM. It is possible that the Yukon data is not transformed to NAD 27, and possibly explains the discrepancy at the BC–Yukon border.
SILVERTIP MINING CORPORATION
Silvertip Property
Claim Map
Map 1
SCALE 1 : 20000
0
800m
1600m
FILE: midcomp_20000.dwg
PLOT FILE: Mid20.plt
DRAWN BY: C. Craig
DATE: December 14, 1998

LEGEND

PALEOZOIC

MISSISSIPPIAN TO PERMIAN

SYLVESTER ALLOCHTHON

uPSA	uPSA Mid-to dark grey, thinly interbedded chert, cherty argillite, slate-phyllite, chloritic phyllite. Minor grey limestone lenses. Local sericitic alteration on Brinco Hill.

UPPER DEVONIAN-MISSISSIPPIAN

EARN GROUP

DME2B	Unit 2B: Conglomerate, pebble to cobble clasts of chert, argillite; massive to thickly bedded; mostly matrix-supported. Sandstone, medium to coarse-grained, well bedded, blocky, flaggy. Minor siltstone, slate interbeds. Within alteration zone: speckled buff-yellow to orange, sericitic matrix and 'bleached' argillite clasts; sericitized sandstone.
DME2A	Unit 2A: Siltstone, slate, shale, 'phyllite'. Dark grey, fine-grained, thinly interbedded, laminated, crenulated. Rusty brown weathering. Subordinate sandstone beds and laminae. 2AP: Disrupted sandstone lenses in laminated silty slate-argillite matrix. 2AC: Calcarenite, grey, platy to flaggy, brown-weathering. 2Aex: Exhalite, pale grey, fine-grained, laminated, siliceous. Local pyrite, sphalerite, galena; generally limonitic to strongly gossanous.
DME1B	Unit 1B: Sandstone, greywacke, siltstone, slate. Mid- to dark grey, moderately well bedded, laminated, blocky to flaggy weathering. Pebbly sandstone to massive conglomerate locally. Within alteration zone: pale creamy-grey, very fine to medium grained, weakly to strongly sericitized phyllite. Rusty, buff-yellow weathering, with limonite.
DME1A	Unit 1A: Argillite, shale-slate, siltstone. Dark grey to black, very fine grained, laminated. Locally pyritic. Blue-grey weathering, very recessive.

MIDDLE (UPPER) DEVONIAN

McDAME GROUP

mDMl	Limestone: Mid- to dark grey, fine to medium-grained with bioclastic texture. Highly fossiliferous with stromatoporoids, corals and brachiopods. Moderately bedded to massive. Local off-white to pink, recrystallized 'bleaching'. Locally buff-brown weathering dolomitization. Local gossanous areas with residual silver-rich galena.
mDMd	Dolostone: Pale to dark buff-grey and mauve-grey, very fine grained. Bedded and cryptalgal laminated; intraclast breccia. Dolomitic limestone (secondary): mottled, streaky grey to pale pink, buff-brown, fine to coarse-grained, crystalline, vague sporadic bioclasts; probably transitional with mDMl.

SILURIAN-DEVONIAN

TAPIOCA SANDSTONE (informal)

SDTS	Dolostone, sandy dolostone, dolomitic quartzite to sandstone to siltstone, dolomitic breccia. Pale creamy buff-grey, fine to medium-grained. Massive to moderately bedded to locally laminated or cross-bedded.

ORDOVICIAN-SILURIAN

ROAD RIVER GROUP

OSRR	Slate, siltstone, limestone. Black, carbonaceous, calcareous and non-calcareous, locally graptolitic. Limestone thin-bedded.

UPPER CAMBRIAN TO LOWER ORDOVICIAN

KECHIKA GROUP

ꞒOK	Limestone, slate, siltstone. Grey, thinly interbedded argillaceous limestone and calcareous slate to siltstone. Monotonous, weakly fossiliferous.

LOWER CAMBRIAN

ATAN GROUP

ROSELLA FORMATION

lꞒR	Limestone, dolomitized limestone, interbedded slate. Archeocyathid-bearing.

SYMBOLS

- Geological contact, approximate
- Geological contact, inferred
- Fault, approximate
- Fault, inferred
- Thrust, approximate; teeth on upper plate
- Relative movement indicator, tick on side moved down
- Area of outcrop exposure
- Area of subsurface mineralization (deposit areas)
- Area of sericitic alteration
- Limit of 1998 mapping
- Bedding, right way up, top unknown
- Foliation or cleavage, normally bedding-parallel
- Crenulation plane
- Elongation lineation
- Crenulation lineation
- Intersection lineation, bedding/foliation
- Fracture
- Fracture-controlled vein
- Line 1 — CSAMT (Magnetotelluric) survey line

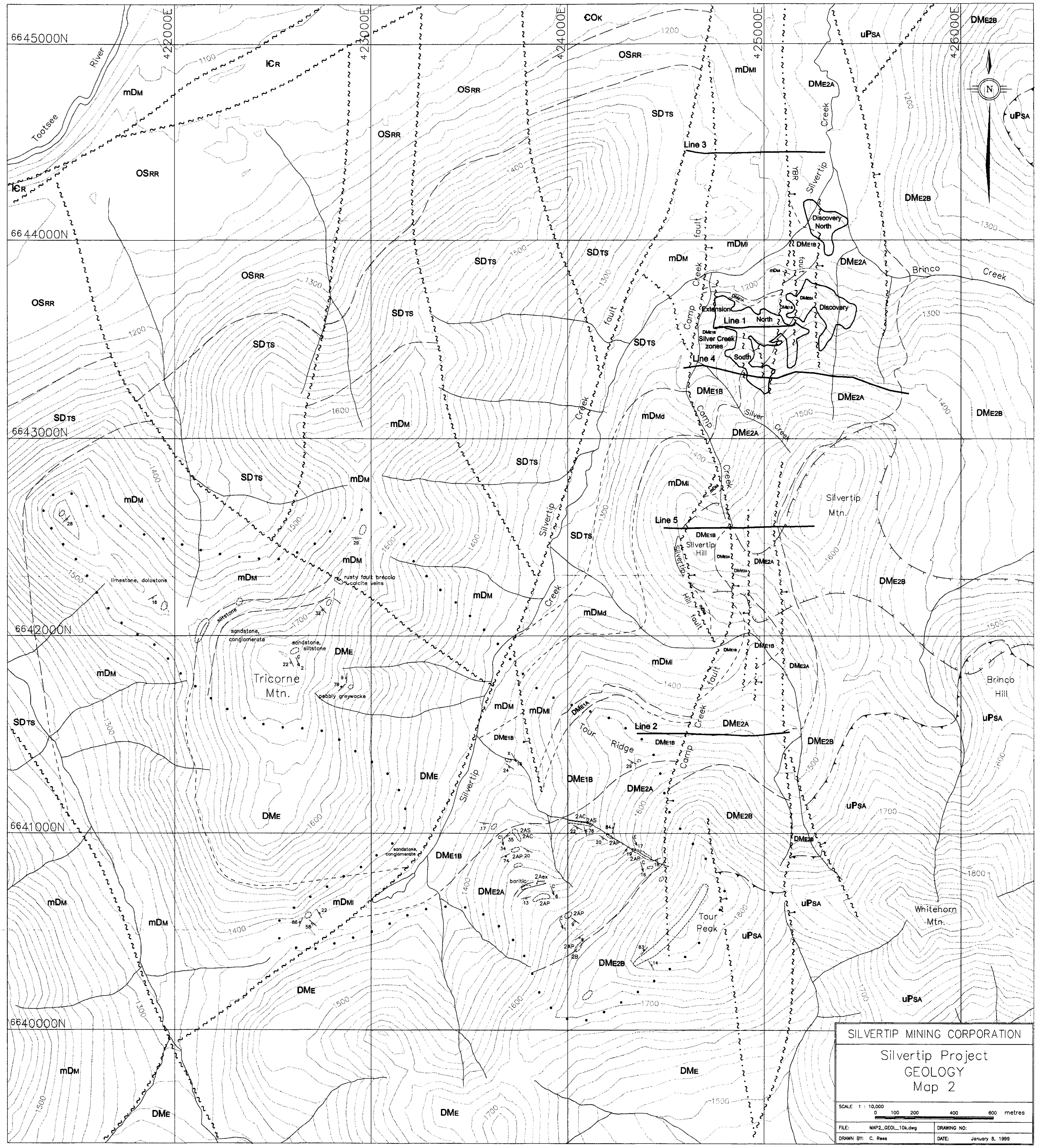
NOTES

Base map derived from TRIM database, reprocessed by McElhanney Consulting Services, 1997

UTM grid is NAD 1927. Grid north is 1° west of true north.

Geology outside limit of 1998 mapping from SMC 1997 Summary Report, and Nelson and Bradford, B.C. Energy, Mines and Petroleum Resources, Open File 1987-5.

Map accompanies SMC 1998 Summary Report, January 1999.



SILVERTIP MINING CORPORATION

Silvertip Project
GEOLOGY
Map 2

SCALE 1 : 10,000 (0 100 200 400 600 metres)	
FILE: MAP2_GEOL_10k.dwg	DRAWING NO:
DRAWN BY: C. Rees	DATE: January 8, 1999

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